

ASTRONOMY 2020

Supplementary Information

PERTH

Quasar Publishing
Version 1.0

This year for our thirtieth edition we have made some changes. As part of this we have removed some data from the yearbook.

To decide what could be taken out we reviewed how the people, who value our book, participate in the hobby and how has this evolved over the years. For the true beginners with little more than a sense of wonder and a thirst to know, we believe they are well catered for in Astronomy 2020.

Telescope users have become polarised into two camps. There are those we call the pure observers who, with some knowledge, spend their money on the optics, taking a more low cost approach to their mounts. Then there are the people who ride the back of the technology revolution turning to computer controlled scopes, now much more affordable instruments, that can automatically slew to an object selected from its database.

Keeping this in mind, we had a hard look at the sea of numbers in Part II. Printed rise and set times for all the planets are not used by the beginner or pure observer and not needed by the techies. Besides, no one observes the planets (or anything) close to the horizon unless they have to. For this reason we

believe the approximate times given in the Rise–Set charts in Part I should suffice. Often the transit times for the outer planets are more valuable, when the planet is high in the northern sky with minimal atmospheric turbulence. Using the same reasoning, the position tables of the Sun, Moon and planets are either not used or not necessary.

When we started these books in 1990 there was no internet (believe it or not!), so some of the information we supplied wasn't easily obtainable elsewhere. Today a lot is available either online, from computer programmes or through cheap (or free) astronomy/planetarium apps on mobile devices. The lunar occultation tables are no longer included as the Occult software (written by Australian David Herald) is readily available for download and it can tailor event times for your location. Nevertheless, if you still need this information it is now available here.

The data on the following pages (available for download from our web site) is supplementary to the yearbook ASTRONOMY 2020 that we published in October 2019. Note there is a separate PDF for each capital city in Australia.

www.quasarastronomy.com.au/downloads---2020.html

In the event you are reading this and don't know what the yearbook we are referring to is, have a look here.

www.quasarastronomy.com.au/order.html

GEOCENTRIC POSITION of the SUN

(0 hr UT, Epoch 2000.0)

	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE	
	RA hh mm.m	Dec. ° ' "	RA hh mm.m	Dec ° ' "	RA hh mm.m	Dec ° ' "	RA hh mm.m	Dec ° ' "	RA hh mm.m	Dec ° ' "	RA hh mm.m	Dec ° ' "
1	18 42.4	-23 04.8	20 55.0	-17 23.1	22 48.4	-07 35.6	00 42.1	+04 31.9	02 33.6	+15 04.1	04 36.4	+22 02.9
2	18 46.8	-23 00.1	20 59.1	-17 06.2	22 52.1	-07 12.8	00 45.8	+04 55.0	02 37.4	+15 22.1	04 40.5	+22 10.8
3	18 51.2	-22 54.9	21 03.2	-16 49.0	22 55.8	-06 49.8	00 49.4	+05 18.0	02 41.2	+15 39.9	04 44.6	+22 18.4
4	18 55.6	-22 49.3	21 07.2	-16 31.5	22 59.6	-06 26.8	00 53.1	+05 40.9	02 45.1	+15 57.4	04 48.7	+22 25.6
5	19 00.0	-22 43.2	21 11.3	-16 13.7	23 03.3	-06 03.7	00 56.7	+06 03.8	02 48.9	+16 14.6	04 52.8	+22 32.4
6	19 04.4	-22 36.7	21 15.3	-15 55.6	23 07.0	-05 40.4	01 00.4	+06 26.5	02 52.8	+16 31.6	04 57.0	+22 38.8
7	19 08.8	-22 29.7	21 19.3	-15 37.3	23 10.7	-05 17.2	01 04.0	+06 49.1	02 56.6	+16 48.3	05 01.1	+22 44.8
8	19 13.2	-22 22.3	21 23.3	-15 18.7	23 14.4	-04 53.8	01 07.7	+07 11.6	03 00.5	+17 04.7	05 05.2	+22 50.4
9	19 17.5	-22 14.4	21 27.3	-14 59.8	23 18.1	-04 30.4	01 11.4	+07 33.9	03 04.4	+17 20.9	05 09.4	+22 55.6
10	19 21.9	-22 06.1	21 31.3	-14 40.7	23 21.8	-04 06.9	01 15.0	+07 56.2	03 08.3	+17 36.7	05 13.5	+23 00.4
11	19 26.3	-21 57.4	21 35.3	-14 21.3	23 25.5	-03 43.4	01 18.7	+08 18.3	03 12.2	+17 52.3	05 17.6	+23 04.8
12	19 30.6	-21 48.3	21 39.2	-14 01.7	23 29.1	-03 19.8	01 22.4	+08 40.3	03 16.1	+18 07.5	05 21.8	+23 08.7
13	19 34.9	-21 38.7	21 43.2	-13 41.9	23 32.8	-02 56.2	01 26.1	+09 02.1	03 20.1	+18 22.5	05 25.9	+23 12.3
14	19 39.3	-21 28.7	21 47.1	-13 21.8	23 36.5	-02 32.5	01 29.8	+09 23.8	03 24.0	+18 37.1	05 30.1	+23 15.5
15	19 43.6	-21 18.3	21 51.0	-13 01.5	23 40.2	-02 08.9	01 33.5	+09 45.3	03 28.0	+18 51.4	05 34.2	+23 18.3
16	19 47.9	-21 07.5	21 54.9	-12 41.0	23 43.8	-01 45.2	01 37.2	+10 06.7	03 31.9	+19 05.4	05 38.4	+23 20.6
17	19 52.2	-20 56.3	21 58.8	-12 20.3	23 47.5	-01 21.5	01 40.9	+10 27.9	03 35.9	+19 19.1	05 42.5	+23 22.6
18	19 56.4	-20 44.6	22 02.7	-11 59.4	23 51.1	-00 57.7	01 44.6	+10 48.9	03 39.9	+19 32.5	05 46.7	+23 24.1
19	20 00.7	-20 32.6	22 06.5	-11 38.3	23 54.8	-00 34.0	01 48.3	+11 09.7	03 43.8	+19 45.5	05 50.9	+23 25.2
20	20 05.0	-20 20.2	22 10.4	-11 17.1	23 58.4	-00 10.3	01 52.0	+11 30.4	03 47.8	+19 58.2	05 55.0	+23 25.9
21	20 09.2	-20 07.4	22 14.2	-10 55.6	00 02.1	+00 13.4	01 55.8	+11 50.9	03 51.8	+20 10.6	05 59.2	+23 26.2
22	20 13.4	-19 54.2	22 18.1	-10 34.0	00 05.7	+00 37.1	01 59.5	+12 11.2	03 55.8	+20 22.6	06 03.4	+23 26.1
23	20 17.7	-19 40.7	22 21.9	-10 12.2	00 09.4	+01 00.8	02 03.3	+12 31.3	03 59.9	+20 34.3	06 07.5	+23 25.5
24	20 21.9	-19 26.8	22 25.7	-09 50.2	00 13.0	+01 24.4	02 07.0	+12 51.1	04 03.9	+20 45.6	06 11.7	+23 24.6
25	20 26.1	-19 12.5	22 29.5	-09 28.1	00 16.6	+01 48.1	02 10.8	+13 10.8	04 07.9	+20 56.5	06 15.8	+23 23.2
26	20 30.2	-18 57.9	22 33.3	-09 05.9	00 20.3	+02 11.6	02 14.6	+13 30.3	04 12.0	+21 07.1	06 20.0	+23 21.4
27	20 34.4	-18 42.9	22 37.1	-08 43.5	00 23.9	+02 35.2	02 18.4	+13 49.5	04 16.0	+21 17.3	06 24.1	+23 19.3
28	20 38.6	-18 27.6	22 40.8	-08 21.0	00 27.6	+02 58.6	02 22.1	+14 08.5	04 20.1	+21 27.2	06 28.3	+23 16.7
29	20 42.7	-18 12.0	22 44.6	-07 58.4	00 31.2	+03 22.0	02 25.9	+14 27.3	04 24.2	+21 36.7	06 32.4	+23 13.6
30	20 46.8	-17 56.0			00 34.8	+03 45.4	02 29.8	+14 45.8	04 28.3	+21 45.8	06 36.6	+23 10.2
31	20 50.9	-17 39.7			00 38.5	+04 08.7			04 32.3	+21 54.5		
	JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
1	06 40.7	+23 06.4	08 45.5	+18 01.3	10 41.4	+08 17.5	12 29.4	-03 10.3	14 25.4	-14 24.8	16 29.0	-21 47.5
2	06 44.8	+23 02.2	08 49.3	+17 46.1	10 45.0	+07 55.7	12 33.0	-03 33.5	14 29.4	-14 43.9	16 33.4	-21 56.6
3	06 49.0	+22 57.6	08 53.2	+17 30.6	10 48.7	+07 33.7	12 36.6	-03 56.7	14 33.3	-15 02.7	16 37.7	-22 05.3
4	06 53.1	+22 52.5	08 57.1	+17 14.8	10 52.3	+07 11.7	12 40.2	-04 19.9	14 37.2	-15 21.3	16 42.0	-22 13.6
5	06 57.2	+22 47.1	09 00.9	+16 58.7	10 55.9	+06 49.5	12 43.9	-04 43.0	14 41.2	-15 39.7	16 46.4	-22 21.5
6	07 01.3	+22 41.3	09 04.7	+16 42.3	10 59.5	+06 27.2	12 47.5	-05 06.0	14 45.2	-15 57.8	16 50.7	-22 28.9
7	07 05.4	+22 35.1	09 08.6	+16 25.7	11 03.1	+06 04.8	12 51.2	-05 29.0	14 49.2	-16 15.7	16 55.1	-22 35.9
8	07 09.5	+22 28.5	09 12.4	+16 08.8	11 06.7	+05 42.3	12 54.8	-05 51.9	14 53.2	-16 33.2	16 59.5	-22 42.4
9	07 13.6	+22 21.5	09 16.2	+15 51.7	11 10.3	+05 19.8	12 58.5	-06 14.8	14 57.2	-16 50.5	17 03.9	-22 48.6
10	07 17.7	+22 14.1	09 20.0	+15 34.3	11 13.9	+04 57.1	13 02.2	-06 37.5	15 01.2	-17 07.6	17 08.2	-22 54.2
11	07 21.8	+22 06.4	09 23.8	+15 16.6	11 17.5	+04 34.3	13 05.8	-07 00.2	15 05.3	-17 24.3	17 12.6	-22 59.4
12	07 25.9	+21 58.2	09 27.6	+14 58.7	11 21.1	+04 11.5	13 09.5	-07 22.8	15 09.3	-17 40.7	17 17.1	-23 04.2
13	07 29.9	+21 49.7	09 31.3	+14 40.6	11 24.7	+03 48.5	13 13.2	-07 45.3	15 13.4	-17 56.8	17 21.5	-23 08.5
14	07 34.0	+21 40.8	09 35.1	+14 22.2	11 28.3	+03 25.6	13 16.9	-08 07.6	15 17.5	-18 12.6	17 25.9	-23 12.3
15	07 38.0	+21 31.6	09 38.8	+14 03.6	11 31.8	+03 02.5	13 20.7	-08 29.9	15 21.6	-18 28.1	17 30.3	-23 15.7
16	07 42.1	+21 22.0	09 42.6	+13 44.8	11 35.4	+02 39.4	13 24.4	-08 52.1	15 25.7	-18 43.3	17 34.7	-23 18.6
17	07 46.1	+21 12.0	09 46.3	+13 25.7	11 39.0	+02 16.2	13 28.1	-09 14.1	15 29.8	-18 58.1	17 39.2	-23 21.0
18	07 50.1	+21 01.6	09 50.0	+13 06.5	11 42.6	+01 53.0	13 31.9	-09 36.0	15 34.0	-19 12.6	17 43.6	-23 23.0
19	07 54.1	+20 50.9	09 53.8	+12 47.0	11 46.2	+01 29.8	13 35.6	-09 57.7	15 38.1	-19 26.8	17 48.0	-23 24.5
20	07 58.2	+20 39.9	09 57.5	+12 27.3	11 49.8	+01 06.5	13 39.4	-10 19.3	15 42.3	-19 40.6	17 52.5	-23 25.5
21	08 02.2	+20 28.5	10 01.2	+12 07.4	11 53.4	+00 43.2	13 43.2	-10 40.8	15 46.5	-19 54.0	17 56.9	-23 26.1
22	08 06.1	+20 16.7	10 04.9	+11 47.4	11 57.0	+00 19.8	13 46.9	-11 02.1	15 50.7	-20 07.1	18 01.4	-23 26.2
23	08 10.1	+20 04.6	10 08.6	+11 27.1	12 00.5	-00 03.5	13 50.7	-11 23.2	15 54.9	-20 19.8	18 05.8	-23 25.8
24	08 14.1	+19 52.2	10 12.2	+11 06.7	12 04.1	-00 26.9	13 54.5	-11 44.2	15 59.1	-20 32.1	18 10.2	-23 25.0
25	08 18.0	+19 39.4	10 15.9	+10 46.1	12 07.7	-00 50.3	13 58.4	-12 04.9	16 03.4	-20 44.1	18 14.7	-23 23.6
26	08 22.0	+19 26.4	10 19.6	+10 25.3	12 11.3	-01 13.6	14 02.2	-12 25.5	16 07.6	-20 55.7	18 19.1	-23 21.8
27	08 25.9	+19 13.0	10 23.2	+10 04.4	12 14.9	-01 37.0	14 06.0	-12 45.9	16 11.9	-21 06.8	18 23.5	-23 19.6
28	08 29.9	+18 59.2	10 26.9	+09 43.3	12 18.5	-02 00.3	14 09.9	-13 06.1	16 16.1	-21 17.6	18 28.0	-23 16.9
29	08 33.8	+18 45.2	10 30.5	+09 22.1	12 22.1	-02 23.7	14 13.8	-13 26.1	16 20.4	-21 28.0	18 32.4	-23 13.7
30	08 37.7	+18 30.9	10 34.2	+09 00.7	12 25.8	-02 47.0	14 17.6	-13 45.9	16 24.7	-21 37.9	18 36.8	-23 10.0
31	08 41.6	+18 16.2	10 37.8	+08 39.1			14 21.5	-14 05.4			18 41.3	-23 05.9

GEOCENTRIC POSITION of the MOON

(0 hr UT, Epoch 2000.0)

	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE	
	RA	Dec.	RA	Dec	RA	Dec	RA	Dec	RA	Dec	RA	Dec
	hh mm.m	° ' "	hh mm.m	° ' "	hh mm.m	° ' "	hh mm.m	° ' "	hh mm.m	° ' "	hh mm.m	° ' "
1	23 15.7	-10 04.9	01 56.6	+06 46.5	03 13.9	+14 13.4	06 27.4	+23 37.5	09 04.4	+20 22.1	12 27.9	+02 40.0
2	00 00.0	-05 39.9	02 41.8	+11 10.9	04 02.4	+17 50.3	07 24.8	+23 29.6	10 00.8	+16 43.7	13 20.9	-03 14.0
3	00 43.6	-01 03.0	03 29.3	+15 13.3	04 53.8	+20 44.1	08 23.3	+22 00.0	10 56.2	+12 02.6	14 14.9	-09 00.5
4	01 27.4	+03 37.9	04 19.7	+18 41.7	05 48.4	+22 41.2	09 21.9	+19 08.2	11 50.9	+06 33.8	15 10.8	-14 17.5
5	02 12.2	+08 14.3	05 13.5	+21 21.6	06 45.9	+23 27.7	10 19.9	+15 01.0	12 45.4	+00 36.4	16 08.8	-18 42.6
6	02 58.9	+12 36.6	06 10.9	+22 57.1	07 45.6	+22 52.3	11 17.0	+09 52.2	13 40.4	-05 27.3	17 08.8	-21 55.9
7	03 48.4	+16 32.8	07 11.0	+23 13.3	08 46.2	+20 49.4	12 13.3	+04 01.5	14 36.7	-11 12.9	18 09.6	-23 43.8
8	04 41.2	+19 48.4	08 12.5	+22 00.9	09 46.5	+17 21.9	13 09.3	-02 06.9	15 34.6	-16 15.6	19 09.8	-24 02.0
9	05 37.5	+22 06.7	09 14.0	+19 19.3	10 45.6	+12 42.2	14 05.6	-08 07.1	16 34.0	-20 13.3	20 07.9	-22 55.6
10	06 36.8	+23 11.7	10 14.1	+15 18.9	11 43.2	+07 10.3	15 02.7	-13 33.5	17 34.5	-22 50.0	21 02.9	-20 37.3
11	07 37.9	+22 51.3	11 12.0	+10 18.5	12 39.5	+01 11.1	16 00.8	-18 03.9	18 34.7	-23 58.3	21 54.4	-17 22.6
12	08 39.2	+21 02.1	12 08.0	+04 41.5	13 35.1	-04 49.5	16 59.7	-21 21.6	19 33.2	-23 40.2	22 42.8	-13 26.7
13	09 39.1	+17 50.8	13 02.3	-01 07.9	14 30.6	-10 27.0	17 58.6	-23 17.3	20 29.0	-22 05.5	23 28.6	-09 02.9
14	10 36.8	+13 32.8	13 55.9	-06 47.5	15 26.5	-15 20.4	18 56.5	-23 49.5	21 21.6	-19 27.6	00 12.8	-04 22.1
15	11 32.1	+08 28.0	14 49.5	-11 57.8	16 23.0	-19 13.5	19 52.5	-23 03.5	22 11.1	-16 00.8	00 56.1	+00 26.6
16	12 25.5	+02 57.6	15 43.6	-16 22.9	17 19.9	-21 55.2	20 45.9	-21 09.2	22 57.8	-11 58.2	01 39.4	+05 14.5
17	13 17.8	-02 38.4	16 38.5	-19 49.7	18 16.7	-23 20.0	21 36.5	-18 18.6	23 42.5	-07 31.0	02 23.8	+09 53.1
18	14 09.8	-08 01.8	17 34.1	-22 08.9	19 12.5	-23 28.1	22 24.4	-14 43.9	00 26.1	-02 48.7	03 10.0	+14 12.4
19	15 02.4	-12 56.1	18 29.9	-23 14.9	20 06.7	-22 24.3	23 10.1	-10 36.4	01 09.3	+01 59.7	03 58.7	+18 00.8
20	15 56.0	-17 06.2	19 25.1	-23 07.2	20 58.7	-20 17.3	23 54.3	-06 06.4	01 52.9	+06 45.4	04 50.2	+21 04.8
21	16 51.0	-20 18.9	20 18.9	-21 49.9	21 48.3	-17 17.4	00 37.7	-01 23.3	02 37.9	+11 18.8	05 44.7	+23 10.3
22	17 47.1	-22 23.5	21 10.6	-19 31.1	22 35.6	-13 35.9	01 21.1	+03 23.6	03 24.8	+15 29.0	06 41.5	+24 04.3
23	18 43.4	-23 14.0	22 00.0	-16 21.4	23 21.1	-09 23.8	02 05.0	+08 04.8	04 14.1	+19 03.7	07 39.6	+23 38.2
24	19 39.1	-22 49.7	22 47.2	-12 32.6	00 05.2	-04 51.5	02 50.3	+12 30.2	05 06.2	+21 49.4	08 37.6	+21 49.9
25	20 33.1	-21 16.0	23 32.5	-08 16.0	00 48.6	-00 08.9	03 37.6	+16 28.6	06 00.8	+23 33.3	09 34.6	+18 45.0
26	21 24.7	-18 42.6	00 16.5	-03 42.4	01 32.0	+04 34.4	04 27.2	+19 48.1	06 57.2	+24 04.5	10 29.7	+14 35.2
27	22 13.8	-15 21.4	00 59.9	+00 58.4	02 16.2	+09 09.0	05 19.3	+22 16.3	07 54.4	+23 17.1	11 23.2	+09 35.8
28	23 00.6	-11 24.8	01 43.4	+05 37.4	03 01.7	+13 24.9	06 13.9	+23 41.2	08 51.4	+21 10.8	12 15.4	+04 04.1
29	23 45.5	-07 04.2	02 27.8	+10 05.5	03 49.2	+17 11.4	07 10.1	+23 53.3	09 47.3	+17 51.6	13 07.3	-01 42.1
30	00 29.3	-02 29.6			04 39.3	+20 17.2	08 07.3	+22 47.1	10 41.8	+13 30.3	13 59.6	-07 24.5
31	01 12.7	+02 10.1			05 32.1	+22 29.9			11 35.2	+08 20.9		
	JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
1	14 53.4	-12 43.9	18 28.3	-24 00.6	21 54.1	-17 18.8	00 01.8	-05 14.6	02 45.6	+12 43.1	04 57.9	+22 18.2
2	15 49.2	-17 20.6	19 26.7	-23 51.1	22 42.7	-13 17.1	00 45.3	-00 19.1	03 31.8	+16 48.1	05 50.7	+24 11.0
3	16 47.1	-20 55.7	20 23.5	-22 22.0	23 29.0	-08 45.8	01 28.6	+04 35.7	04 20.2	+20 14.3	06 45.4	+24 54.3
4	17 46.7	-23 13.6	21 17.7	-19 44.1	00 13.6	-03 57.6	02 12.3	+09 19.8	05 10.9	+22 50.0	07 40.9	+24 21.8
5	18 46.8	-24 05.1	22 08.8	-16 12.1	00 57.2	+00 56.7	02 57.2	+13 43.6	06 03.8	+24 24.7	08 36.2	+22 32.7
6	19 45.7	-23 30.1	22 57.0	-12 01.1	01 40.5	+05 47.0	03 43.7	+17 36.9	06 58.3	+24 49.3	09 30.6	+19 31.4
7	20 42.3	-21 36.9	23 42.9	-07 25.1	02 24.5	+10 24.0	04 32.5	+20 49.1	07 53.7	+23 58.5	10 23.8	+15 26.4
8	21 35.7	-18 39.5	00 27.1	-02 36.1	03 09.8	+14 38.6	05 23.8	+23 09.2	08 49.1	+21 51.0	11 15.8	+10 29.3
9	22 25.8	-14 54.0	01 10.5	+02 15.7	03 57.1	+18 20.9	06 17.4	+24 26.3	09 43.9	+18 30.6	12 07.2	+04 54.1
10	23 12.9	-10 35.3	01 54.0	+07 01.3	04 47.0	+21 19.9	07 12.9	+24 31.1	10 37.9	+14 05.1	12 58.9	-01 03.6
11	23 58.0	-05 56.3	02 38.5	+11 32.0	05 39.7	+23 23.8	08 09.4	+23 17.4	11 31.3	+08 46.5	13 51.9	-07 05.0
12	00 41.7	-01 07.5	03 24.7	+15 38.6	06 35.1	+24 20.4	09 06.2	+20 43.7	12 24.6	+02 50.2	14 47.1	-12 48.5
13	01 25.0	+03 42.0	04 13.3	+19 10.4	07 32.4	+23 59.5	10 02.6	+16 54.1	13 18.7	-03 24.0	15 45.1	-17 49.6
14	02 08.8	+08 24.0	05 05.0	+21 55.3	08 30.8	+22 14.9	10 58.3	+11 58.7	14 14.3	-09 32.7	16 46.1	-21 43.2
15	02 54.0	+12 49.4	05 59.7	+23 39.4	09 29.2	+19 07.3	11 53.5	+06 13.3	15 12.3	-15 09.2	17 49.3	-24 08.5
16	03 41.5	+16 48.1	06 57.1	+24 10.0	10 26.7	+14 44.7	12 48.6	-00 01.2	16 12.7	-19 46.6	18 52.8	-24 54.2
17	04 31.8	+20 07.9	07 56.1	+23 17.3	11 23.1	+09 22.8	13 44.3	-06 20.0	17 15.2	-23 01.8	19 54.6	-24 01.7
18	05 25.3	+22 34.9	08 55.4	+20 58.5	12 18.6	+03 22.6	14 41.3	-12 16.3	18 18.2	-24 40.7	20 53.1	-21 44.1
19	06 21.6	+23 54.7	09 53.9	+17 19.4	13 13.6	-02 51.4	15 40.0	-17 23.6	19 20.1	-24 41.1	21 47.5	-18 20.5
20	07 20.1	+23 55.6	10 50.8	+12 33.7	14 09.0	-08 53.9	16 40.4	-21 19.2	20 19.2	-23 12.2	22 37.9	-14 10.3
21	08 19.2	+22 31.6	11 46.1	+07 01.1	15 05.2	-14 20.6	17 41.6	-23 47.8	21 14.6	-20 30.1	23 25.1	-09 30.6
22	09 17.8	+19 44.9	12 40.1	+01 03.9	16 02.8	-18 50.4	18 42.4	-24 43.4	22 06.0	-16 52.9	00 09.9	-04 35.0
23	10 14.7	+15 45.9	13 33.7	-04 55.0	17 01.4	-22 07.1	19 41.4	-24 09.4	22 54.1	-12 37.0	00 53.4	+00 25.9
24	11 09.7	+10 50.9	14 27.5	-10 34.0	18 00.6	-24 00.4	20 37.5	-22 17.0	23 39.6	-07 56.2	01 36.5	+05 23.0
25	12 03.1	+05 19.3	15 22.3	-15 33.4	18 59.1	-24 27.6	21 30.2	-19 20.6	00 23.3	-03 01.7	02 20.2	+10 07.9
26	12 55.4	-00 29.0	16 18.5	-19 35.8	19 56.1	-23 32.8	22 19.6	-15 35.4	01 06.4	+01 56.9	03 05.3	+14 31.4
27	13 47.7	-06 14.5	17 16.0	-22 27.6	20 50.5	-21 25.7	23 06.4	-11 15.3	01 49.5	+06 50.7	03 52.6	+18 23.3
28	14 40.7	-11 38.3	18 14.3	-23 59.6	21 42.0	-18 18.9	23 51.1	-06 32.3	02 33.6	+11 30.4	04 42.5	+21 31.8
29	15 35.1	-16 22.3	19 12.2	-24 08.5	22 30.8	-14 26.1	00 34.6	-01 37.2	03 19.4	+15 45.9	05 35.0	+23 44.2
30	16 31.4	-20 09.7	20 08.6	-22 58.0	23 17.2	-10 00.6	01 17.6	+03 20.2	04 07.4	+19 25.8	06 29.8	+24 48.7
31	17 29.4	-22 45.8	21 02.7	-20 37.1	00 01.8	-05 14.6	02 01.1	+08 10.3	04 57.9	+22 18.2	07 26.0	+24 36.8

LUNAR OCCULTATIONS for PERTH (31° 57' S, 115° 51' E)

INTRODUCTION From month to month the Moon does not occult the same stars. In fact over a number of years it drifts in declination between plus and minus 28°. The brighter stars that the Moon occults are listed in the Zodiacal Catalogue (ZC). There are about 3500 stars in the ZC.

The Moon moves from west to east, so it rises and sets later each day. From just after New Moon to just before Full Moon, stars being occulted disappear behind part of the dark limb and reappear from the bright limb. The limb is another term for the edge of the Moon. After Full Moon a star disappears on the bright limb and reappears on the dark limb. There is no dark limb at Full Moon.

Dark limb events, in particular disappearances, are the easiest to observe. Following a star until it *winks out* is much easier than scanning the lunar limb, waiting for it to suddenly reappear. The brighter the star, the more spectacular the event. The table here present the easier to observe occultations for this year as predicted. Both events, the disappearance and reappearance, are not necessarily included. An event may not be present because:

1. The Moon is in daylight.
2. The Moon is too close to or below the horizon.
3. For faint stars, events on a bright limb (in particular reappearances) are difficult to observe and have been omitted.

TELESCOPE REQUIREMENTS. These vary greatly with the brightness of the star being observed, the brightness of the Moon (how close to Full Moon) and whether the event is on a bright or dark limb. Disappearances of first magnitude stars on the dark limb can be observed with the naked eye.

www.lunar-occultations.com/iota/iotandx.htm
www.occultations.org.nz

The faintest stars, which have occultation predictions, are about 6.5 magnitude. The criteria for selection are complex involving the Sun and Moon altitude, star magnitude and whether it is a bright or dark limb event.

WST the date and time of the occultation, hr and min are in WST
OBJECT n, nn, nnn, nnnn ZC catalogue number
 ggg ccc Greek letter and constellation abbreviation
 n ccc Flamsteed number and constellation
 name of planet, satellite or deep sky object.

PD event, consisting of two letters.
 The first letter is the Event type: D = Disappearance and R = Reappearance. The 2nd letter represents: D = Dark limb, B = a bright limb event. G indicates a graze at or near the location. M means a miss with a graze nearby.

Mag magnitude of the star.
Elg elongation or separation of the Moon from the Sun as measured in degrees.

Alt altitude of the Moon during the occultation.

PA position angle is the position the event occurs on the limb of the Moon (measured as degrees east of north).

A coefficient of longitude (see below)

B coefficient of latitude (see below)

NB. For some stars, close to grazing, A and B values would be useless, and no values are shown.

CALCULATING EVENT TIME FOR OTHER LOCATIONS

Unless the event is close to a graze (PA is close to 0° or 180°) this method will give a good approximation for any location within about 500 km of this city. The predicted time at your location is given by:

$$\text{Predicted Time} = \text{Time from Table} + (A \times n) + (B \times p)$$

where *A* and *B* are taken from the table below and *n* and *p* are given by (convert to decimal degrees)

$$n = \text{your longitude} - \text{reference longitude}$$

$$p = \text{reference latitude} - \text{your latitude}$$

you need to preserve the signs of *n* and *p*, that is, whether they are positive or negative and it is best to use your closest city.

WST	Object	PD	Mag	Elg°	Alt°	PA°	A	B	WST	Object	PD	Mag	Elg°	Alt°	PA°	A	B	WST	Object	PD	Mag	Elg°	Alt°	PA°	A	B
Dec 31 21:22	74 Aqr	DD	5.8	61	21	115	1.0	0.3	Apr 29 20:42	1155	DD	6.4	73	17	33	4.0	5.7	Sep 19 19:26	80 Vir	RB	5.7	28	10	242	0.2	2.5
Jan 02 22:40	49	DD	6.1	83	17	45	0.4	2.2	Apr 29 21:00	1157	DD	6.2	73	14	64	1.8	2.0	Sep 21 20:02	34 Lib	DD	5.8	56	30	182	1.9	-8.4
Jan 03 23:59	33 Cet	DD	6.0	95	7	115	0.4	0.3	May 06 22:59	2043	DD	6.5	168	66	127	1.6	-1.5	Sep 21 20:16	34 Lib	RB	5.8	56	27	208	-0.4	9.1
Jan 08 22:27	108 Tau	DD	6.3	152	36	46	2.0	1.4	May 06 23:26	2047	DD	6.6	168	67	134	1.5	-1.7	Sep 24 22:26	24 Sgr	DD	5.5	96	39	59	0.6	2.1
Jan 09 00:53	109 Tau	DD	5.0	153	26	128	1.5	-0.5	May 08 05:02	30 Lib	RD	6.5	174	28	298	0.8	0.0	Sep 24 22:42	25 Sgr	DD	6.5	96	36	105	1.1	0.5
Jan 09 23:37	8 Gem	DD	6.1	165	34	41	2.3	1.8	May 08 21:35	2316	RD	6.4	164	38	263	1.2	-0.8	Sep 24 23:27	24 Sgr	RB	5.5	96	26	285	0.7	0.6
Jan 09 23:47	9 Gem	DD	6.2	165	34	97	2.4	0.0	May 08 23:54	2331	RD	6.3	163	66	331	0.9	-2.9	Sep 25 19:28	49 Sgr	RB	5.5	107	82	291	2.7	-1.2
Jan 10 01:10	10 Gem	DD	6.6	166	29	134	1.6	-0.9	May 14 00:48	26 Cap	RD	6.7	99	20	193	2.0	4.5	Sep 25 23:48	2857	DD	6.5	109	34	130	1.8	-0.8
Jan 13 02:10	1393	RD	6.5	154	39	358	0.2	-4.2	May 31 21:27	1739	DD	6.4	108	45	155	0.8	-1.7	Sep 26 02:11	2875	DD	6.0	110	6	100	-0.1	0.7
Jan 22 04:31	58 Oph	DB	4.9	35	18	75	0.4	-0.6	Jun 01 20:02	1854	DD	6.8	121	58	132	1.6	-1.6	Oct 01 01:00	3506	DD	6.1	166	56	119	4.9	-1.8
Jan 23 10:00	Jupiter	DB	-1.7	21	74	38	3.1	3.7	Jun 12 00:15	56 Aqr	RD	6.4	107	18	201	0.9	2.2	Oct 06 04:06	517	RD	6.1	137	37	302	3.6	-1.1
Jan 23 10:49	Ganymed	RD	5.4	21	81	322	2.5	-4.1	Jun 15 03:22	106	RD	6.6	72	23	212	0.5	1.2	Oct 07 03:23	646	RD	6.1	126	37	228	2.0	1.2
Jan 23 10:55	Jupiter	RD	-1.7	21	81	325	2.5	-4.6	Jun 28 18:27	1813	DD	5.7	91	56	162	0.8	-2.5	Oct 07 04:26	651	RD	6.0	126	36	239	2.4	1.3
Feb 11 03:35	1598	DD	6.5	159	40	201	-4.1	-9.3	Jun 28 19:33	1813	RB	5.7	91	53	272	2.5	0.4	Oct 22 22:18	2811	DD	6.3	78	27	87	0.5	1.1
Feb 11 03:49	1598	RD	6.5	159	39	223	6.8	8.5	Jun 30 20:45	2072	DD	6.6	119	67	104	2.3	-0.4	Oct 24 22:00	3081	DD	6.5	102	50	19	0.1	3.5
Feb 15 02:55	2089	RD	6.7	104	50	266	2.0	-0.7	Jul 01 20:18	30 Lib	DD	6.5	132	71	143	1.3	-2.3	Oct 24 23:07	26 Cap	DD	6.7	102	37	84	1.0	1.3
Feb 17 01:02	Chi Oph	DB	4.2	80	10	88	0.0	-0.9	Jul 05 05:43	2706	DD	5.8	175	16	62	-0.2	1.6	Oct 27 02:35	74 Aqr	DD	5.8	126	9	38	-0.2	2.0
Feb 17 01:54	Chi Oph	RD	4.2	79	21	314	-0.1	-2.0	Jul 09 02:17	3265	RD	6.6	136	68	203	1.5	3.1	Oct 28 00:24	3478	DD	6.4	137	42	38	0.8	2.4
Feb 18 02:59	2509	RD	5.8	66	25	257	0.7	-0.7	Jul 27 22:13	2043	DD	6.5	90	30	51	1.2	4.3	Nov 05 00:50	132 Tau	RD	5.0	135	25	219	0.9	0.9
Feb 27 19:54	89 Psc	RB	5.1	42	14	227	0.5	2.2	Jul 27 22:25	2047	DD	6.6	90	27	75	0.9	1.9	Nov 11 03:37	Iot Leo	RD	3.9	61	10	308	0.6	-1.9
Mar 09 03:21	46 Leo	DD	5.4	165	20	132	0.5	-0.4	Jul 29 21:00	2301	DD	6.7	116	70	144	1.8	-2.2	Nov 20 20:14	17 Cap	DD	5.9	70	47	46	0.6	2.3
Mar 15 04:55	2331	RD	6.3	109	77	276	2.4	-0.3	Jul 30 22:46	2457	DD	6.3	130	62	58	2.0	2.6	Nov 20 21:18	17 Cap	RB	5.9	70	33	268	0.8	1.1
Mar 16 00:16	2456	RD	6.3	98	16	347	-0.9	-3.2	Aug 01 02:16	1 Sgr	DD	5.0	144	31	138	1.6	-1.1	Nov 23 21:16	Psi 3 Aqr	DD	5.0	105	56	67	1.9	1.6
Mar 17 00:30	2595	RD	5.7	86	10	211	1.5	2.2	Aug 01 02:55	1 Sgr	RB	5.0	144	23	212	-0.6	3.2	Nov 23 22:34	Psi 3 Aqr	RB	5.0	105	41	222	0.8	2.3
Mar 17 01:12	2604	RD	6.7	85	18	254	0.4	-0.6	Aug 02 21:38	2921	DD	6.0	167	63	23	2.6	4.7	Dec 05 00:30	Lam Cnc	RD	5.9	130	18	294	1.7	-1.7
Apr 02 20:59	1195	DD	6.8	103	31	91	2.2	0.5	Aug 07 05:48	3478	RD	6.4	143	42	266	1.7	1.2	Dec 09 03:12	Pi Vir	DB	4.7	80	22	92	1.1	-1.1
Apr 06 01:36	1598	DD	6.5	145	26	157	0.3	-1.4	Aug 13 04:48	Ome 1 Tau	DB	5.5	76	30	41	1.0	0.9	Dec 09 04:15	Pi Vir	RD	4.7	79	34	327	1.0	-2.3
Apr 09 21:05	2089	RD	6.7	158	23	305	0.3	-1.7	Aug 13 06:09	Ome 1 Tau	RD	5.5	76	37	263	2.6	-0.1	Dec 11 03:25	1965	DD	6.5	53	12	256	0.4	-0.7
Apr 11 23:58	2401	RD	5.6	130	39	305	0.6	-1.9	Sep 03 02:46	Psi 2 Aqr	DB	4.4	172	54	23	0.7	2.9	Dec 21 21:06	3506	DD	6.1	85	41	80	1.6	1.4
Apr 13 23:20	2706	RD	5.8	105	11	225	0.7	0.6	Sep 03 03:53	Psi 2 Aqr	RD	4.4	172	41	268	1.6	1.2	Dec 26 22:58	517	DD	6.1	140	36	53	2.1	1.7
Apr 13 23:35	2709	RD	6.7	105	13	308	-0.4	-1.9	Sep 11 05:05	121 Tau	DB	5.4	84	30	69	2.0	0.1	Dec 27 23:03	651	DD	6.0	151	36	142	4.8	-4.4
Apr 28 19:38	1023	DD	6.4	60	18	94	1.4	0.8	Sep 19 18:51	80 Vir	DD	5.7	28	17	166	0.4	-2.2	Dec 28 02:09	665	DD	5.7	152	13	45	1.6	2.5