





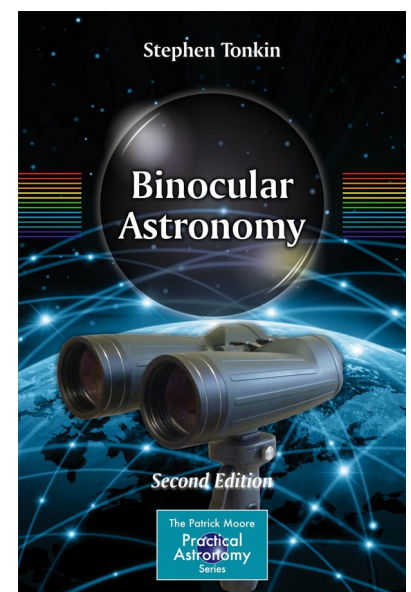
Introduction

Welcome to the **Binocular Sky** Newsletter of November 2015. 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.

Solar-system charts are clickable and will take you to a (usually) larger chart that may be more useful as well as being downloadable to your computer, tablet or smartphone.

If you would like me to email this newsletter to you each month, please complete and submit the [subscription form](#). You can get “between the newsletters” alerts, etc. via  and .

If you would like to support this Newsletter, the simplest way is to purchase my book, [Binocular Astronomy](#). Click on the image for more information.



The Deep Sky

As the sky darkens at twilight, in the North are [NGC 457 \(the Owl Cluster\)](#) and [NGC 663](#) in Cassiopeia and the [Perseus Double Cluster](#). To the East of them lie [M34](#) in Perseus and the often-overlooked [NGC 752](#) in Andromeda. Rising in the north-east is the trio of Auriga clusters, [M36](#), [M37](#) and [M38](#) and, later, [M35](#) in Gemini. 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. To the south of them, the Pleiades and Hyades are getting higher in the evening skies. Also look out for the nearby [NGC1647](#).

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 November, 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. [M51 \(The Whirlpool\)](#) and [M101](#) are becoming much more difficult owing to their lower altitudes; if you wish to see them this month, you should look as soon as the sky is dark.

Two notable exceptions to the generalisation of galaxies being poorly placed on November evenings are [The Great Andromeda Galaxy, M31](#) and [M33 \(The Pinwheel\)](#), 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 November evenings that the Sculptor Galaxy, NGC 253, becomes observable before midnight.

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!

Although the two Hercules globulars, M92 and the very impressive, and very easy to find, M13 are still observable, but their altitude becomes less favourable as the month progresses. M15 and M2 are both better placed. This is also the best time of year to observe NGC 288 in the evening.

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.

The easiest planetary nebula, M27 (the Dumbbell Nebula – although I insist that it looks more like an apple core than a dumbbell!) – is visible in the evening skies in even 30mm binoculars. The Helix Nebula, NGC 7293 is becoming less easy to observe, and is another object that you need to attempt as early as possible in the evening.

Planetary Nebulae are short-lived (generally 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 disc-like appearance of planets.

Variable Stars

Mira-type stars near predicted maximum (mag < +7.5)		
Star	Mag Range	Period (days)
R Hya*	4.5-9.5	389
V CrB	7.5-11.0	358

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
T Cep	6.0-10.3	388d	Mira
SS Cep	6.7-7.8	ca. 190d	Semi-regular
RZ Cas	6.2-7.7	1.195d	Eclipsing binary

* *R Hya* emerges from dawn twilight towards the end of the month, as a difficult, low-altitude object.

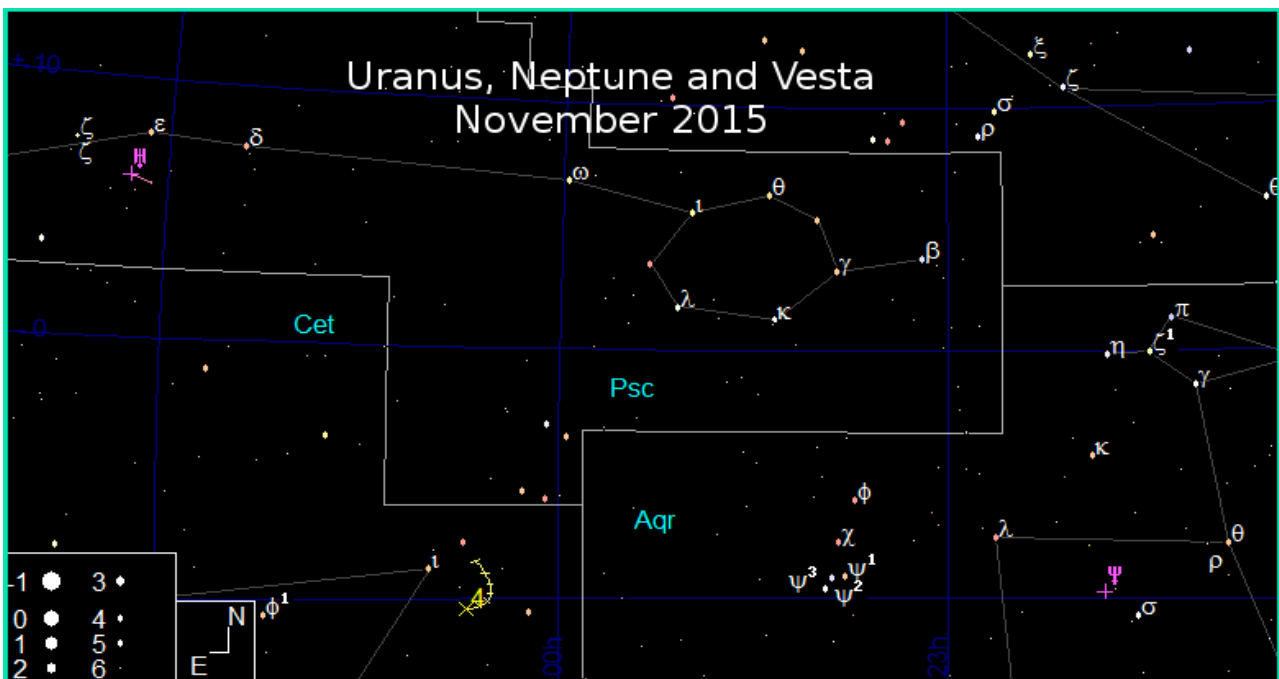
Double Stars

Binocular Double Stars for November			
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
δ 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
ρ-1 Umi	6.6, 7.2	G5, G5	31

The Solar System

Minor Planets

During November, **Asteroid 4 (Vesta)** fades from mag. +6.8 to +7.2 as it moves on a 2.5° long arc just west of ι Ceti.



Planets

Uranus shines at mag. +5.7 just S of ϵ Psc. ; it is visible throughout the hours of darkness at the beginning of the month and sets soon after 03:00 by month end. It moves just under a degree to the south-southwest during the month.

Neptune lies between λ and σ Aqr, but is much fainter than Uranus at mag. +7.9 is now best observed in the evening. It returns to prograde motion on the 17th, and its position changes by only 5 arcminutes throughout the month.

Comets

Comet 2013 US10 (Catalina) will not be visible from our latitude until next month; watch this space!

Meteor Showers

The Moon is favourable for the **Leonids**, which is active for the last 3 weeks of the month and has its peak predicted for 04:00 UT on the 17th, with a ZHR of 15. The meteors are grains of dust that were left in the wake of Comet 55P (Temple-Tuttle). As these particles enter the atmosphere, they compress and heat the air in front of them. This heat causes the surface of the particle to ablate and ionise. Binoculars are useful for observing the persistence of these ionisation trains that form the streak in the sky which is what we observe as a "shooting star".

Asteroid Occultations

There are no asteroid occultations of stars visible from the UK and suitable for binoculars this month.

Lunar Occultations

There are several occultations of stars brighter than mag +7.5 visible from the UK this month. 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 types are **(D)**isappearance, **(R)**eappearance and **(Gr)**aze; they are all dark-limb events unless there is a **(B)**.

Lunar Occultations, Nov 2015, 50.9°N, 1.8°W					
Date	Time	Type	Star	Mag	PA (°)
Nov 01	03:35	R	26 Gem	5.2	328
Nov 03	03:06	R	29 Cnc	5.9	283
Nov 04	02:43	R	SAO 98476	6.4	267
Nov 07	04:39	R	SAO 118981	6.9	295
Nov 17	18:12	D	SAO 163612	6.4	96
Nov 18	18:40	D	18 Aqr	5.5	130
Nov 19	17:25	D	SAO 145992	5.8	45
Nov 20	22:30	D	SAO 145545	6.6	53
Nov 24	23:42	D	SAO 93327	6.1	103
Nov 27	06:51	R	111 Tau	5	247
Nov 28	02:19	R	SAO 95419	5.9	280
Nov 28	06:00	R	SAO 95572	6.3	288
Nov 29	02:05	R	SAO 96611	6.5	254

The Moon

- Nov 03 Last Quarter
- Nov 11 New Moon
- Nov 19 First Quarter
- Nov 25 Full Moon

Equipment Reviews

As some readers know, I review binoculars for the *BBC Sky at Night* magazine. I have recently been approached by The Binocular Shop (part of *First Light Optics*) to review astronomical binoculars for them as well. We have agreed that they will not influence the reviews: we both value the integrity of complete independence. It's early days

at the moment, but I have posted the first reviews on the [Binocular Sky website](#). I currently have the [Helios Stellar-II 15x70](#) and [10x50](#) for review; I'll get started when the foul weather that we are experiencing at present clears, expect those reviews to be added during the coming month.

I have also been playing with the Ravelli/Amazon Basics tripod and trigger-grip combo (available from the UK and the USA). It's a very inexpensive route to mounting small binoculars; [click here](#) for more info (about half-way down the page).



Wishing you Clear Dark Skies,

Steve Tonkin

for

[The Binocular Sky](#)



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*

Occultation data derived with Dave Herald's *Occult*

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