The Binocular Sky Newsletter

December 2016

Introduction

Welcome to the **Binocular Sky** Newsletter for December 2016.

The intention of this monthly offering is to highlight some of the binocular targets for the coming month. It is primarily targeted at observers in the UK, but should have some usefulness for observers anywhere north of Latitude 30°N and possibly even further south.

The low-resolution charts are "clicky" and will take you to a higher resolution chart than is possible in the newsletter.

If you would like to automatically receive this newsletter 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.

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.

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.

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.

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.

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 ancestors of the genus Homo were just evolving!

Of the globular clusters, M15 and M2 are both well 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. They are important for two reasons: Firstly, they contain some of the oldest stars in the galaxy, so studying them helps us understand the evolution of stars. Secondly, they are useful as "standard candles" in establishing a distance scale of the Universe, based on the assumption that the brightest stars in any globular cluster will be approximately the same brightness and that the brightest globulars in a galaxy will be approximately the same brightness.

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

Mira-type stars near predicted maximum (mag < +7.5)		
Star	**Mag Range**	**Period (days)**
R Hya*	4.5-9.5	389

***NB**: Tricky object in pre-dawn at beginning of the month

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
V Aqr	7.6-9.4	ca. 244d	Semi-regular
TW Peg	7.0-9.2	ca. 90d	Semi-regular
U Cep	6.8-9.2	2.5d (increasing)	Eclipsing binary
SS Cep	6.7-7.8	ca. 190d	Semi-regular
RZ Cas	6.2-7.7	1.195d	Eclipsing binary

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
OΣ525 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

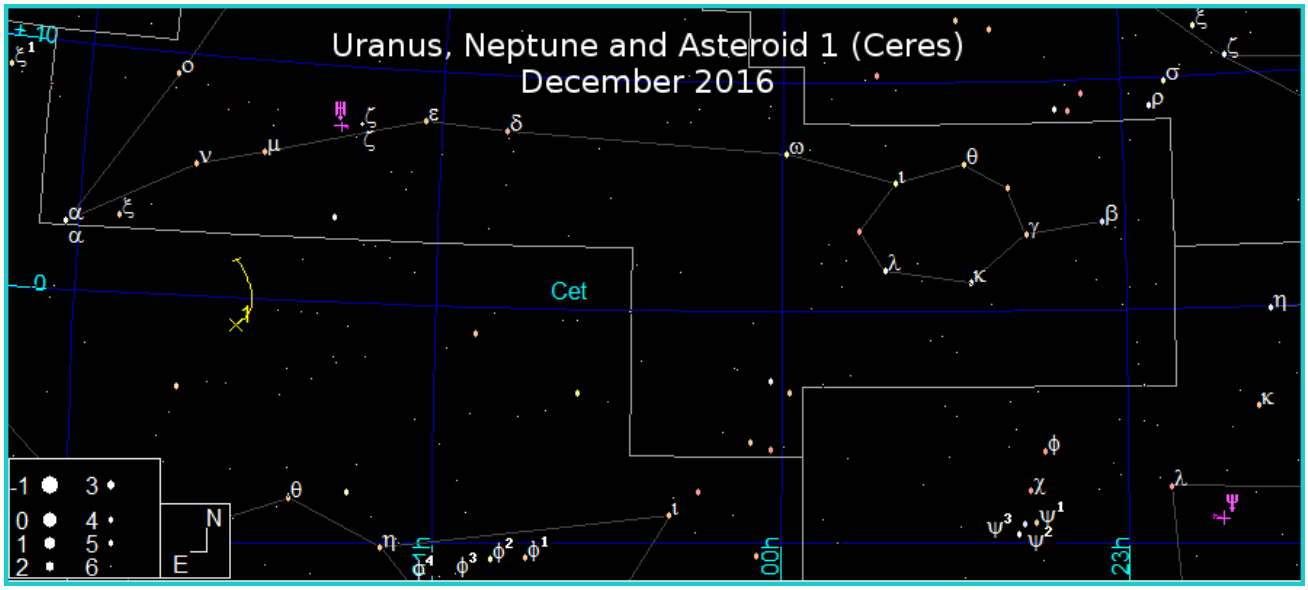
The Solar System (charts are 'clicky')

Planets

The binocular planets, **Uranus** and **Neptune,** are now available in a fully dark sky all month.

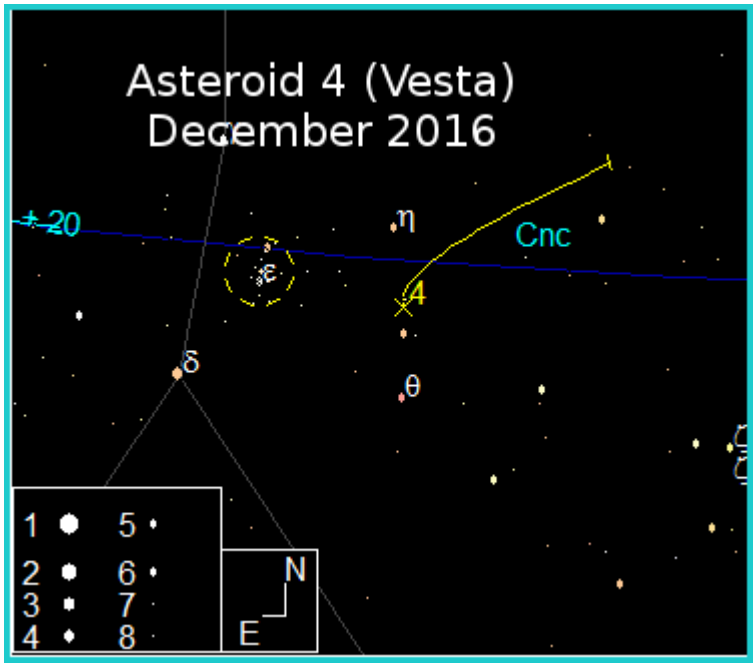
Uranus is at mag. +5.7 on a direct line between o and ζ Psc.

Neptune is at mag. +7.9 just south of λ Aqr.



Asteroid 1 (Ceres) starts the month as a mag. +8.1 and fades to mag +8.6 during the month.

At the beginning of December, **Asteroid 4 (Vesta)** shines at mag. +7.3, 2° W of M44 (*The Beehive Cluster*). It brightens by just over half a magnitude as it moves 3.5° retrograde during December.

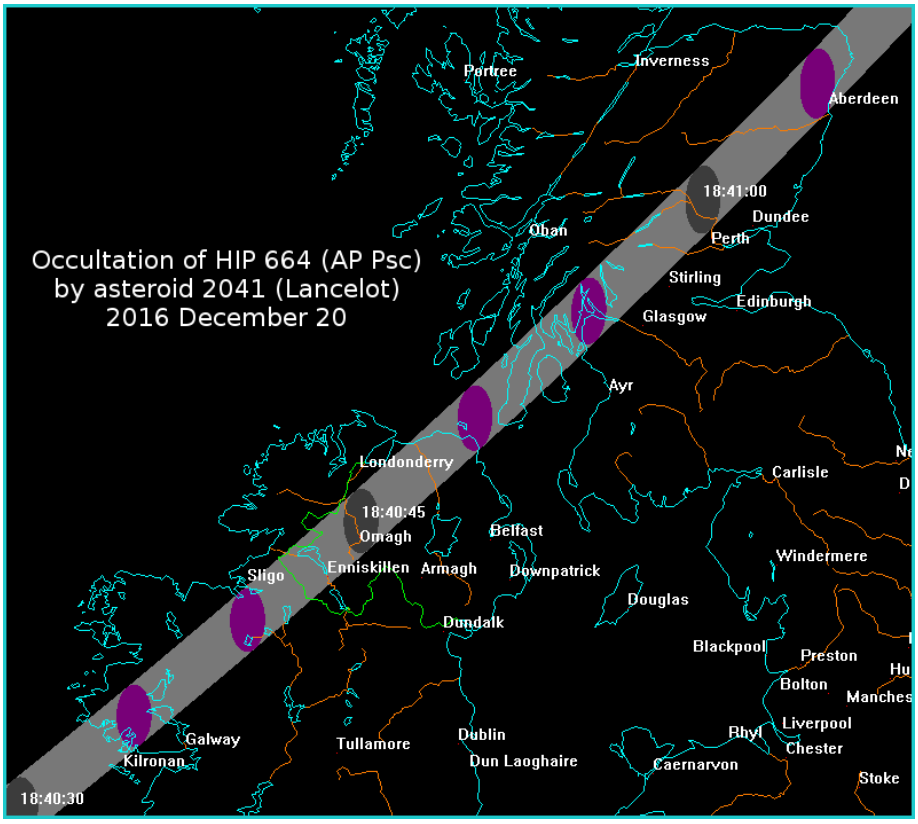


Comets

There are no comets suitable for binoculars and visible from the UK this month.

Asteroid Occultations

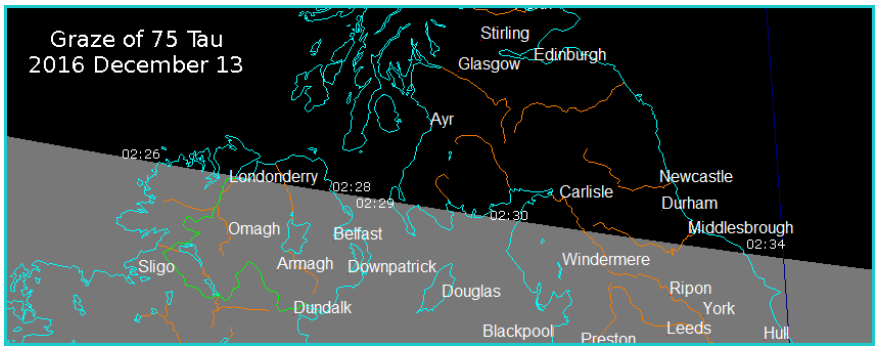
For observers in Scotland and Ireland, there is an occultation of a mag +6.2 star on the evening of the 20th. As with all asteroid occultations, predicted tracks are uncertain and observers not on the track may witness something. Also, null observations are useful.



Lunar Occultations

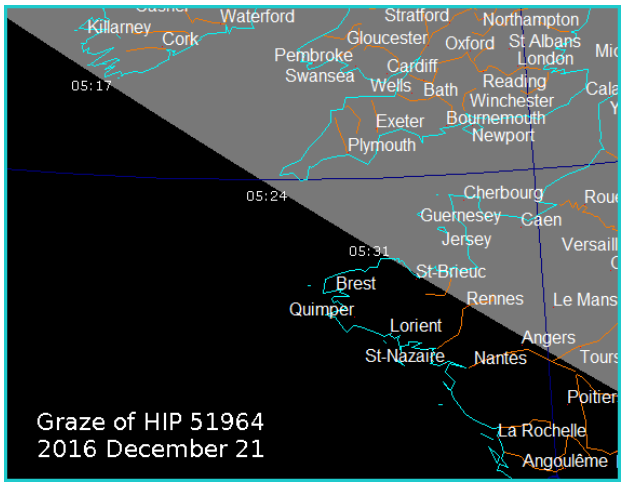
Times and Position Angles are for my location (approx: 50.9N, 1.8W) and will vary by up to several minutes for other UK locations. The phases are (**D**)isappearance, (**R**)eappearance and (**Gr**)raze; I have only listed dark-limb events unless there is a **(B)**. The highlights for the UK are the grazing occultation of 75 Tau in the early hours of the 13th (Donegal/Antrim/ Dumfries/Lake District/North Yorks) and a full occultation of Aldebaran a few hours later. There is also a graze of HIP 59164 on the 21st , which passes through Brittany and may be observable from the Scillies.

Lunar Occultations, Dec 2016, 50.9°N, 1.8°W							
Date	**Time**	**Phase**	**Star**	**Spectrum**	**Magnitude**	**Cusp Angle**	**Position Angle**
Dec 02	17:40:27	D	HIP 93996	B2	5.6	82N	70
Dec 05	21:08:15	D	HIP 107750	A1	6.3	83S	77
Dec 06	17:12:55	D	HIP 111398	K0	6.5	30N	8
Dec 06	20:30:00	D	HIP 111910	G0	6.9	59S	99
Dec 07	18:31:14	D	HIP 115892	K2	7	70N	46
Dec 09	19:20:02	D	89 Psc	A3	5.1	57S	98
Dec 11	17:54:42	D	HIP 14764	B8	6	60S	95
Dec 12	19:38:07	D	48 Tau	F5	6.3	61S	90
Dec 12	21:36:46	D	γ Tau	G8	3.7	52S	99
Dec 13	00:37:43	D	70 Tau	F7	6.6	50S	100
Dec 13	02:08:25	D	θ1 Tau	G7	3.8	29S	120
Dec 13	02:16:25	D	HIP 20916	F7	6.7	69S	80
Dec 13	02:17:30	D	75 Tau	K2	5	59N	28
Dec 13	02:32:14	Gr	75 Tau	K2	5	24.4N	
Dec 13	02:59:06	D	HIP 21029	A6	4.8	66S	82
Dec 13	03:04:41	D	HIP 21053	F5	6.5	56S	93
Dec 13	05:23:02	D	Aldebaran	K5	0.9	69N	35
Dec 16	03:33:29	R	74 Gem	M0	5	46N	331
Dec 18	01:37:11	R	HIP 46713	K0	6.9	78N	302
Dec 18	03:43:26	R	HIP 47022	B9	6.8	62N	318
Dec 21	05:31:30	Gr	HIP 59164	F2	7	3.3S	
Dec 21	05:48:48	R	HIP 59164	F2	7	30S	234



The Moon

Dec 07	First Quarter
Dec 14	Full Moon
Dec 21	Last Quarter
Dec 29	New Moon



Equipment Mini-Review

Oberwerk Ultra 10x50 (United Optics BA8)

Manufacturer's Specification

Weight (g)	1600
Field of View (°)	6.6
Eye Relief (mm)	18
IPD (mm)	57-73
Waterproof	Yes
Prism Type	Porro
Origin	China
Body Material	Metal
Armour Type	Rubber
Nitrogen Gas Filled	Yes
Prism Material	BaK4
Prism Coating	Multi-coated
Lens Coating	Fully multi-coated
Eyecup Type	Fold down

This was my sturdy 10x50 workhorse for several years. It is available under several other brand names including *Helios Apollo, William Optics, Delta Extreme, Orion Resolux*.

It comes with a well-padded neck strap and a semi-rigid cordura case. It has well-fitting, tethered objective caps and eye-lens caps. It is not internally stopped, so you get the full 50mm equivalent aperture. It is noticeably heavier and slightly larger than both the *Helios Stellar* and *Lunt magnesium* 10x50s that were reviewed in February and September 2016 respectively. Its coatings are well applied and it is nearly as bright as the *Lunt.* Its eye relief for spectacle wearers is poor; it is specified as 18mm, but the eye lenses are recessed 7mm into their barrels so, even with the eye cups folded down there is only 11mm effective eye relief.

It is very comfortable to use and, although it is heavy at 1600g, this does help to damp any shakes. Its individual eyepiece focusing makes it suitable for astronomy. Focus is smooth, but suitably stiff, so you are unlikely to accidentally defocus it. It is waterproof and nitrogen-filled so it will not suffer from internal condensation if you use it on humid nights. Control of stray light is very good. Control of false colour is very good on axis, but becomes noticeable on bright objects once they are off-axis, although it is still well-controlled and not overly obtrusive. I did not notice it at all on first magnitude stars. It is sensitive to eye positioning.

Albireo (34 arcsec) splits cleanly to about 85% of the way out from the centre. There is very little vignetting or field curvature noticeable at the edge.

I consider this to be a good choice of binocular for someone who wants a significant step-up from the entry level stuff, but does not want to go to the expense of a premium instrument.

Public Outreach & Talks

During December I will be at the following events, where I would be delighted to meet any readers of this newsletter who attend:

8th:	StarQuest Astronomy Club	**The Star of Bethlehem** *(Talk)*
13th:	Cody Astronomical Society	**How Old is it?** *(Talk)*

Wishing you Clear Dark Skies,

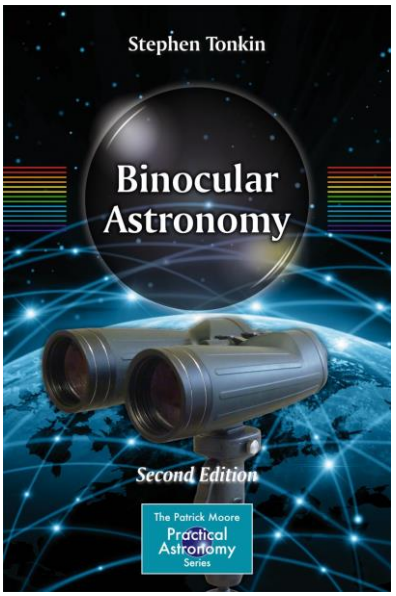
Steve Tonkin

for

The Binocular Sky

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

- Purchase my book, Binocular Astronomy: Click on the image for more information
- Make a purchase via the affiliate links in the Binocular Sky shopfront
- Make a small PayPal donation to newsletter@binocularsky.com



Acknowledgments:

The charts in this newsletter were prepared with Guide v9.0 from http://projectpluto.com

Variable star data based on David Levy's *Observing Variable Stars*

Lunar occultation data derived with Dave Herald's *Occult*

Asteroid occultation data derived from Hristo Pavlov's *OccultWatcher*

Disclosure: Links to *Amazon* or *The Binocular Shop* may be affiliate links

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