



The Binocular Sky

No. 120
December 2021

Newsletter



Introduction

Newsletter No 120! That's 10 years of this, and what another "interesting" year it has been! To all of you: *Thanks for making this feel worthwhile, and may I wish you a joyous festive season, however you celebrate it. Keep safe and keep looking up!*

We've got the **Pleiades** and **Orion Nebula** back in the evening sky, at last. The ice-giants, **Uranus** and **Neptune**, are only 3 hours apart in the sky, so can be observed during the same session if you time it well. Uranus is now relatively easy, but Neptune is getting quite difficult and is only available in the evening ([page 7](#)).

The **Geminids** meteor shower will be impacted by the Moon except for pre-dawn observations ([page 8](#)).

But the "big news" is that **Comet C/2021 A1 (Leonard)** should be an evening binocular object before it enters the solar glare just before mid month ([page 8/9](#)).

If you would like to receive the newsletter automatically each month, please complete and submit the [subscription form](#). You can get "between the newsletters" alerts, etc. via  and .

The Deep Sky

([Hyperlinks](#) will take you to finder charts and more information on the objects.)

December marks the welcome return of the [Pleiades \(M45\)](#) and the [Great Orion Nebula \(M42\)](#) to early evening observation at a reasonable altitude. The trio of open clusters in Auriga, [M36](#), [M37](#) and [M38](#) and [M35](#) in Gemini are also worth observing. While you are looking at [M35](#), also see if you can identify two smaller open clusters, [NGC 2158](#), which is half a degree to the SE, and the slightly more difficult [IC 2157](#), which is a degree to the ESE. Nearer the Pleiades is [NGC 1647](#), which is within the 'V' asterism of the [Hyades](#). It is a sparse cluster and, although it is visible in a 10x50 binocular, it really benefits from a little more aperture and magnification.

Open (also called 'Galactic') Clusters are loosely packed groups of stars that are gravitationally bound together; they may contain from a few dozen to a few thousand stars which recently formed in the galactic disk.

The open cluster [NGC 752](#) is very well placed this month; it is one of those objects that is often overlooked because of its proximity to a more famous object, in this case, the Great Andromeda Galaxy (see below). [NGC 752](#) is a very fine cluster, and easy in 50mm binoculars in which it begins to resolve. Nearby towards Perseus is another fine cluster, [M34](#).

In December, the Milky Way is nearly overhead in the mid-to-late evening. This means that those objects (globular clusters and galaxies) that are outside our galaxy are not as well placed for observation as they are when the Milky Way is low in the sky. [M81 \(Bode's Nebula\)](#) and [M82 \(The Cigar Galaxy\)](#), are still relatively easy to observe, even in a 50mm binocular, and we can be grateful that their altitude is such that we are unlikely to get neck-strain when we do so with straight-through binoculars. This pair can be used as a good demonstration of averted vision: if you have them both in the same field of view, you may see that the core of [M81](#) becomes more

Galaxies are gravitationally bound "island universes" of hundreds of billions of stars at enormous distances. The light that we see from [M31](#), for example, left that galaxy around the time our technology consisted of rocks, sticks and bones.

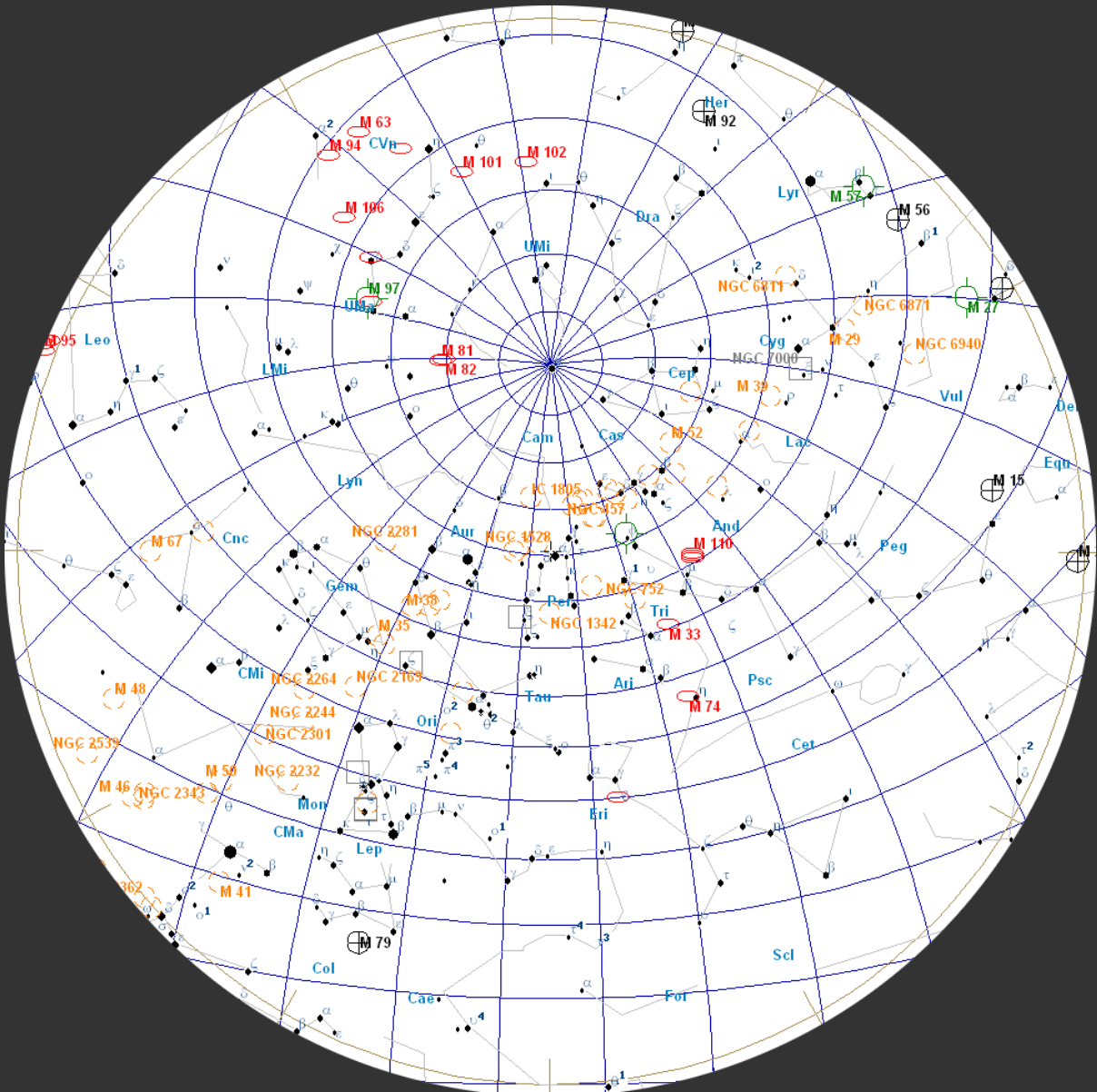
51°N

December 01, 23:00 UT

December 15, 22:00 UT

December 31, 21:00 UT

(chart is "clicky")



apparent if you look at M82.

Two notable exceptions to the generalisation of galaxies being poorly placed on December evenings are The Great Andromeda Galaxy, M31 and M33 (The Triangulum Galaxy), both of which are close to the plane of the

Milky Way. M31 in particular is very easily visible this month and is a naked eye object in moderately dark skies. It is large and bright enough to be able to withstand quite a lot of light pollution (making it available to urban observers). M33 has a low surface-brightness and benefits from lower magnification. This generally makes it easier to see in, say, a 10x50 binocular than in many "starter" telescopes. It is in December evenings that the Sculptor Galaxy, NGC 253, becomes observable before midnight, but you will need a good southern horizon for this.

Although the two Hercules globular clusters, M92 and the very impressive, and very easy to find, M13 are still observable in the early evening, but their altitude becomes less favourable as the month progresses. M15 and M2 are both much better placed for observation in December.

Globular clusters are tightly-bound, and hence approximately spherical, clusters of tens, or even hundreds, of thousands of stars that orbit in a halo around almost all large galaxies that have been observed.

The easiest planetary nebula, M27 (the Dumbbell Nebula – also known as the Apple Core and the Diabolo) – is visible in the evening skies in even 30mm binoculars. The Helix Nebula, NGC 7293 is now about as well-placed as it gets for observation from Britain before midnight; you'll need a decent southern horizon.

Planetary Nebulae are short-lived (a few tens of thousands of years) masses of gas and plasma that result from the death of some stars. They have nothing to do with planets, but get their name from the fact that, in early telescopes, they had the appearance of giant ghostly planets.

For interactive maps of Deep Sky Objects visible from 51°N, you can visit: https://binocularsky.com/map_select.php

December Deep Sky Objects by Right Ascension

Object	Con	Type	Mag	RA (hhmmss)	Dec (ddmmss)
M31 (the Great Andromeda Galaxy)	And	gal	4.3	004244	411608
M33 (NGC 598, the Pinwheel Galaxy)	Tri	gal	6.2	013351	303929
NGC 752	And	oc	5.7	015742	374700
M34 (NGC 1039)	Per	oc	5.2	024204	424542
M45 (the Pleiades)	Tau	oc	1.6	034729	240619
Melotte 25 (the Hyades)	Tau	oc	0.5	042650	154841
NGC 1647	Tau	oc	6.4	044555	190542
M38 (NGC 1912)	Aur	oc	6.4	052842	355117
M42 (NGC 1976, The Great Orion Nebula)	Ori	en	4.0	053517	-052325
M36 (NGC 1960)	Aur	oc	6.0	053617	340826
M37 (NGC 2099)	Aur	oc	5.6	055218	323310
IC 2157	Gem		8.4	060449	240350
NGC 2158	Gem	oc	8.6	060726	240529
M35 (NGC 2168)	Gem	oc	5.1	060900	242100
M81 (NGC 3031)	UMa	gal	7.8	095533	690401
M82 (NGC 3034)	UMa	gal	9.2	095554	694059
M13 (NGC 6205, the Great Hercules Globular Cluster)	Her	gc	5.8	164141	362738
M92 (NGC 6341)	Her	gc	6.4	171707	430812
M15 (NGC 7078)	Peg	gc	6.2	212958	121003
M2 (NGC 7089)	Aqr	gc	6.5	213327	-004922

Double Stars

Binocular Double Stars for December

Star	Magnitudes	Spectral Types	Separation (arcsec)
ζ Lyr	4.3, 5.6	A3, A3	44
β Lyr	3.6, 6.7	B8, B3	46
οΣ525 Lyr	6.0, 7.6	G0, A0	45
β Cyg	3.1, 4.7	K0, B9	35
d Cep	4.1, 6.1	F5, A0	41
56 And	5.7, 5.9	K0, K2	128
ΣI 1 And	7.1, 7.3	G5, G5	47
ψ-1 Psc	5.3, 5.8	A2, A0	30
14 Ari	5.0, 7.9	F0, F2	106
62 Eri	5.4, 8.9	B9, B8	67
τ Tau	4.3, 7.0	B5, A0	63
ν Gem	4.1, 8.0	B5, A0	113
ζ Gem	4.0, 7.6	G0, G	101
π-1 Umi	6.6, 7.2	G5, G5	31

Variable Stars

Mira-type stars near predicted maximum (mag < +7.5)		
Star	Mag Range	Period (days)
R Cyg	6.1 – 14.4	426.45

Selection of binocular variables (mag < +7.5)			
Star	Mag Range	Period	Type
XY Lyr	5.8-6.4	Irreg	Irregular
U Sge	6.5-9.3	3.38d	Eclipsing binary
U Vul	6.7-7.5	7.99d	Cepheid
SU Cyg	6.4-7.2	3.84d	Cepheid
U Del	7.0-8.0	ca. 110d	Irregular
TW Peg	7.0-9.2	ca. 90d	Semi-regular
U Cep	6.8-9.2	2.5d (increasing)	Eclipsing binary
V Aqr	7.6-9.4	ca. 244d	Semi-regular
SS Cep	6.7-7.8	ca. 190d	Semi-regular
RZ Cas	6.2-7.7	1.195d	Eclipsing binary

The Solar System

(Charts are "clicky" for higher resolution alternatives)

The Moon

December 04	New Moon
December 11	First Quarter
December 19	Full Moon
December 27	Last Quarter

Lunar Occultations

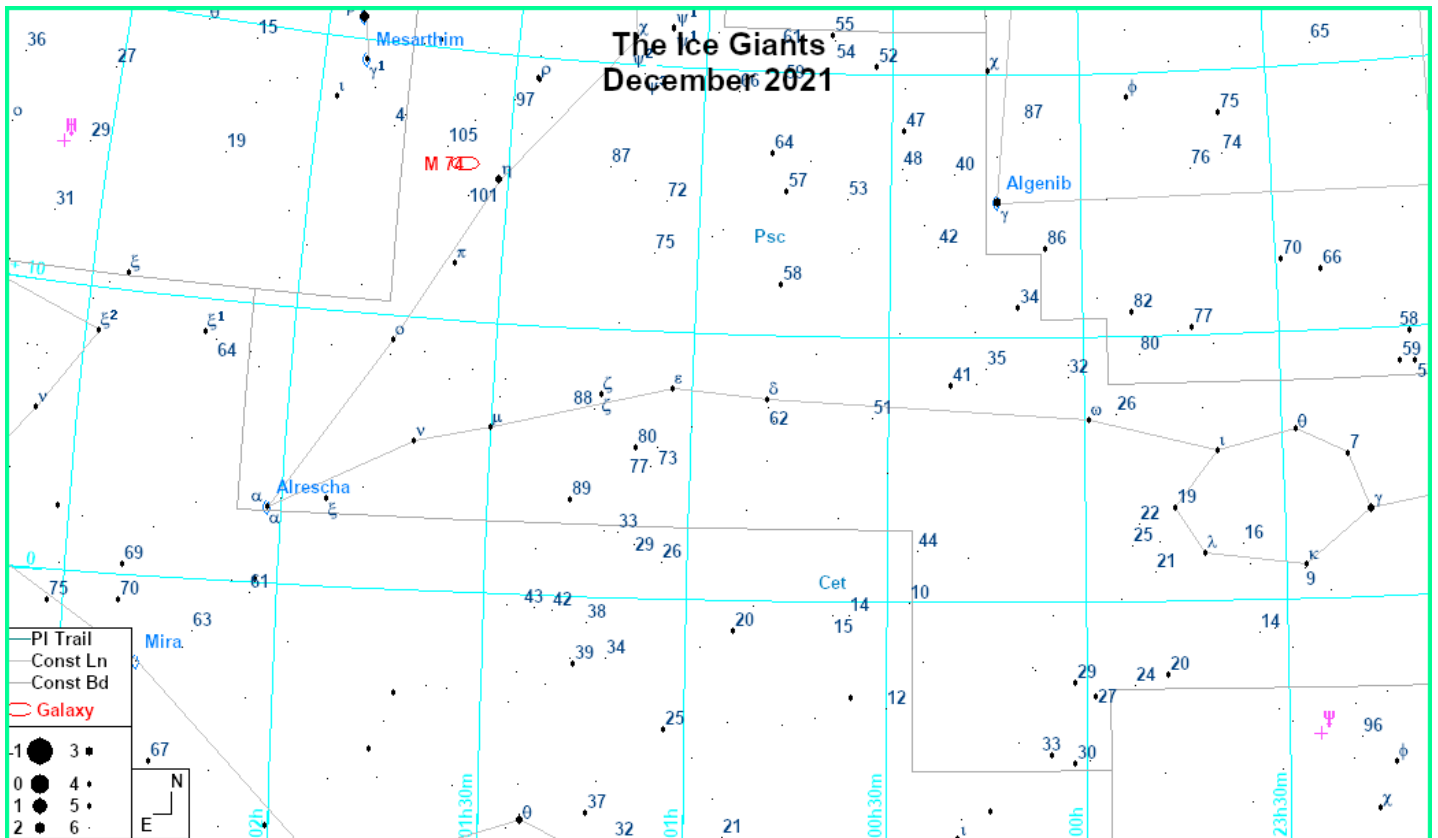
Data are for my location and may vary by several minutes for other UK locations. The phases are **(D)**isappearance, **(R)**eappearance and **(Gr)**aze; they are dark-limb events unless there is a **(B)**.

Lunar Occultations December 2021 50.9°N 1.8°W

Date	Time (UT)	Phase	Star	Spectral Type	Magnitude	Position Angle	Cusp Angle
Dec 02	13:39:37	R	alp Lib	A3	2.8	238	56S
Dec 08	18:03:45	D	35 Cap	K3	5.8	65	80N
Dec 11	17:39:19	D	HIP 118298	G5	6.6	32	57N
Dec 15	21:34:30	D	HIP 14318	K3	6.4	358	16N
Dec 17	21:31:03	D	tau Tau	B3	4.3	18	24N
Dec 17	22:14:22	D	HIP 22013	B9	6.9	58	64N
Dec 18	04:09:14	D	HIP 22743	K0	6.6	80	83N
Dec 22	02:01:01	R	lam Cnc	B9	5.9	346	21N
Dec 24	04:20:15	D	eta Leo	A0	3.5	69	-52N
Dec 24	05:10:40	R	eta Leo	A0	3.5	349	28N
Dec 29	06:10:12	R	HIP 69500	G5	7.0	278	78S

Planets

Uranus (mag +5.7) is now an evening object, and **Neptune** (mag +7.9) is best early in the evening; it's getting lower in the west, so is best early in the month.

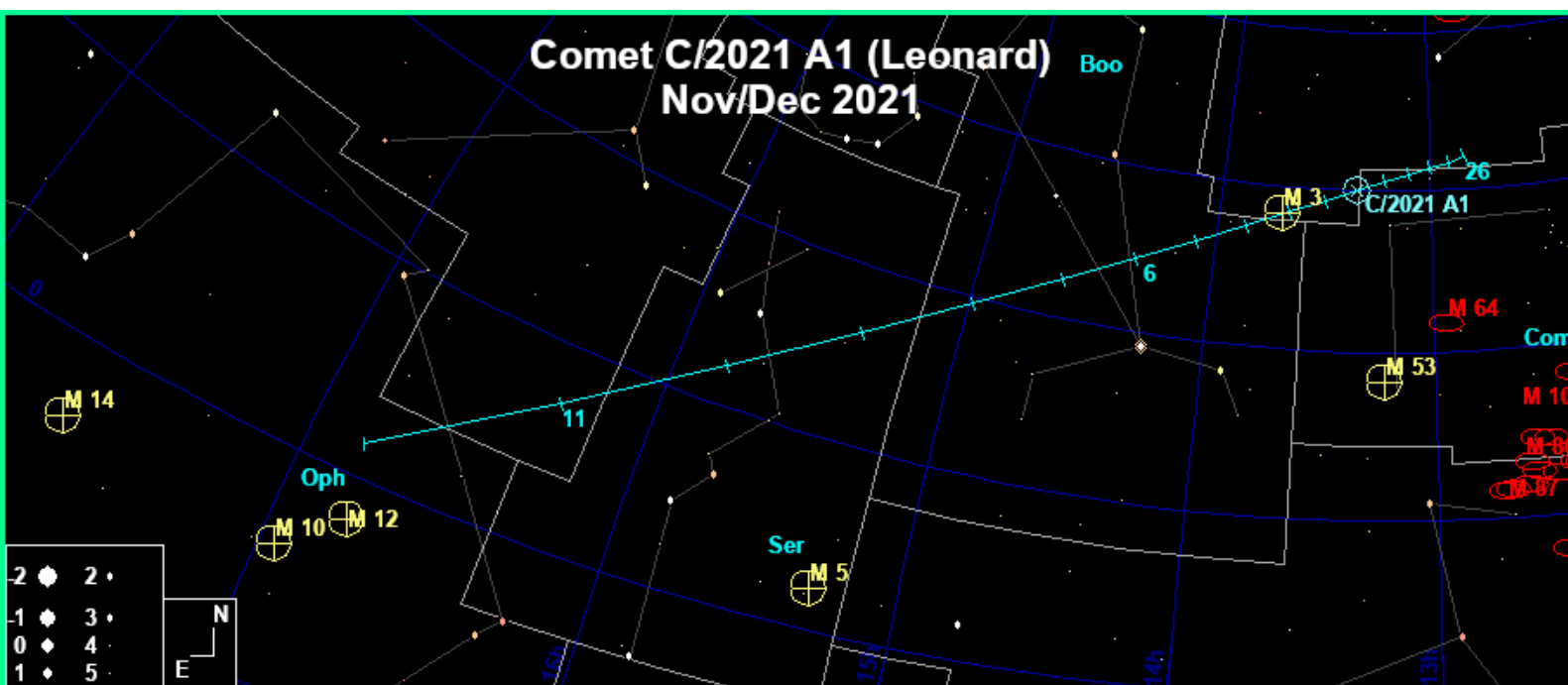


Meteor Showers

The **Geminids** is the best meteor shower if conditions are right, and although the Moon will impact on it this year, it sets by 3am on the 14th, so early risers have an opportunity for good observations. The shower is active for the last 3 weeks of the month and has its peak predicted for the evening of the 13th, with a ZHR of 120 to 160 (it has been intensifying in recent years). Most meteors are due to debris left by comets, but the Geminid shower is one of two (the other is the Quadrantid shower, which peaks on January 03) that originates from an asteroid, in this case asteroid **3200 Phaethon**. You can use binoculars to examine the persistence of any ionisation trains from these slow-moving, colourful meteors, as they reveal the wind patterns in the upper atmosphere.

Comets

Comet C/2021 A1 (Leonard) should be visible in binoculars for the first week and a half of December, in the western sky after the end of civil twilight. It becomes increasingly difficult as its elongation decreases and it enters the solar glare.



Ephemeris of Comet C/2021 A1 (Leonard)

Date	RA	declination	mag	<u>Elong</u>
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26 Nov 2021	12h49m30.14s	+32 01' 06.7"	7.8	70.8
27 Nov 2021	12h54m33.70s	+31 43' 46.4"	7.6	70.7
28 Nov 2021	13h00m09.72s	+31 23' 35.2"	7.4	70.4
29 Nov 2021	13h06m23.72s	+30 59' 50.5"	7.2	69.9
30 Nov 2021	13h13m22.40s	+30 31' 37.2"	7.0	69.3
1 Dec 2021	13h21m13.84s	+29 57' 43.3"	6.8	68.5
2 Dec 2021	13h30m07.83s	+29 16' 33.6"	6.6	67.4
3 Dec 2021	13h40m16.15s	+28 26' 01.9"	6.3	66.0
4 Dec 2021	13h51m52.90s	+27 23' 20.3"	6.1	64.2
5 Dec 2021	14h05m14.65s	+26 04' 46.1"	5.9	62.0
6 Dec 2021	14h20m40.27s	+24 25' 27.8"	5.6	59.2
7 Dec 2021	14h38m30.05s	+22 19' 14.9"	5.3	55.7
8 Dec 2021	14h59m03.57s	+19 38' 45.0"	5.1	51.4
9 Dec 2021	15h22m35.62s	+16 16' 15.4"	4.8	46.1
10 Dec 2021	15h49m09.73s	+12 05' 55.3"	4.6	39.8
11 Dec 2021	16h18m30.15s	+07 07' 44.5"	4.4	32.8
12 Dec 2021	16h49m55.64s	+01 32' 03.4"	4.3	25.4

Zoom/Webex Talks during the SARS-CoV-2 emergency?

I regularly give talks, on *Binocular Astronomy* and numerous other astronomical topics. I'm happy to do this – potentially anywhere in the world – on Zoom or Webex if that is of interest.

If you would like a talk for your society/group, [Click here for current talks.](#)

For schools/scouts/guides, etc., I am a STEM Ambassador and will charge you nothing except travel expenses.

The **Binocular Sky Newsletter** will always be free to anyone who wants it, but if you would like to support it, there are a number of options:

- Purchase one of my books, **[Binocular Astronomy](#)** or **[Discover the Night Sky through Binoculars.](#)**
- Make a small [PayPal](#) donation to newsletter@binocularsky.com

Wishing you Clear Dark Skies,

Steve Tonkin

for

[The Binocular Sky](#)

Acknowledgements:

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Variable star data based on *The International Variable Star Index*

Occultation data derived with Dave Herald's *Occult*

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