The Binocular Sky Newsletter

No. 132
December 2022

Introduction

Welcome to the last **Binocular Sky Newsletter** of 2022. What an eventful year it has been! The winter solstice season is a time of reflection and resolution in northern temperate traditions and, in what are very uncertain times, astronomy helps me to take solace in the knowledge that we all share the same sky (as, indeed, has every sighted person who has ever lived, at least until the advent of all-night public lighting, which now denies this heritage to all but about 10% of humanity), and hope that those who are fomenting conflict will get a sense of perspective and come to accept that we have much more in common than the things that divide us.

We've got the **Pleiades** and **Orion Nebula** back in the evening sky, at last; winter I struly here.

The ice-giants, **Uranus** and **Neptune**, are only 3 hours apart in the sky, so can be observed during the same session if you time it well. Uranus is now relatively easy, but Neptune is getting quite difficult and is only available in the evening (page 8).

Prospects for the **Geminids** meteor shower will be impacted by a 70% illuminated waning gibbous Moon (page 8).

But the "big news" is that **Comet C/2022 E3 (ZTF)** is visible in medium binoculars before it sets in the early evening. (page 9).

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.)

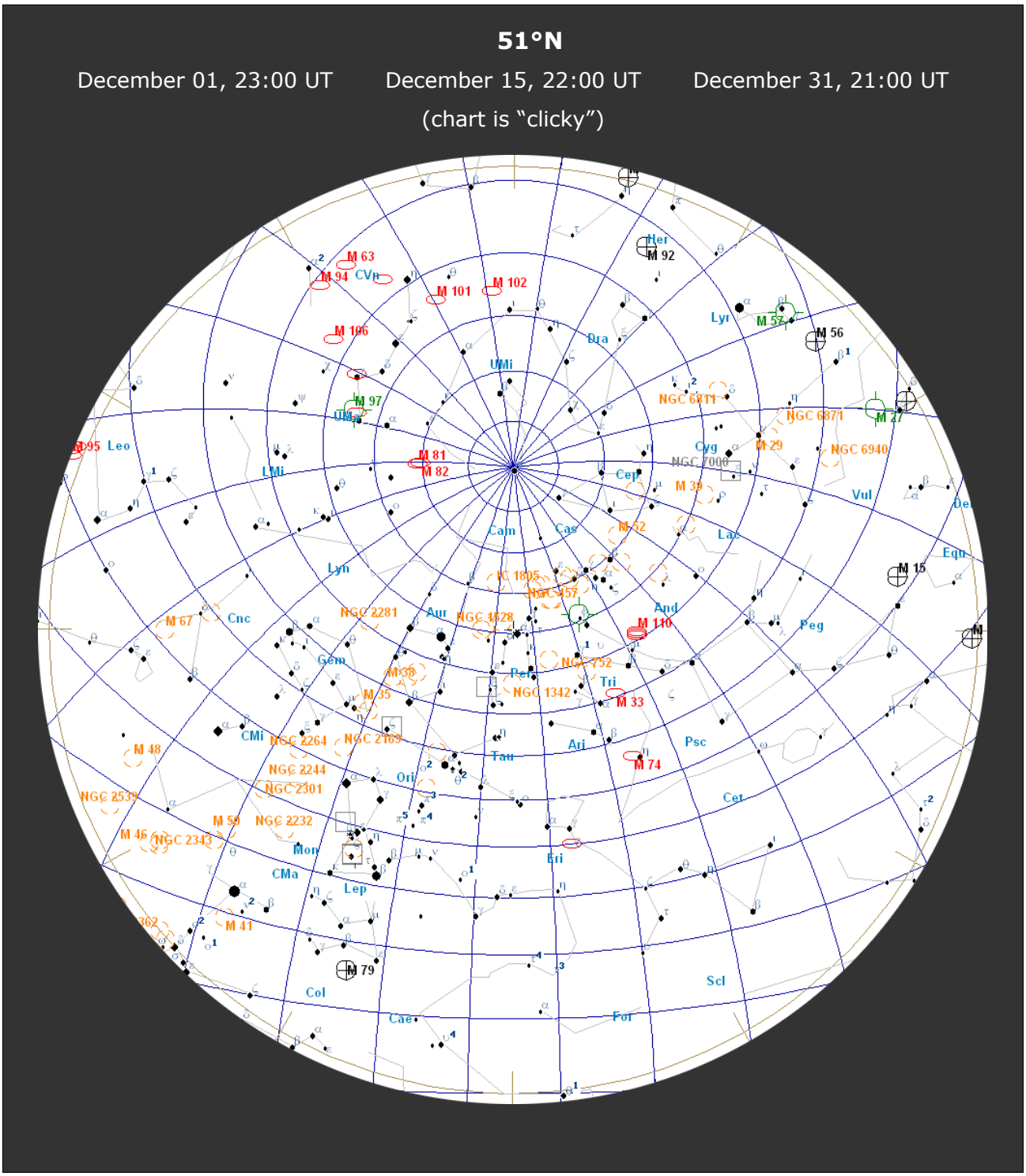
Open (also called 'Galactic') Clusters are loosely packed groups of stars that are gravitationally bound together; they may contain from a few dozen to a few thousand stars which recently formed in the galactic disk.

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.

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 December, the Milky Way is nearly 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. M81 (Bode's Nebula) and M82 (The Cigar Galaxy), are still relatively easy to observe, even in a 50mm binocular, and we can be grateful that their altitude is such that we are unlikely to get neck-strain when we do so with straight-through binoculars. This pair 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. It is in December evenings that the Sculptor Galaxy, NGC 253, becomes observable before midnight, but you will need a good southern horizon for this.

Although the two Hercules globular clusters, M92 and the very impressive, and very easy to find, M13 are still observable in the early evening, but their altitude becomes less favourable as the month progresses. M15 and M2 are both much better placed 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.

The easiest planetary nebula, M27 (the Dumbbell Nebula – also known as the Apple Core and the Diabolo) – is visible in the evening skies in even 30mm binoculars. The Helix Nebula, NGC 7293 is now about as well-placed as it gets for observation from Britain before midnight; you'll need a decent southern horizon.

Planetary Nebulae are short-lived (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 appearance of giant ghostly planets.

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

December 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
NGC 752	And	oc	5.7	015742	374700
M34 (NGC 1039)	Per	oc	5.2	024204	424542
M45 (the Pleiades)	Tau	oc	1.6	034729	240619
Melotte 25 (the Hyades)	Tau	oc	0.5	042650	154841
NGC 1647	Tau	oc	6.4	044555	190542
M38 (NGC 1912)	Aur	oc	6.4	052842	355117
M42 (NGC 1976, The Great Orion Nebula)	Ori	en	4.0	053517	-052325
M36 (NGC 1960)	Aur	oc	6.0	053617	340826
M37 (NGC 2099)	Aur	oc	5.6	055218	323310
IC 2157	Gem		8.4	060449	240350
NGC 2158	Gem	oc	8.6	060726	240529
M35 (NGC 2168)	Gem	oc	5.1	060900	242100
M81 (NGC 3031)	UMa	gal	7.8	095533	690401
M82 (NGC 3034)	UMa	gal	9.2	095554	694059
M13 (NGC 6205, the Great Hercules Globular Cluster)	Her	gc	5.8	164141	362738
M92 (NGC 6341)	Her	gc	6.4	171707	430812
M15 (NGC 7078)	Peg	gc	6.2	212958	121003
M2 (NGC 7089)	Aqr	gc	6.5	213327	-004922

Double Stars

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

Variable Stars

Mira-type stars near predicted maximum (mag < +7.5)		
Star	**Mag Range**	**Period (days)**
R And	5.8 – 15.2	409.2

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
V Aqr	7.6-9.4	ca. 244d	Semi-regular
SS Cep	6.7-7.8	ca. 190d	Semi-regular
RZ Cas	6.2-7.7	1.195d	Eclipsing binary

The Solar System

(Charts are "clicky" for higher resolution alternatives)

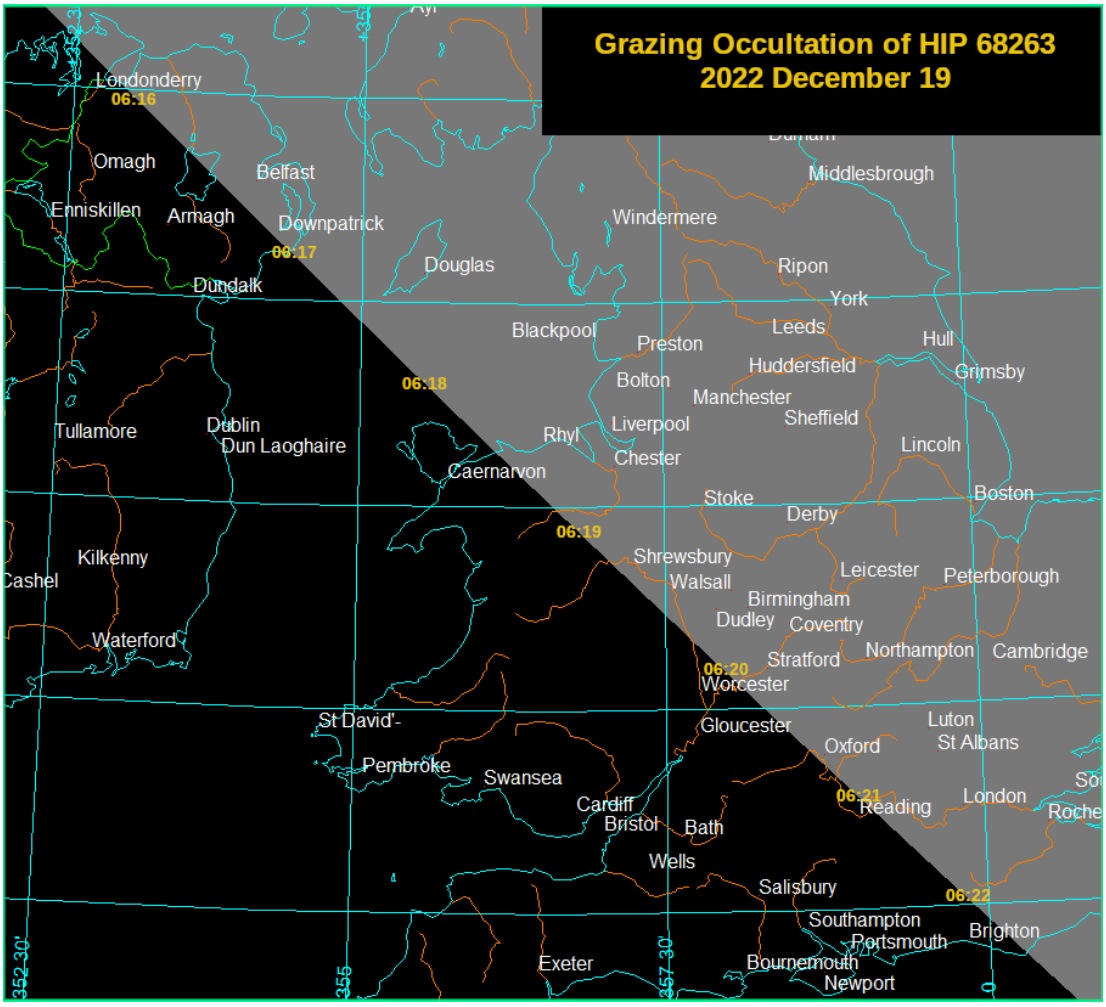
The Moon

December 08 Full Moon
December 16 Last Quarter
December 23 New Moon
December 30 First Quarter

Lunar Occultations

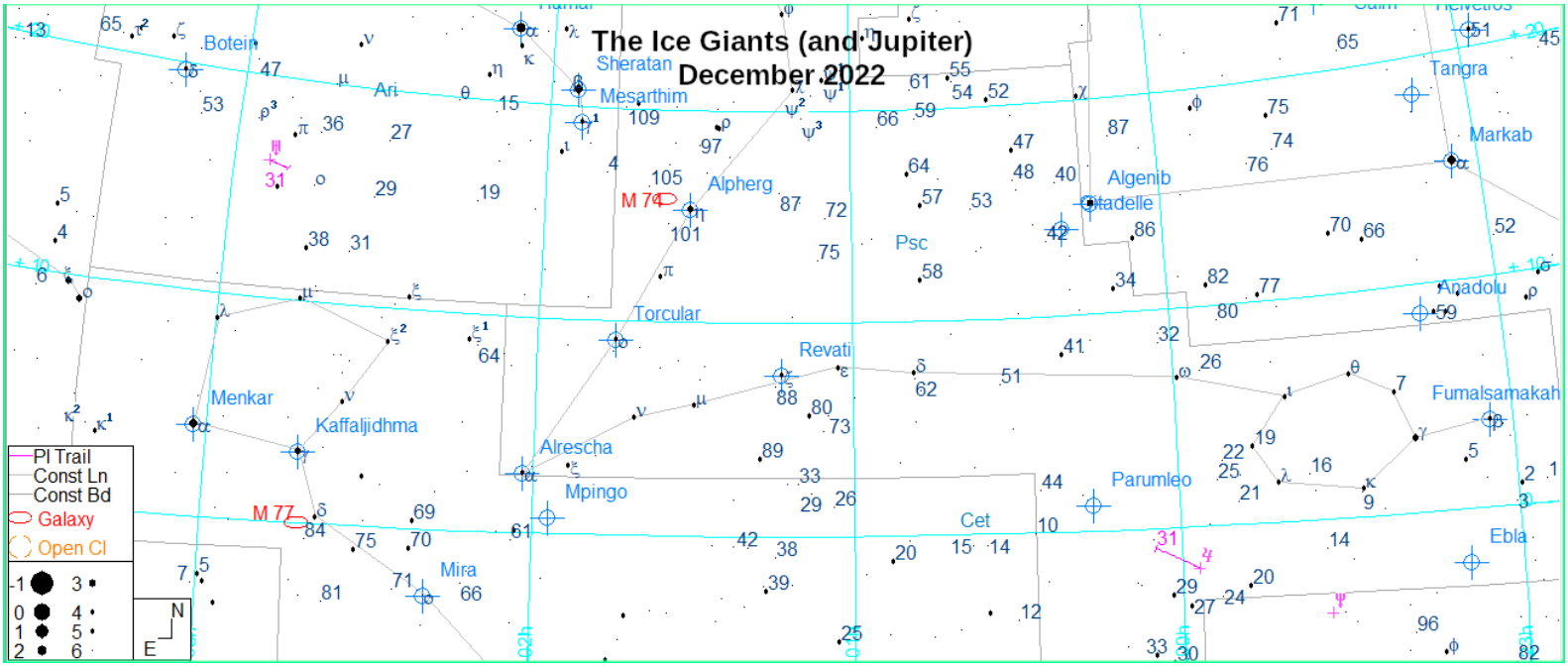
Data are for my location and may vary by several minutes for other UK locations. The phases are (**D**)isappearance, (**R**)eappearance and (**Gr**)aze; they are dark-limb events unless there is a (**B**). The highlights are the occultation of Mars by the Full Moon on the 8th and the grazing occultation of HIP 68263 on the 19th.

Lunar Occultations December 2022 50.9°N 1.8°W							
Date	Time (UT)	Phase	Star	Spectral Type	Magnitude	Position Angle	Cusp Angle
Dec 01	20:37:58	D	HIP 117420	K4	6.1	113	43S
Dec 05	16:45:30	D	Uranus		5.7	5	23N
Dec 06	01:42:04	D	53 Ari	B1	6.1	47	62N
Dec 07	05:02:08	D	37 Tau	K0	4.4	97	78S
Dec 07	05:24:37	D	39 Tau	G5	5.9	123	53S
Dec 08	05:01:04	D	Mars		-1.9	94	16N
Dec 08	06:00:02	R	Mars		-1.9	257	11S
Dec 09	20:42:50	R	994	F5	6.6	282	71N
Dec 13	01:13:33	R	HIP 45272	A2	6.5	338	36N
Dec 15	04:28:04	R	HIP 53039	K0	6.9	252	51S
Dec 16	04:53:26	R	HIP 56618	K0	6.8	252	48S
Dec 18	05:15:17	D	the Vir	A1	4.4	72	-49N
Dec 18	05:57:11	R	the Vir	A1	4.4	1	22N
Dec 19	06:20:18	Gr	HIP 68263	G5	7.0		14S
Dec 25	17:41:45	D	HIP 101823	A7	6.9	1	7N
Dec 26	19:00:43	D	HIP 107238	A0	6.2	57	71N
Dec 27	18:44:01	D	HIP 111790	A5	7.5	19	38N
Dec 28	21:08:23	D	HIP 116428	G5	6.4	72	86S
Dec 29	17:17:40	D	HIP 1470	K2	7.2	10	33N
Dec 31	23:19:11	D	HIP 9569	K0	6.5	119	41S



Planets

Uranus (mag +5.6) is now an evening object, and **Neptune** (mag +7.9) is best early in the evening; it's getting lower in the west, so will be easier to observe early in the month.

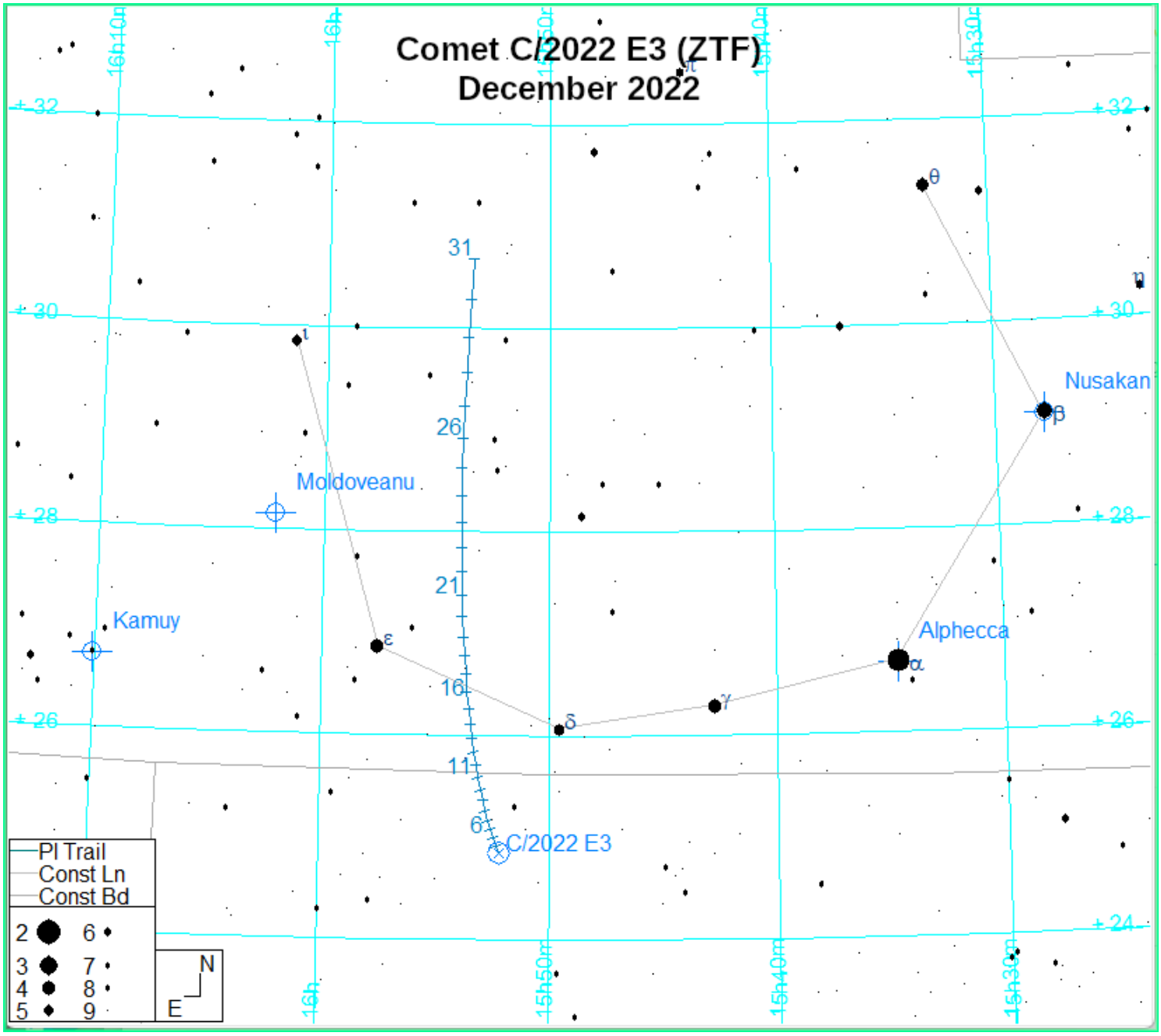


Meteor Showers

The **Geminids** is the best meteor shower if conditions are right, and although a 73% illuminated Moon nearby in Leo will impact on it this year, it rises nearly 3 hours after the onset of astro-dark, suiting early evening observers. Most meteors are due to debris left by comets, but the Geminid shower is one of two (the other is the Quadrantid shower, which peaks on January 03) that originates from an asteroid, in this case asteroid **3200 Phaethon**. You can use binoculars to examine the persistence of any ionisation trains from these slow-moving, colourful meteors, as they reveal the wind patterns in the upper atmosphere.

Comets

Comet C/2022 E3 (ZTF) is a difficult early evening object, currently at about mag. +10, but brightening as it moves northward from Serpens into Corona Borealis.



Outreach & Talks

This month I will be giving the following talks/events; please do come and say hello if you are at any of the public ones.

7th	IET	**The Star of Bethlehem**
13th	Maiden Bradley PC	**The Right Light at Night**
15th	Home Farm, Tarrant Gunville	**Stargazing Evening**
21st	Wiltshire Ornithology	**How Light Pollution Affects Birds**

Zoom/Webex/Teams Talks?

I regularly give talks, on *Binocular Astronomy* and numerous other astronomical topics. I'd be happy to do this – including locations anywhere in the world on Zoom, Webex or Teams – 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 so there will be no fee.

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 https://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*

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