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 anywhere in the southern hemisphere.

Every year, as I prepare the January newsletter, I run the lunar occultation predictions for the coming year. Later this year we have two occultations of Uranus and one of Mars to look forward to, as well as some grazing occultations. But none of these are this month…

This month we have at least 14 potential occultations of stars that are suitable for small to medium binoculars. Also in the Solar System, we're losing Neptune, but Uranus and Ceres are still available, although the latter is now fading.

Comet Leonard's southerly declination was less than ideal for northern observers, but Comet Borelly, although not as bright, is far better placed.

We're still in "open cluster season" in the temperate North, but January pre-dawn mornings herald one of my favourite bits of sky: the Virgo-Coma region of galaxies.

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 on the objects.)

Two marvellous binocular targets, the *Pleiades* (M45) and Collinder 70 (which too few people spend time with in their haste to get to the Great Orion Nebula) culminate in the early evening, as do the trio of open clusters in Auriga and M35 in Gemini. While you're in the Orion region, have a look at the stars Betelgeuse and Sirius. In the Classical Greek era, they were described as yellow and red respectively!

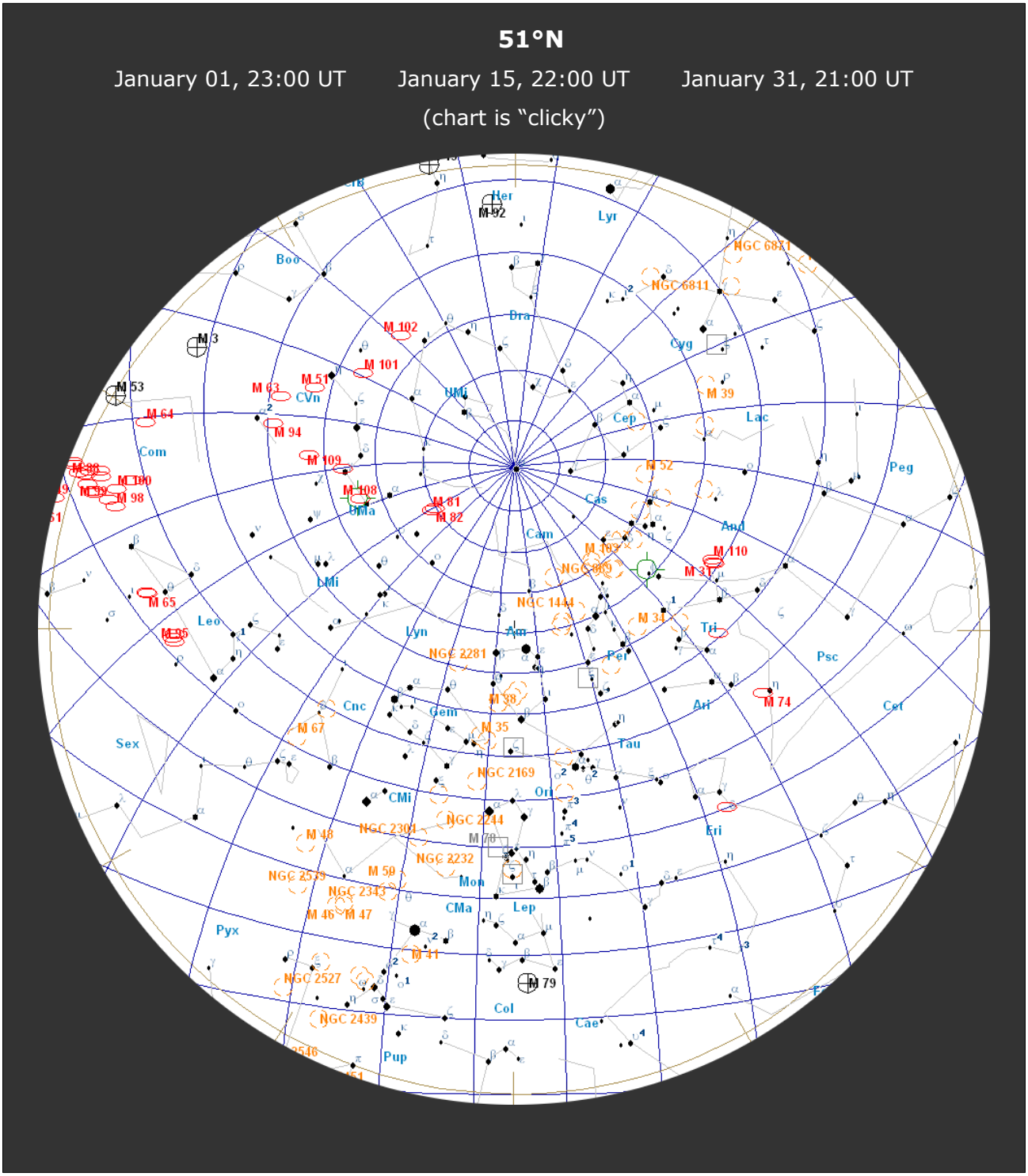
While you are looking at M35, also see if you can identify two smaller open clusters, NGC 2158, which is half a degree to the SE, and the slightly more difficult IC 2157, which is a degree to the ESE. Also high enough to be comfortably observed are M44 (*Praesepe*) and M67 , two fine open clusters in Cancer. Just above M44 youwill find the close (for binoculars) double star iota Cancri. Lower in the southern sky are more open clusters: M46, M47 and, near Sirius, M41.

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 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.

In January, the Milky Way is overhead in the mid-to-late evening, which is why so many open clusters are on view (see the chart). We need to look away from the plane of our galaxy to see other galaxies, but The *Great Andromeda Galaxy*, M31 and M33 (*The Pinwheel*) are both close to the plane of the Milky Way so are worth observing in January evenings. M31 in particular is very easily visible this month and is a

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.



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 therefore 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 as they too appear quite close to the galactic plane. We can 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. When you look directly at M82, it fades and M81 brightens. If you're not used to using averted vision, practice it a bit – it'll come in handy with the next object.

We can 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 although, of course, more aperture and magnification will make it easier.

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 can use averted vision to good effect here as well. 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 Berenices its name.

For interactive maps of Deep Sky Objects visible from 51°N, you can visit: https://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
Collinder 70	Ori	oc	0.4	053532	-010407
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
IC 2157	Gem	oc	8.4	060451	240358
NGC 2158	Gem	oc	8.6	060726	240546
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
iota Cancri	Cnc	ms	4.0	091110	282426
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
NGC 3628	Leo	gal	10.4	112016	133522
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

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

Variable Stars

Mira-type stars near predicted maximum (mag < +7.5)		
Star	**Mag Range**	**Period (days)**
UV Aur	7.3 – 11.1	393.7

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
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

The Solar System

(Low resolution charts may be "clicky" for higher resolution alternatives)

The Moon

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

Lunar Occultations

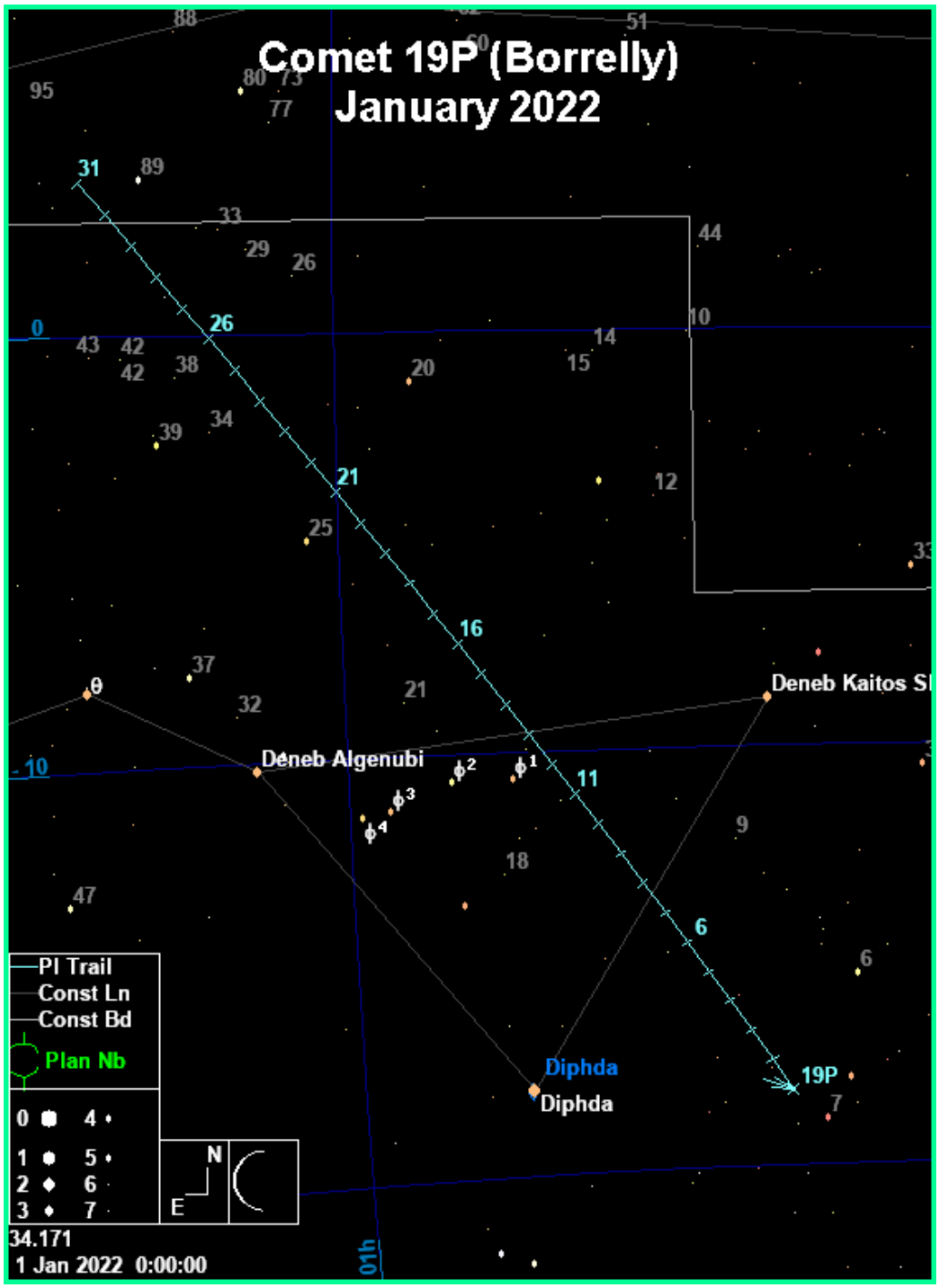
Data are for my location and may vary by several minutes for other UK locations. The phases are (**D**)isappearance, (**R**)eappearance and (**Gr**)aze; they are dark-limb events unless the Cusp Angle is negative.

Lunar Occultations 2022 50.9°N 1.8°W

Date	Time (UT)	Phase	Star	Spectral Type	Magnitude	Position Angle	Cusp Angle
Jan 06	15:59:05	D	tau Aqr	K5	4.1	7	25N
Jan 06	16:45:42	R	tau Aqr	K5	4.1	288	-53N
Jan 08	18:34:19	D	HIP 2496	A0	7.1	73	84S
Jan 09	22:30:02	D	HIP 6441	G5	6.9	67	89N
Jan 17	07:01:46	D	57 Gem	G8	5	120	89S
Jan 20	22:07:38	R	46 Leo	M2	5.4	277	82S
Jan 22	04:25:52	R	HIP 56079	F5	6.7	269	69S
Jan 24	01:16:53	R	46 Vir	K2	6.2	251	49S
Jan 24	03:21:47	R	48 Vir	F0	6.7	305	77N
Jan 25	04:31:59	R	HIP 68038	F5	6.9	352	28N
Jan 26	03:45:33	R	5 Lib	K2	6.3	258	61S
Jan 26	05:35:37	D	alpha Lib	A3	2.8	137	-60S
Jan 26	06:37:37	R	8 Lib	F3	5.2	287	89N
Jan 26	06:45:37	R	alpha Lib	A3	2.8	284	87S

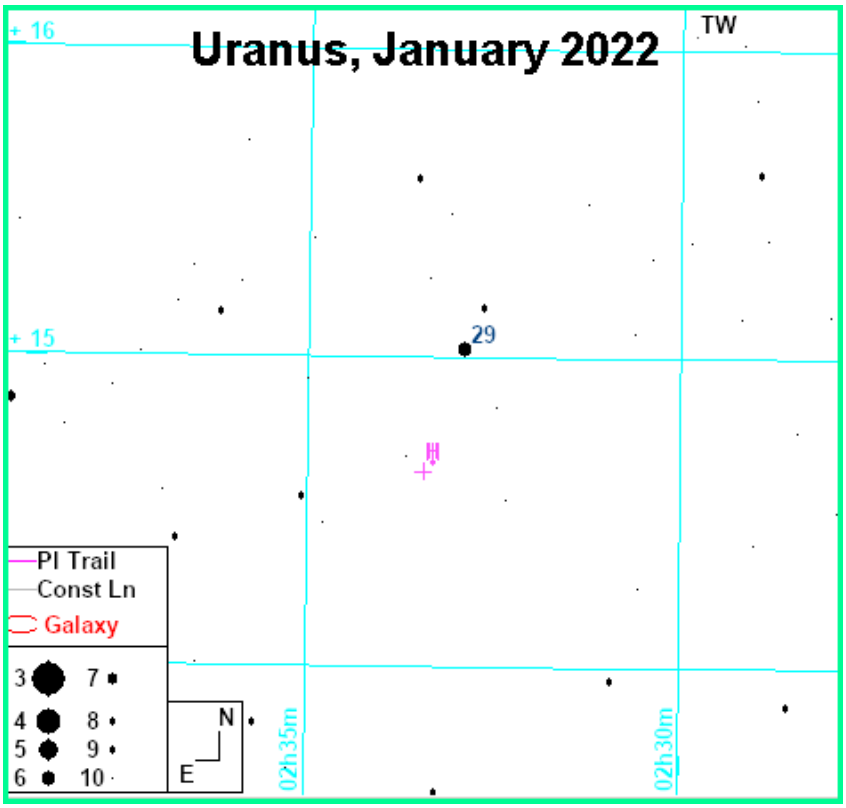
Comets

Comet 19P (Borrelly) is an evening object for small binoculars. It is at a decent elongation, so is still at a reasonable altitude at the end of astronomical twilight. It will brighten to about mag +8.7 by the 20th, before fading slightly towards the end of the month

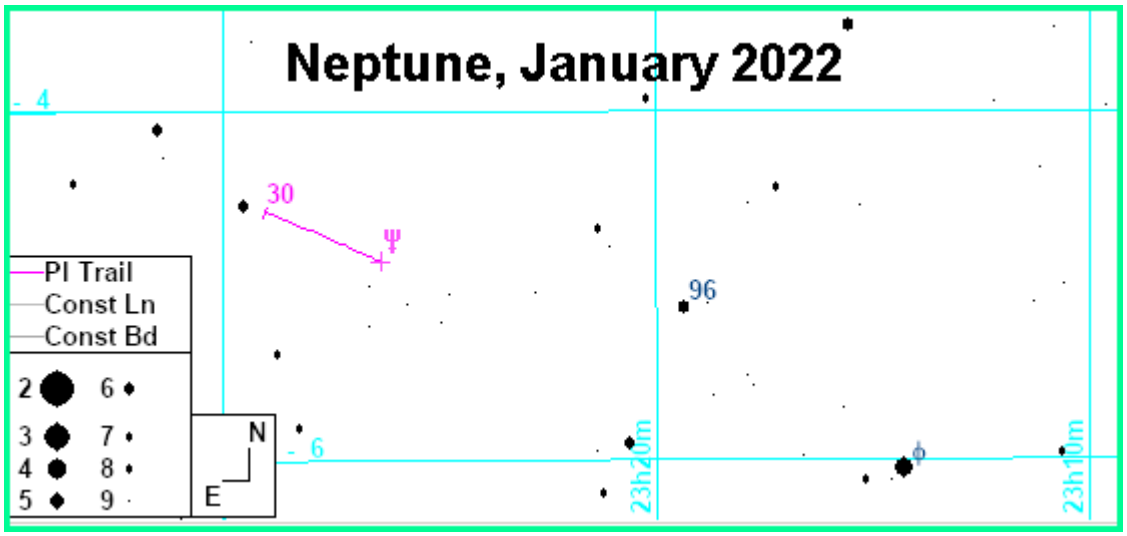


Planets

Uranus (mag +5.7) is now an evening object in Aries, 0.5° S of *29 Arietis*; it only moves a few arcminutes during the month, but they are magnitude brighter than anything within a couple of degrees of them so they should be easy to identify.

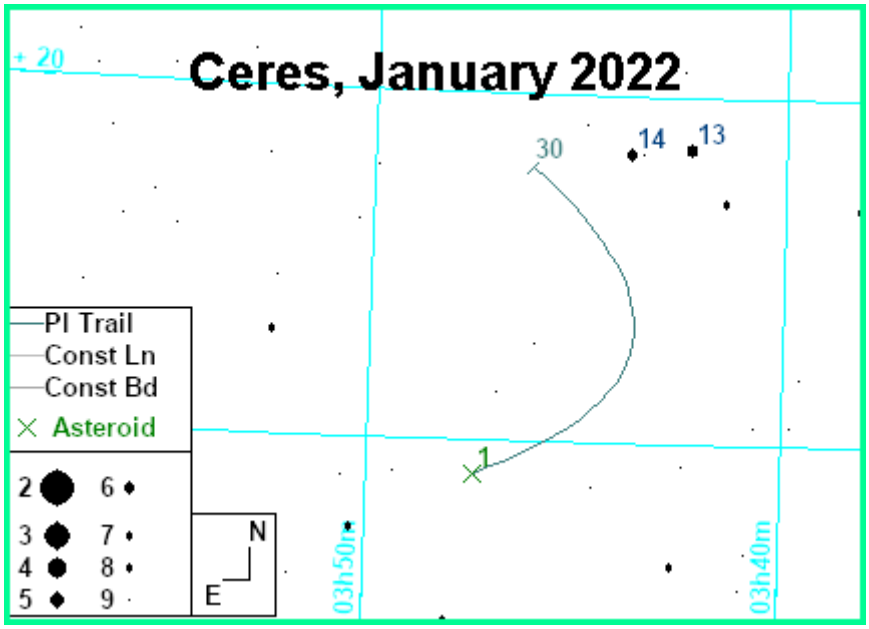


Neptune (mag +7.9) will become difficult by the end of the month, so you should look early in the evening, early in the month. Use *φ* and *96 Aquarii* to locate it. It moves 45 arcmin eastward during the month.



Asteroids

Asteroid 1 (Ceres) is a binocular object in Taurus, in the same 10x50 field of view as *13* and *14 Tauri*, which you can use to locate it. It fades from mag +7.7 to +8.3 over the course of the month.



Meteor Showers

The **Quadrantids** are the first meteor shower of the year, but unfortunately they coincide with a gibbous Moon. The shower has its narrow (6 hour) peak predicted for the afternoon of the 3rd, with a ZHR of 110 (but don't expect to see more than about 15 per hour). Most meteors are due to debris left by comets, but the Quadrantid shower is one of two (the other is the Geminid shower, which was active last month) that originates from an asteroid, in this case asteroid **2003 EH**. You can use binoculars to examine the persistence of any ionisation trains from any fireballs – the normal-brightness meteors of this shower tend not to leave persistent trains, but the shower often produces several fireballs.

Public Outreach & Talks

If you're at any of these, do come and say hello (or give me a virtual "wave" if it's on Zoom). Dates are UT.

Jan 4th	Wantage and Grove U3A	**Time and Calendars**
Jan 26th	Langton Arms, Tarrant Monkton	**Public Stargazing**
Jan 27th	New Milton U3A	**Pseudoastronomy: Planet X, Zetans and Lost Civilisations**
Jan 27th	Tarrant Monkton "Winter Warmers"	**The Right Light at Night + Stargazing**
Jan 28th	Salisbury Young Farmers	**Responsible Lighting + Stargazing**

Zoom/Webex Talks during the SARS-CoV-2 emergency?

I regularly give talks on *Binocular Astronomy* and numerous other astronomical topics. I'm happy to do this – potentially anywhere in the world – on Zoom or Webex if that is of interest.

If you would like a talk for your society/group, Click here for current talks.

For schools/scouts/guides, etc., I am a STEM Ambassador and will charge you nothing except travel expenses.

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 small PayPal donation to 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

---