The Binocular Sky Newsletter

December 2014

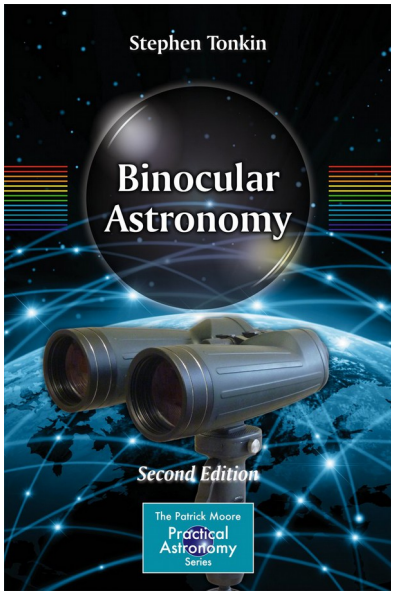
Introduction

Welcome to the ***Binocular Sky*** Newsletter of December 2014. 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. For this Newsletter to be a useful tool, it needs to have the information that **YOU** want in it; therefore please do not be shy about making requests – if I can accommodate your wishes, I shall do so.

Solar-system charts are now clickable and will take you to a (usually) larger chart that may be more useful as well as being downloadable to your computer 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. Please click on the image for more information.



The Deep Sky *(Hyperlinks take you to charts and more information)*

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 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 I 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

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.

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.

Variable Stars

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

Double Stars

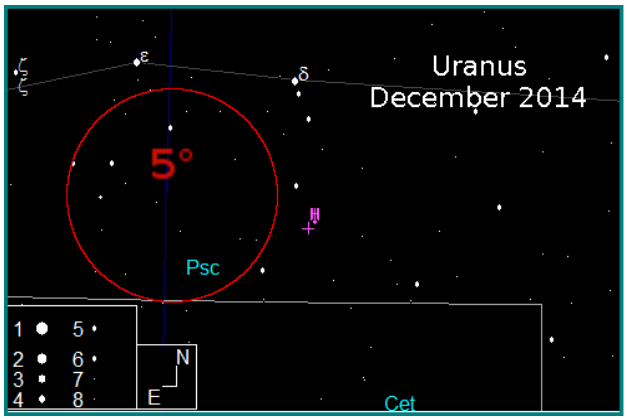
Binocular Double Stars for December			
Star	**Magnitudes**	**Spectral Types**	**Separation (arcsec)**
δ Cep	4.1, 6.1	F5, A0	41
56 And	5.7, 5.9	K0, K2	128
ΣI 1 And	7.1, 7.3	G5, G5	47
ψ-1 Psc	5.3, 5.8	A2, A0	30
14 Ari	5.0, 7.9	F0, F2	106
62 Eri	5.4, 8.9	B9, B8	67
τ Tau	4.3, 7.0	B5, A0	63
ν Gem	4.1, 8.0	B5, A0	113
ζ Gem	4.0, 7.6	G0, G	101
p-1 Umi	6.6, 7.2	G5, G5	31

The Solar System

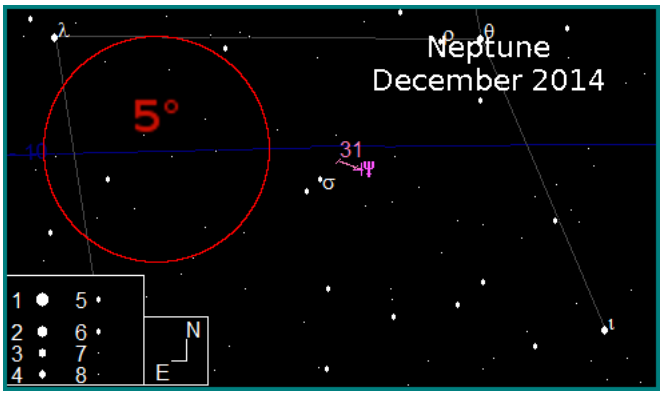
(The charts in this section are "clicky")

Planets

Of the binocular planets, **Uranus** is becoming easier to observe during the evening, shinning at magnitude +5.8 and just over 3° south *δ Psc.* Its position varieds by only 11 arcminutes during during the month.



Neptune starts the month half a degree W of σ *Aqr* and moves retrograde just over half a degree to the NW over the course of the month. It is much fainter than Uranus at magnitude +7.9, and is becoming a tricky binocular target in the evening sky.



The Moon

Dec 06 Full Moon

Dec 14 Last Quarter

Dec 22 New Moon

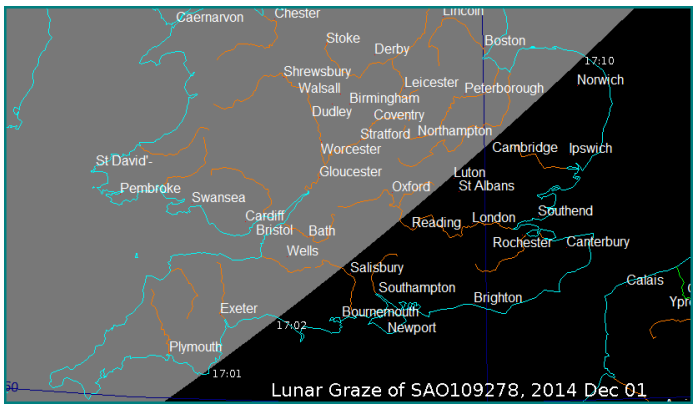
Dec 28 First Quarter

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 (**G**)raze.

Lunar Occultations, Dec 2014, 50.9°N, 1.8°W					
Date	**Time**	**Type**	**SAO**	**Mag**	**PA (°)**
Dec 01	17:05:01	GR	109278	7.5	173
Dec 02	01:25:41	D	109471	5.7	56
Dec 02	17:15:48	D	109907	6.2	77
Dec 02	20:02:30	D	109964	6.5	132
Dec 02	21:19:33	D	109990	7	173
Dec 03	00:50:16	D	110063	7.3	104
Dec 03	02:51:36	D	o Psc	4.3	145
Dec 03	18:56:07	D	92941	7.4	60
Dec 04	01:22:59	D	93022	5.6	150
Dec 05	04:19:51	D	93524	6.4	132
Dec 05	23:27:11	D	93913	7	114
Dec 06	00:44:43	D	93927	7.5	34
Dec 07	04:52:55	R	94554	5.4	259
Dec 07	22:34:37	R	95337	6.4	308
Dec 08	00:47:32	R	95419	5.9	257
Dec 08	04:58:55	R	95572	6.3	267
Dec 08	05:36:58	R	95602	7.4	233
Dec 08	20:52:30	R	96371	7.1	253
Dec 09	03:12:14	R	96611	6.5	325
Dec 09	04:52:08	R	96652	7.3	256
Dec 09	07:04:46	R	λ Gem	3.6	301
Dec 10	03:23:52	R	97503	7.3	292
Dec 10	22:04:45	R	45 Cnc	5.6	242
Dec 11	01:15:44	R	FX Cnc	6.7	276
Dec 11	22:50:22	R	6 Leo	5.1	262
Dec 12	04:59:15	R	117851	6.8	270
Dec 13	01:43:17	R	118271	6.5	193
Dec 15	05:08:57	R	138521	7.1	325
Dec 16	06:50:28	R	138967	6.3	240
Dec 18	06:09:16	R	158554	6.5	217
Dec 23	17:56:55	D	HIP 96666	7.4	22
Dec 23	17:57:24	D	HIP 96667	7.3	21
Dec 25	18:40:13	D	164555	6.1	102
Dec 26	17:02:42	D	146142	6.9	58
Dec 27	18:05:33	D	146733	6.4	74
Dec 27	20:51:28	D	146780	5.9	70
Dec 28	20:37:27	D	109216	7.2	164
Dec 29	21:44:21	D	AR Psc	7.3	117
Dec 30	00:36:53	D	109907	6.2	90
Dec 31	18:20:41	D	93261	7.4	116

The occultations near the Full Moon on the 6th will be very difficult. Of particular interest are the graze on the evening of the 1st (Prawle Point approx. 17:01 to Foulness approx. 17:10) and the double-star occultation on the 23rd. Also of note are the occultations of bright stars *o Psc* (D) on the 3rd and λ *Gem* (R) on the 9th.



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*