



# The Binocular Sky

No. 97  
December 2019

# Newsletter

## Introduction

Welcome to the 8<sup>th</sup> anniversary edition of the **Binocular Sky** Newsletter.



I began it as an experiment to see if there was a readership large enough – maybe a couple of hundred – to warrant the effort. Eight years down the line, I think I can say that there is: last year we broke through the magic 1000 subscribers “barrier”, and we’re up another 30% this year. Several hundred more download it from the **Binocular Sky** website.

To all of you: *Thanks for making this feel worthwhile, and may I wish you a joyous festive season, however you celebrate it. Keep looking up!*

As most of you know, my intention here is to highlight some of the best astronomical targets for binoculars (and small telescopes!) for the coming month. Although it is primarily intended for observers in the UK, nearly all the objects can be seen from anywhere north of latitude 30°N and many of them in the southern hemisphere temperate zone.

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). **Vesta** is dimming, but still available (also page 7).

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 about the object.)*

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 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. Although the bright [M81 \(Bode's Nebula\)](#) and [M82 \(The Cigar Galaxy\)](#), are still relatively easy to observe, even in a 50mm binocular, their altitude is such that you are unlikely to get neck-strain when you do so with straight-through binoculars. [M81](#) and [M82](#) 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 apparent if you look at [M82](#).

*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.*

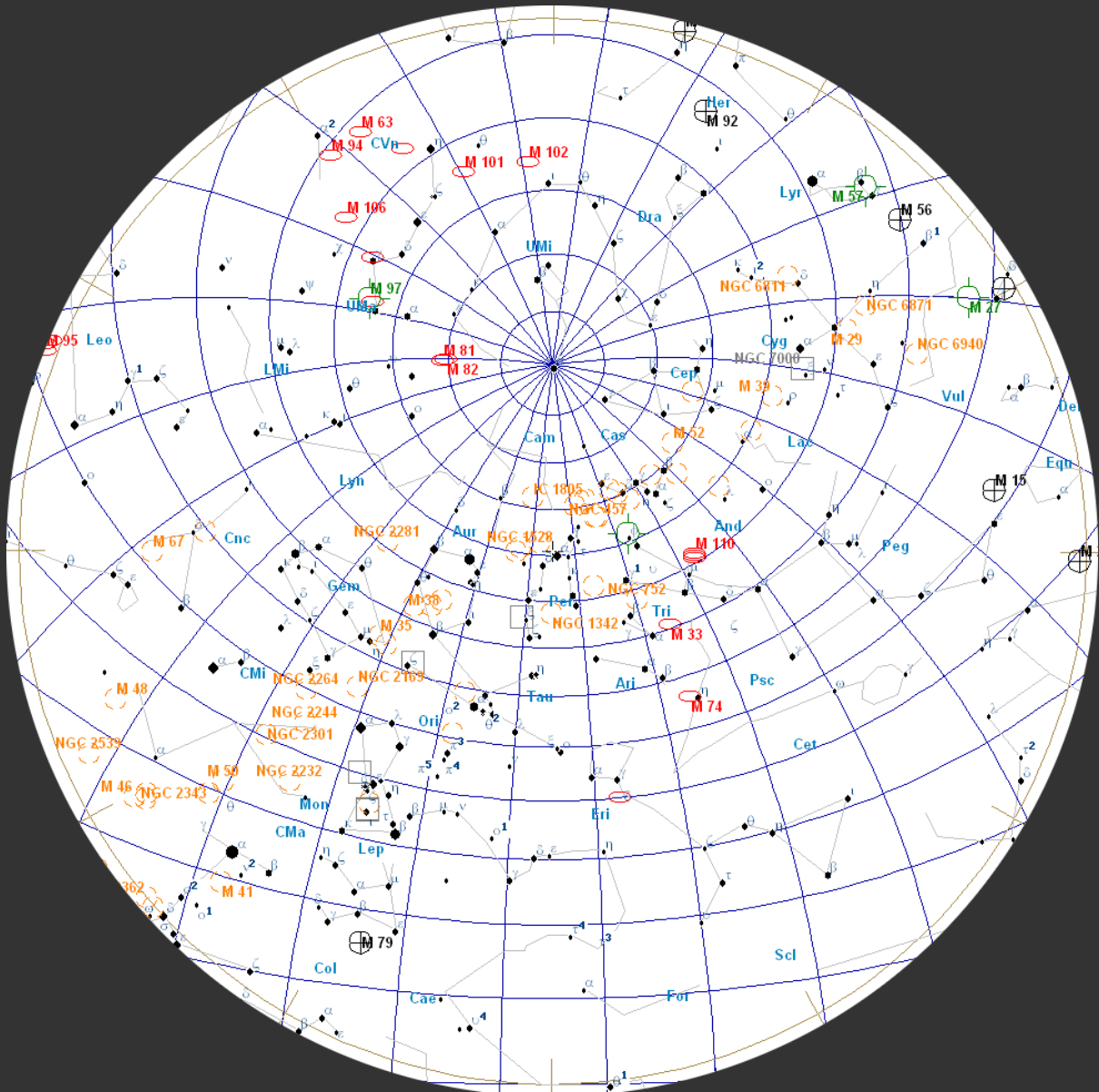
51°N

December 01, 23:00 UT

December 15, 22:00 UT

December 31, 21:00 UT

(chart is "clicky")



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: [http://binocularsky.com/map\\_select.php](http://binocularsky.com/map_select.php)

**December Deep Sky Objects by Right Ascension**

<b>Object</b>	<b>Con</b>	<b>Type</b>	<b>Mag</b>	<b>RA (hhmmss)</b>	<b>Dec (ddmmss)</b>
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

**Variable Stars**

**Mira-type stars near predicted maximum  
(mag < +7.5)**

<b>Star</b>	<b>Mag Range</b>	<b>Period (days)</b>
X Oph	5.9-8.6	338

**Selection of binocular variables (mag < +7.5)**

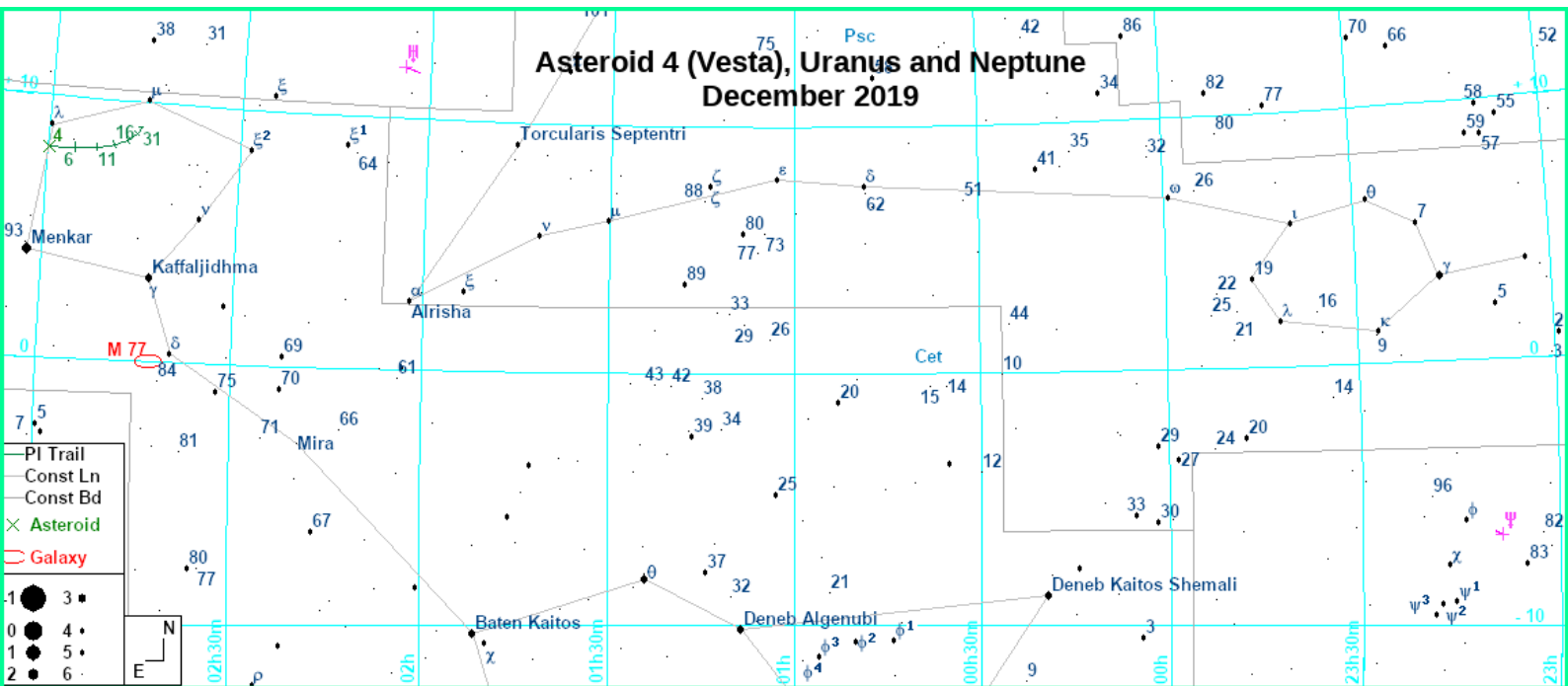
<b>Star</b>	<b>Mag Range</b>	<b>Period</b>	<b>Type</b>
XY Lyr	5.8-6.4	Irreg	Irregular
U Sge	6.5-9.3	3.38d	Eclipsing binary
U Vul	6.7-7.5	7.99d	Cepheid
SU Cyg	6.4-7.2	3.84d	Cepheid
U Del	7.0-8.0	ca. 110d	Irregular
TW Peg	7.0-9.2	ca. 90d	Semi-regular
U Cep	6.8-9.2	2.5d (increasing)	Eclipsing binary
V Aqr	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

## Double Stars

<b>Binocular Double Stars for December</b>			
<b>Star</b>	<b>Magnitudes</b>	<b>Spectral Types</b>	<b>Separation (arcsec)</b>
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

## The Solar System

(Clicking on the charts in this section will take you to higher resolution ones)



The ice giants, **Uranus** and **Neptune**, rise in the evening but, if you want to nab both in the same session, look soon after the sky is dark enough. At the beginning of the month, Neptune (mag + 7.8) transits before astro-dark, so is becoming increasingly more difficult. Uranus transits at about 21:30 UT. By the end of the month, they transit two hours earlier, so Neptune will become more difficult.

Both are moving retrograde. Neptune is the easier to find: at the beginning of the month it is  $1.5^\circ$  from  $\phi$  Aqr in the direction of  $\lambda$  Aqr. Uranus starts the month  $3.5^\circ$  from  $\xi-1$  Cet in the direction of  $\beta$  Ari.

Further east in Taurus, **Asteroid 4 (Vesta)**, is easily visible to 40mm binoculars. It starts the month at mag +6.8 and fades to mag +7.4 by the end of the month. At the beginning of the month it is just south  $\lambda$  Cet and tracks a curve up towards  $\mu$  Cet as the month progresses. It transits about an hour after Uranus.

## The Moon

December 04	First Quarter
December 12	Full Moon
December 19	Last Quarter
December 26	New Moon

## 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)**.

<b>Lunar Occultations, December 2019, 50.9°N, 1.8°W</b>						
<b>Date</b>	<b>Time</b>	<b>Phase</b>	<b>Star</b>	<b>Spectral Type</b>	<b>Magnitude</b>	<b>Cusp Angle</b>
Dec 05	18:02:53	D	33 Cnc	K1	4.6	53N
Dec 05	21:34:20	D	HIP 840	K1	5.8	63S
Dec 09	00:35:29	D	HIP 11603	K2	6.2	78N
Dec 09	19:52:36	D	HIP 14821	K0	6.1	86N
Dec 10	23:14:37	D	HIP 19284	K5	6.1	71S
Dec 13	01:06:30	R	HIP 28561	B8	6.4	73N
Dec 13	05:08:18	R	HIP 29196	K4	5.9	49S
Dec 13	07:19:10	R	Eta Gem	M3	3.5	44N
Dec 14	03:06:04	R	44 Gem	B8	6	61S
Dec 15	01:27:17	R	HIP 39447	K0	6.8	16N
Dec 15	04:10:10	R	Mu-2 Cnc	G2	5.3	76S
Dec 17	03:42:52	R	HIP 49445	F2	6.4	14N
Dec 17	05:36:59	R	HIP 49623	G0	7.1	73S
Dec 21	06:59:35	R	HIP 67083	K0	7.2	36N
Dec 23	05:22:18	R	HIP 75762	K0	6.8	90N
Dec 29	18:52:44	D	HIP 106143	F3	6.6	75S
Dec 30	17:51:28	D	HIP 211463	K0	7.1	60S

## Asteroid Occultations

There are no predicted asteroid occultations of stars mag +7.5 or brighter, observable from the UK, this month.



## Public Outreach & Talks

This month I will be at the following public event; please do come and introduce yourself if you're there.

1<sup>st</sup>: [Cranborne Chase Dark Sky Reserve](#) **Stargazing Evening**

---

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 purchase via the affiliate links in the [Binocular Sky shopfront](#)
- Make a small [PayPal](#) donation to [newsletter@binocularsky.com](mailto:newsletter@binocularsky.com)

Wishing you Clear Dark Skies,

**Steve Tonkin**

for

**[The Binocular Sky](#)**

---

### Acknowledgements:

The charts in this newsletter were prepared with Guide v9.0 from <http://projectpluto.com> or [Stellarium](#) under [GNU Public License](#), incorporating Milky Way panorama ©[Axel Mellinger](#)

Variable star data based on *The International Variable Star Index*  
Occultation data derived with Dave Herald's *Occult*

**Disclosure:** Links to *Amazon* or *First Light Optics* may be affiliate links

© 2019 Stephen Tonkin under a [Creative Commons BY-NC-SA License](#)

