Introduction

Happy New Year, and welcome to first **Binocular Sky** Newsletter of 2019.

As regular readers will know, my intention is to highlight some of the binocular (and small telescope) targets for the coming month. This is primarily intended for visual astronomers in the UK, but should have some usefulness for observers anywhere north of Latitude 30°N and possibly even further south.

January nights are nearly as long as those of December in the northern hemisphere, so there is a lot of sky that is observable. If you've not seen Neptune before, this is your last chance in this apparition, as it sinks towards the evening twilight as we approach February.

There are a couple of very tricky (twilight sky) grazing lunar occultations this month, Comet 46P/Wirtanen is still a binocular object – and is circumpolar – and we have dark skies at January's full Moon because of the total lunar eclipse.

There is also the possibility that another comet, 2018 Y1/Iwamoto may reach binocular visibility by the end of the month; if it does, I'll issue a supplement.

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 about the object.)

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.

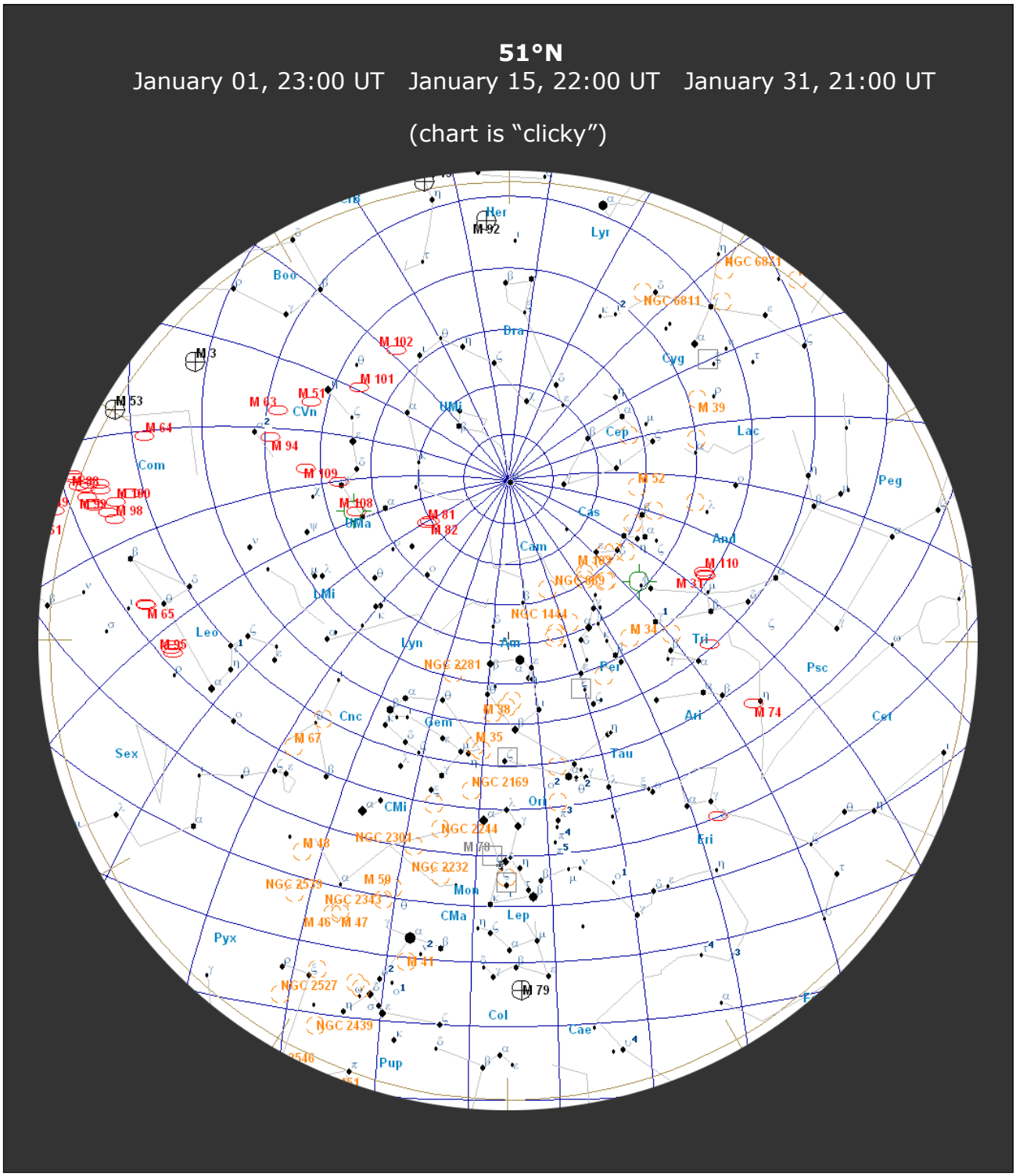
While you are looking at M35, also see if you can identify two smaller open clusters, NGC 2158, which is half a degree to the SE, and the slightly more difficult IC 2157, which is a degree to the ESE. Also high enouigh to be comfortably observed are M44 (*Praesepe*) and M67 , two fine open clusters in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

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. 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

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!



Ursa Major pair of Bode's Nebula (M81) and the Cigar Galaxy (M82) are conveniently placed for most of the night. 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. 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, please 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
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

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

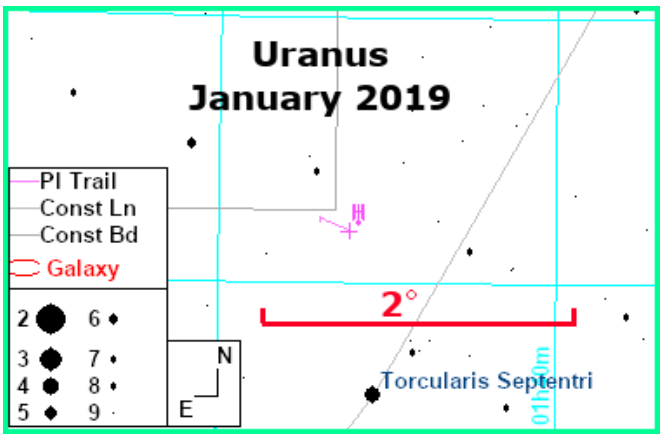
Variable Stars

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

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

NB: *X Oph* will be too low to observe satisfactorily at the beginning of the month.

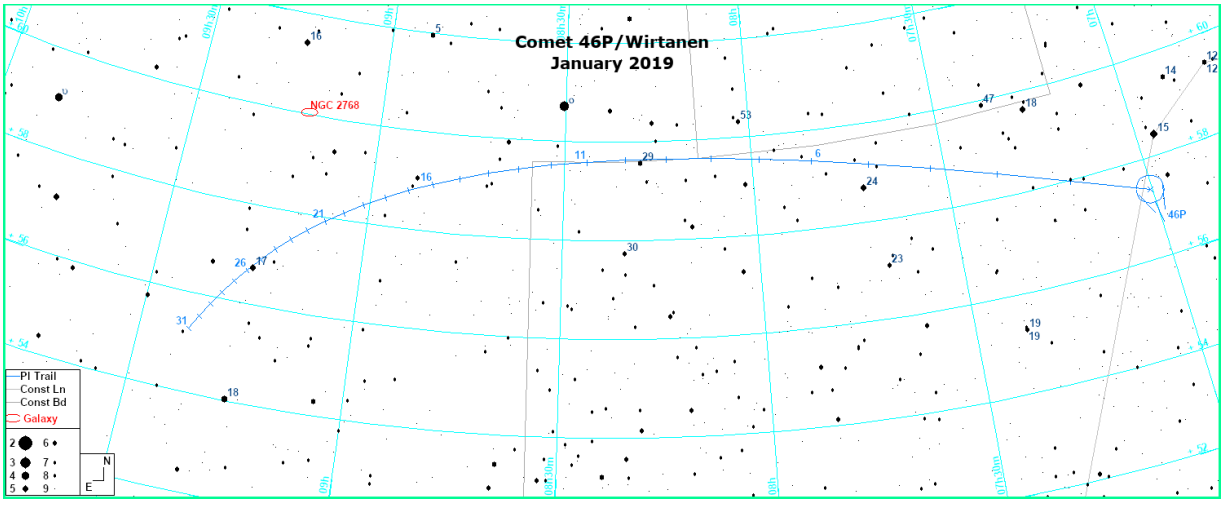
The Solar System



Uranus is available from the onset of twilight, and sets just after 02:00 at the beginning of the month and before midnight by month end. It starts the month about 1.25° north of *o Psc,* and spends the first week of January moving slightly retrograde, before reverting to prograde motion, its position changing by only 15 arcmin during the month.

Comets

Comet 46P/Wirtanen was approximately mag 5 when I was last able to observe it, but will probably fade rapidly, possibly to 8th mag or dimmer, by the end of the month. It's very well placed at the beginning of the month, passing within 10° of the zenith around midnight at latitude 50°N. If you've not yet seen it, in binoculars it looks like a large, ghostly patch; it is larger than the apparent size of the Moon. I've had my best views with a 16x70, which reveals some brightening to the centre. (The chart is "clicky")



Asteroid Occultations

There are no predicted asteroid occultations of stars mag +7.5 or brighter, observable from the UK, this month.

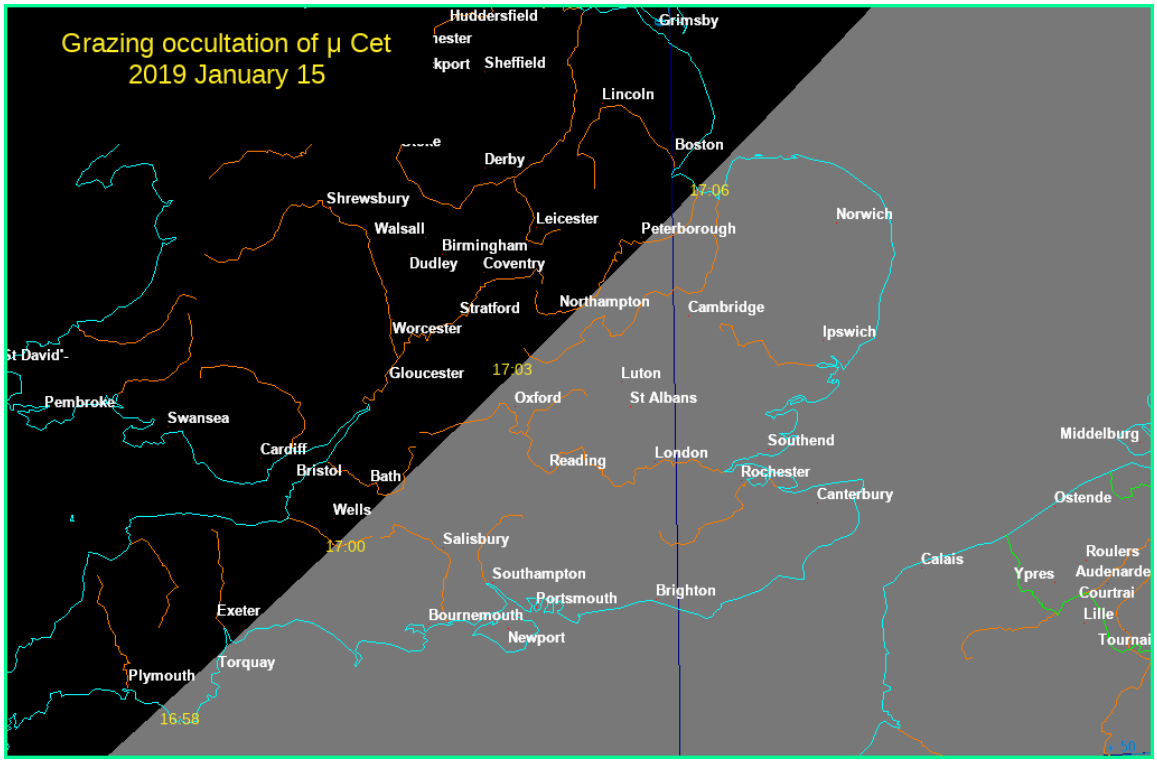
The Moon

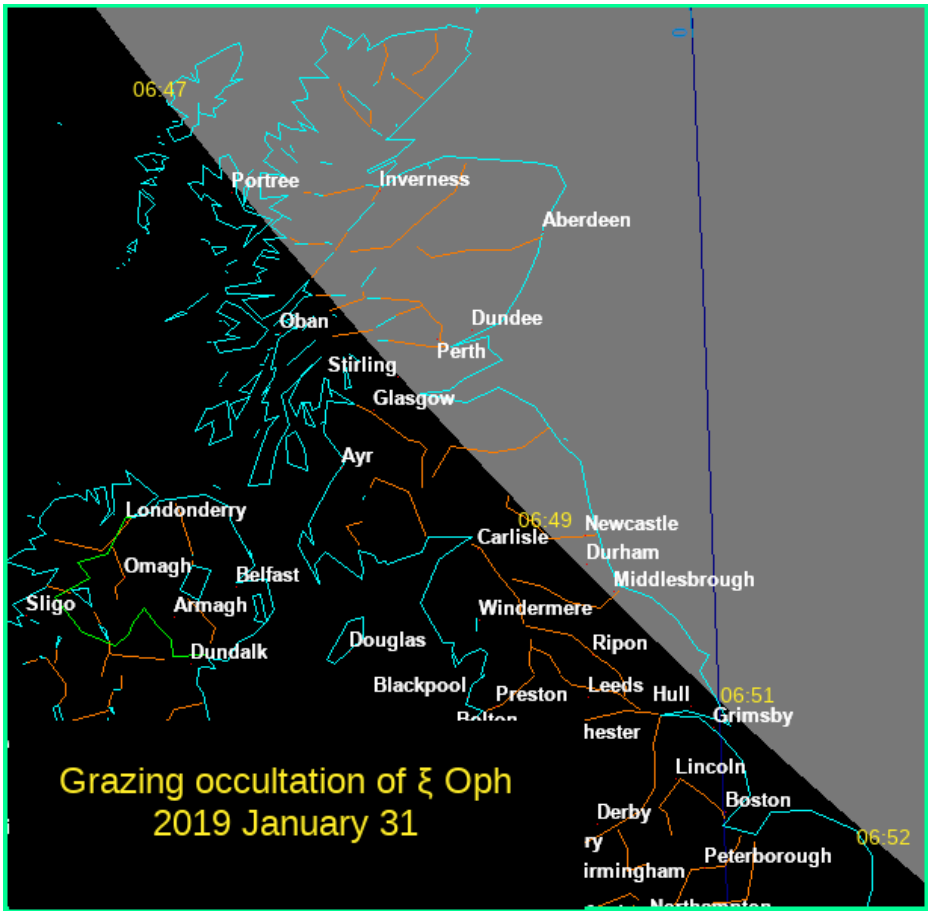
January 06	New Moon
January 14	First Quarter
January 21	Full Moon
January 27	Last Quarter

Lunar Occultations

Data are for my location and may vary by 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**). The highlights are the (difficult, especially *μ Cet*) grazes of *μ Cet* and *ξ Oph*. (The charts on the next page are "clicky")

Lunar Occultations, Jan 2019, 50.9°N, 1.8°W							
Date	Time	Phase	Star	Spectrum	Magnitude	Cusp Angle	Position Angle
01 Jan	03:49:58	R	xi-1 Lib	G7	5.8	73N	306
01 Jan	05:56:26	R	FY Lib	M5	7.1	76S	275
10 Jan	17:45:03	D	74 Aqr	B8	5.8	62N	43
12 Jan	21:05:52	D	HIP 2323	K2	6.9	65S	93
14 Jan	19:13:30	D	HIP 9343	G5	6.8	77N	56
15 Jan	17:08:35	Gr	mu Cet	F1	4.3		
16 Jan	17:14:55	D	HIP 17049	G5	6.7	58S	106
18 Jan	22:56:22	D	HIP 27287	K0	7.1	89S	84
19 Jan	02:02:47	D	HIP 27829	B9	6.7	75S	99
19 Jan	02:31:20	D	chi-1 Ori	G0	4.4	70S	104
20 Jan	00:38:34	D	HIP 33179	K1	6.6	67N	66
20 Jan	05:03:51	D	zet Gem	G3	4.0	31S	149
21 Jan	23:02:10	R	FZ Cnc	M4	6.3	74N	297
23 Jan	04:25:14	R	HIP 49929	F7	6.5	52S	248
26 Jan	02:20:03	R	HIP 63155	F5	6.8	66N	315
30 Jan	05:55:25	R	chi Oph	B2	4.2	86N	284
31 Jan	06:49:33	Gr	xi Oph	F2	4.4		


Grazing occultation of μ Cet
2019 January 15
Huddersfield
Grimsby
Sheffield
Lincoln
Boston
Derby
17:06
Shrewsbury
Leicester
Norwich
Walsall
Peterborough
Birmingham
Dudley
Coventry
Stratford
Northampton
Cambridge
Worcester
Ipswich
Gloucester
17:03
Luton
Oxford
St Albans
Pembroke
Swansea
Middelburg
Cardiff
Southend
Reading
London
Bristol
Bath
Rochester
Canterbury
Wells
Ostende
17:00
Salisbury
Calais
Roulers
Ypres
Audenarde
Southampton
Courtrai
Portsmouth
Brighton
Exeter
Bournemouth
Lille
Newport
Tournai
Torquay
Plymouth
16:58


06:47
Portree
Inverness
Aberdeen
Oban
Dundee
Perth
Stirling
Glasgow
Ayr
Londonderry
06:49
Newcastle
Carlisle
Durham
Omagh
Belfast
Middlesbrough
Sligo
Armagh
Windermere
Douglas
Ripon
Dundalk
Blackpool
Preston
Leeds
Hull
06:51
Grimsby
hester
Grazing occultation of ξ Oph
2019 January 31
Lincoln
Boston
Derby
06:52
Peterborough
irmingham

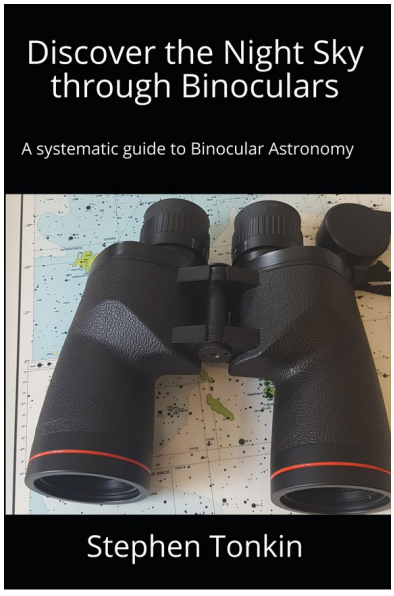
Public Outreach & Talks

This month I will be at the following public events; please do come and introduce yourself if you are at any of them.

15th: Fordingbridge Astronomers	**Binocular Observation of the Deep Sky** (talk)
26th: Moors Valley Country Park	**Public Stargazing Event** (booking essential)
29th: Chasing Stars	**Public Stargazing Event** (booking essential)

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** (now in eBook format as well). Click on the book image for more information.
- 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:

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*

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