The Binocular Sky Newsletter

No. 98
January 2020

Introduction

Happy New Year! .

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 from the southern hemisphere temperate zone.

This month, in addition to the usual content, I concentrate on the useful technique of **averted vision** (page 2).

If you are interested in lunar occultations, there is a **graze** during dawn astronomical twilight on the 15th. We also have two asteroidal occultations available to small/medium binoculars. (page 10)

The ice-giants, **Uranus** and **Neptune**, are still available in the evening. Uranus is relatively easy, but Neptune is getting quite difficult and is only available early on. It has an appulse with **Venus** on the 27th (page 8). **Vesta** is dimming, but still available (page 9).

The "extra star" in Cygnus, **χ Cyg**, is brightening (page 6). You'll need to nab it in the evening.

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The Deep Sky

(Hyperlinks will take you to finder charts and more information about the object.)

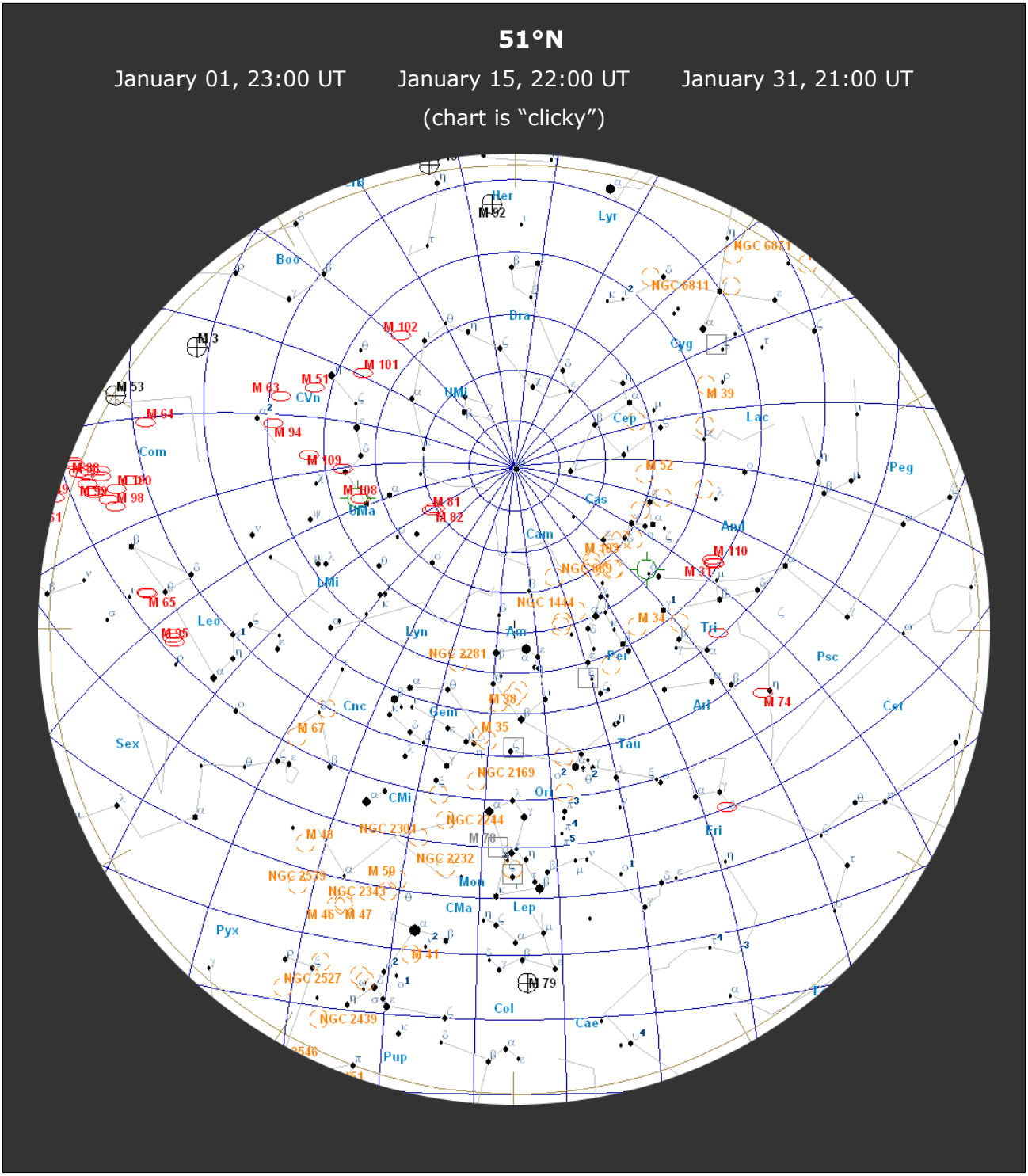
If you are still relatively new to observational astronomy, you may not yet have practiced the very useful technique of *averted vision*. This makes use of the distribution of the two different types of light-detectors in our retinas. The cone cells, which detect colour, are concentrated directly behind your pupil. There are three different types of cone cells in humans, having peak responses at 560 nm (red), 420 nm (green), and 395 nm (blue). As you will have noticed by now, with the exception of stars, we do not perceive colour in deep sky objects (or, if you watch evening twilight, you will notice colours give way to shades of grey). This is because there is insufficient photon flux to trigger the cone cells.

On the other hand, the rod cells, which are distributed more around the periphery of the retina and are not used for colour vision are about one hundred times more sensitive to light than are the cone cells: they can be activated by a single photon.

The "trick" of averted vision is to get the light from your target object to fall on a region of rod cells. To do this, you do not direct your gaze at the object, but some distance away from it, while concentrating your attention on the object of interest. Practice initially on objects that you can see with direct vision, and determine which, for you (it varies between individuals) is the best direction to look. Once you have the hang of it, you'll be able to use it to see objects that you simply cannot see with direct vision. We'll use it this month on some galaxies.

The *Pleiades* (M45) and the Great Orion Nebula (M42) culminate in the early evening, as do the trio of open clusters in Auriga and M35 in Gemini. Also in Orion, note how Betelgeuse looks fainter than usual. This is not an illusion: Betelgeuse is a variable star, but it hasn't been this faint for a long time. Binoculars should show you that it looks a bit redder than usual as

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.



well. Interestingly, in the Classical Greek era, it was reported to be yellow, not orange.

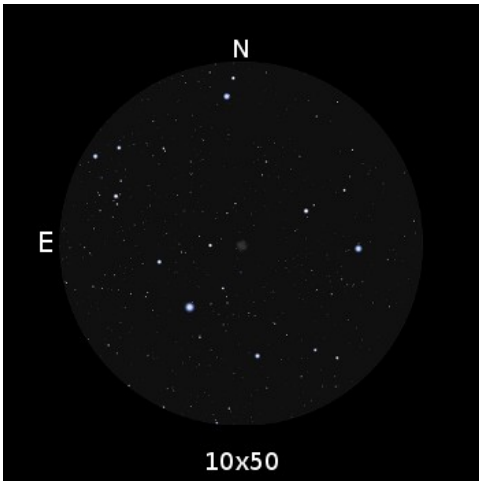
While you are looking at M35, also see if you can identify two smaller open clusters, NGC 2158, which is half a degree to the SE, and the slightly

more difficult IC 2157, which is a degree to the ESE. Also high enough to be comfortably observed are M44 (*Praesepe*) and M67 , two fine open clusters in Cancer. Lower in the southern sky are more open clusters M46, M47 and, near Sirius, M41.

The rather indistinct open cluster NGC1502, is brought to prominence by an asterism named Kemble's Cascade, in honour of Fr. Lucian Kemble, a Canadian amateur astronomer and Franciscan friar, who discovered it with a 7x35 binocular. He described as "*a beautiful cascade of faint stars tumbling from the northwest down to the open cluster NGC 1502*." It is one of the most pleasing objects in small and medium binoculars.

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.

In January, the Milky Way is overhead in the mid-to-late evening. However, two galaxies worth observing this month 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. High in the northern sky, the Ursa Major pair of Bode's Nebula (M81) and the Cigar Galaxy (M82) are conveniently placed for most of the night. We'll use these to demonstrate the effects of averted vision: acquire both galaxies in the same field of view; look at M81 and notice (without gazing back at it) what happens to M82. It seems to brighten and glow slightly.



Now let's try it on M1, the Crab Nebula supernova remnant. Identify *ζ Tau*; M1 is slightly more than 1° NW (towards *El Nath, β Tau*). Put *ζ* just SE of centre-field and concentrate your gaze on it – a small dim patch

of slightly brighter sky should just make itself apparent. You may need to experiment a bit with the best place to direct your gaze but, if the sky is dark and transparent, 10x50 should be sufficient.

If you are up around midnight (or later) it is worth looking out for the galaxy trios in Leo (M95/96/105 and M65/66/NGC3628) and Markarian's Chain in Coma Berenices. This latter group is part of the Virgo-Coma cluster of galaxies and we'll use these as our third demonstration of averted vision. I find 70mm binoculars ideal for this. Find one of the brighter galaxies in the group and centre your gaze on it. Notice the other fainter galaxies that exist around it. Now look directly at one of the fainter ones – notice how it disappears. Try not to get too frustrated by this if you are trying to count galaxies!

If you have a big binocular, also observe the edge-on NGC4565 (Berenice's Hair Clip), which is next to Melotte 111, the cluster that gives Coma its name.

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

January 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
M45 (the Pleiades)	Tau	oc	1.6	034729	240619
Kemble's Cascade	Cam	ast	9.0	035752	630711
M38 (NGC 1912)	Aur	oc	6.4	052842	355117
M1 (NGC 1952, the Crab Nebula, SN1054)	Tau	snr	8.4	053431	220051
M42 (NGC 1976, The Great Orion Nebula)	Ori	en	4.0	053517	-052325
M36 (NGC 1960)	Aur	oc	6.0	053617	340826
σ Orionis	Ori	ms	3.8	053845	-023553
M37 (NGC 2099)	Aur	oc	5.6	055218	323310
M35 (NGC 2168)	Gem	oc	5.1	060900	242100
M41 (NGC 2287)	CMa	oc	4.5	064559	-204515
M47 (NGC 2422)	Pup	oc	4.4	073634	-142846
M46 (NGC 2437)	Pup	oc	6.1	074146	-144836
M44 (NGC 2632, Praesepe, The Beehive Cluster)	Cnc	oc	3.1	083957	194020
M67 (NGC 2682)	Cnc	oc	6.9	085124	114900
M95 (NGC 3351)	Leo	gal	10.6	104357	114211
M96 (NGC 3368)	Leo	gal	10.1	104645	114912
M105 (NGC 3379)	Leo	gal	10.5	104749	123449
M65 (NGC 3623)	Leo	gal	10.1	111855	130526
M66 (NGC 3627)	Leo	gal	9.7	112015	125924
Melotte 111	Com	oc	1.8	122430	260122
Markarian's Chain	Vir	gal	9.9	122611	125647
NGC 4565 (Berenice's Hair Clip)	Com	gal	9.9	123620	255914

Variable Stars

Mira-type stars near predicted maximum (mag < +7.5)		
Star	**Mag Range**	**Period (days)**
X Oph	5.9-8.6	338
χ Cyg	3.3-10.2	408.5

Selection of binocular variables (mag < +7.5)			
Star	**Mag Range**	**Period**	**Type**
AA Cam	7.5-8.8	Irreg	Irregular
RX Lep	5.4-7.4	Irreg	Irregular

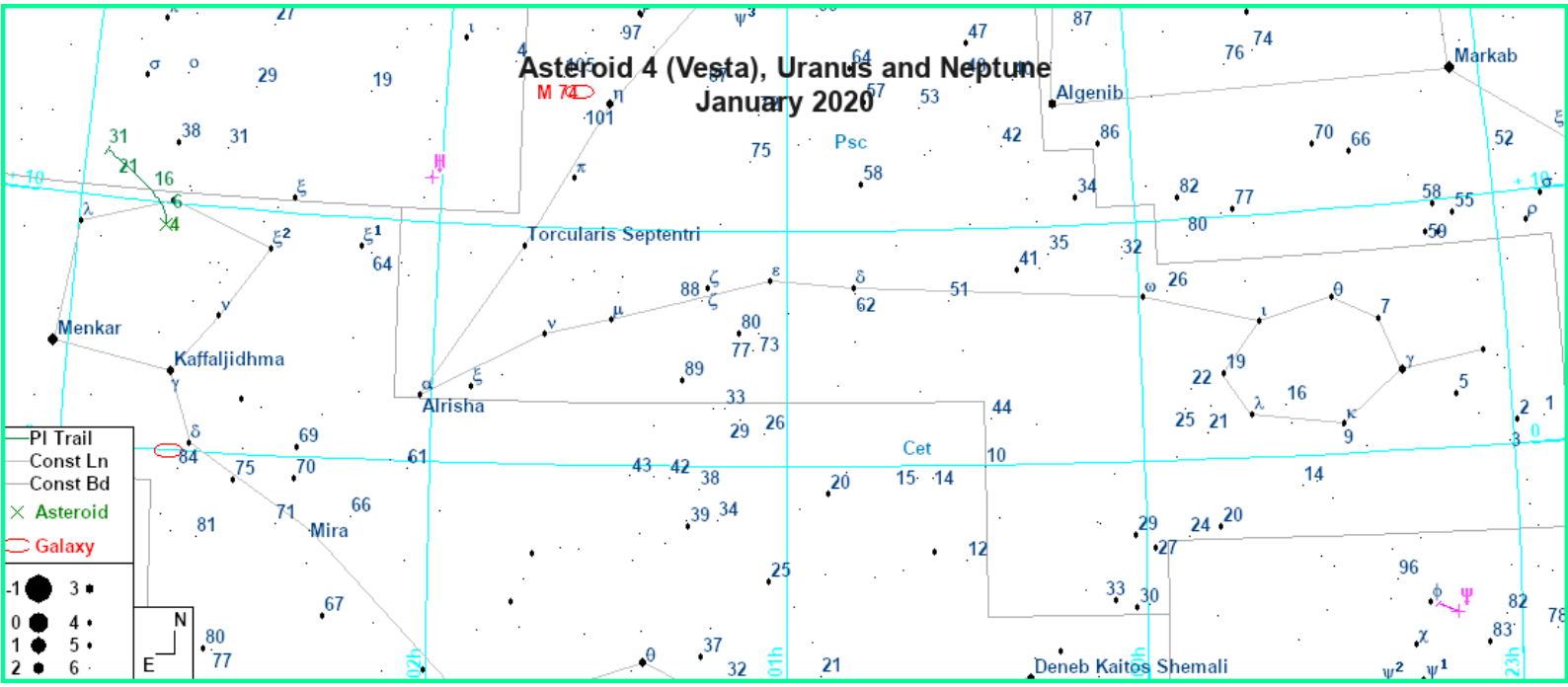
Selection of binocular variables (mag < +7.5)			
Star	**Mag Range**	**Period**	**Type**
U Cep	6.8-9.2	2.5d (increasing)	Eclipsing binary
SS Cep	6.7-7.8	ca. 190d	Semi-regular
RZ Cas	6.2-7.7	1.195d	Eclipsing binary

Double Stars

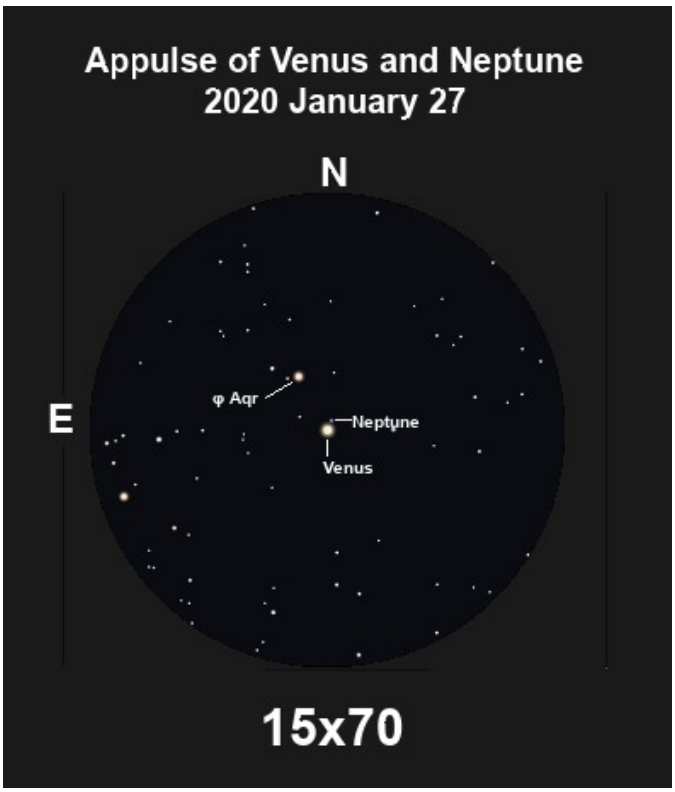
Binocular Double Stars for January			
Star	**Magnitudes**	**Spectral Types**	**Separation (arcsec)**
δ Cep	4.1, 6.1	F5, A0	41
56 And	5.7, 5.9	K0, K2	128
ΣI 1 And	7.1, 7.3	G5, G5	47
14 Ari	5.0, 7.9	F0, F2	106
62 Eri	5.4, 8.9	B9, B8	67
τ Tau	4.3, 7.0	B5, A0	63
ν Gem	4.1, 8.0	B5, A0	113
ζ Gem	4.0, 7.6	G0, G	101
ι Cnc	4.0, 6.0	G5, A5	31
p-1 Umi	6.6, 7.2	G5, G5	31

The Solar System

(Clicking on the chart below will take you to a higher resolution one)



The ice giants, **Uranus** and **Neptune**, rise in the evening but Neptune is becoming increasingly difficult as it is getting lost in evening twilight, starting the month a little more than a degree from *φ Aqr* in the direction of *λ Aqr*, and moving to within 20 arcsec of it by the 31st. On the 27th it has an appulse with Venus, making it easy to locate. The two planets will be in the same wide angle binocular field for a couple of days either side of this.



Uranus transits at about 19:30 UT on New Year's Day, and

will resume prograde motion on the 12th; it will remain visible for another few months. Uranus starts the month 4° NW of *ξ-1 Cet* and is shining at mag. +5.7, nominally naked-eye brightness, so easy in even small binoculars, even some of the 20mm plastic-lensed toy ones!

Further east in Taurus, **Asteroid 4 (Vesta)**, is easily visible to 40mm binoculars. It starts the month at mag +7.4 and fades to mag +7.9 by the end of the month. At the beginning of the month it is 1° S of *μ Cet* and tracks a curve NE upwards into Aries as the month progresses. It transits about an hour after Uranus.

The Moon

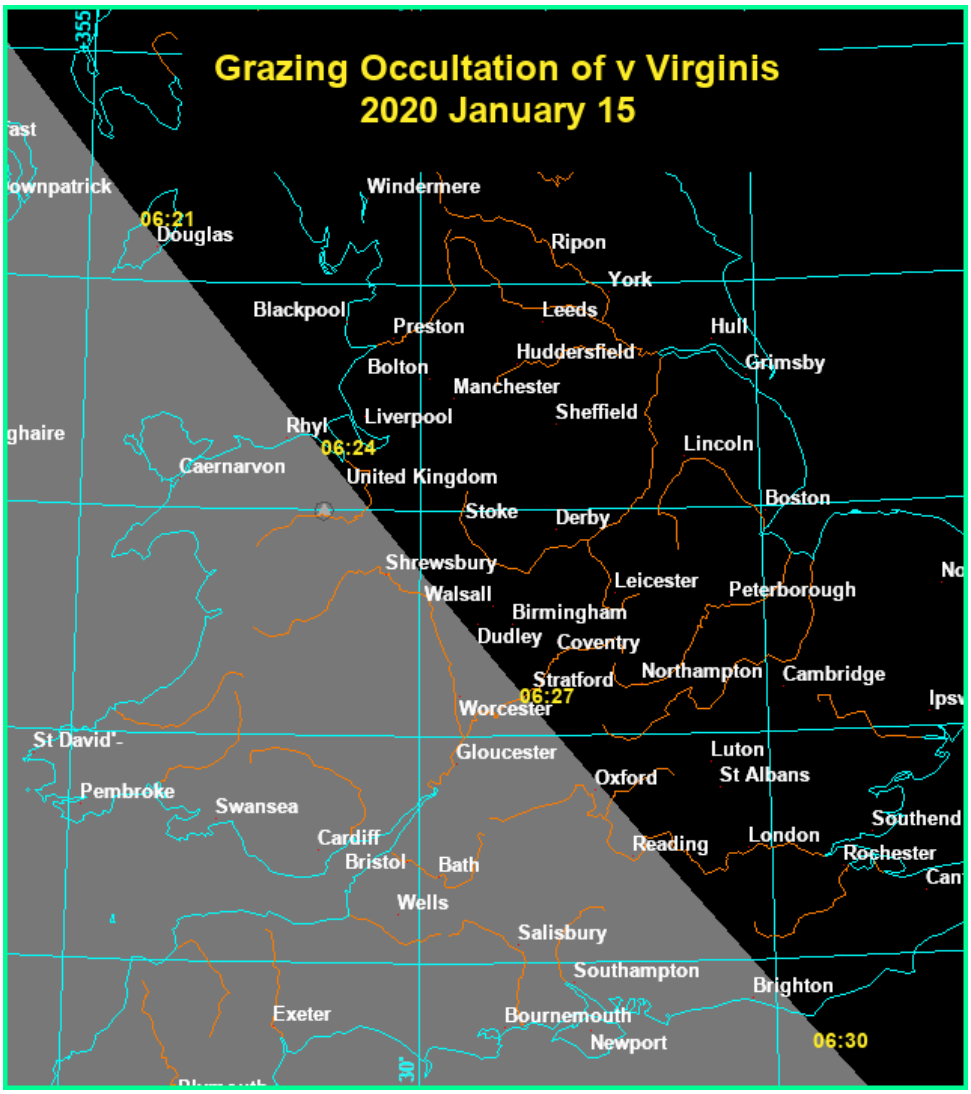
January 03	First Quarter
January 10	Full Moon
January 17	Last Quarter
January 24	New Moon

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**). The highlight is the graze of *v Vir* on the 15th (chart on p10).

Lunar Occultations 2020 50.9°N 1.8°W

Date	Time (UT)	Phase	Star	Spectral Type	Magnitude	Position Angle	Cusp Angle	Distance to Graze Track
Jan 04	20:30:53	D	HIP 9785	F0	6.8	205	87S	
Jan 09	00:59:23	D	HIP 26616	A1	6.4	238	76N	
Jan 09	17:05:09	D	Mu Gem	M3	2.9	73	45N	
Jan 09	17:48:57	R(B)	Mu Gem	M3	2.9	81	-60N	
Jan 12	01:12:03	R	HIP 42628	A0	6.8	174	83N	
Jan 15	06:20:23	D(B)	Nu Vir	M0	4.0	221	-24N	
Jan 15	06:27:13	Gr(B)	Nu Vir	M0	4.0		-8.4N	95km in Az 50°
Jan 15	06:37:44	R	Nu Vir	M0	4.0	226	6N	
Jan 21	05:58:31	R	HIP 83684	A1	6.3	135	42N	



Asteroid Occultations

19th : HIP 48324 (mag. +5.7) occulted by Asteroid 12712 (1991 EY3) for N of Scotland: Details.

27th : HIP 33179 (mag. +6.3) occulted by Asteroid 28758 (2000 HE10) for Cornwall and S of Eire: Details.

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- 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

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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