

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

Next Talk
11th February 2019
Dark nebulae
Dr Nick Hewitt
BAA

EDITORIAL

Hopefully you all had a good Christmas and a not too merry New Year and you have all come back refreshed with new astronomical goodies for 2019. There were some clear skies over the break to follow Comet 46P, unfortunately I only really managed to follow it in binoculars. As noted we have several events on in October including the Lunar Eclipse on the 20/21st Jan (an early morning even) and the ever popular Oxford University Star gazing on Saturday the 26th Jan where we will have a stand. We did have a successful first observing session in Jan and a number of members braved the cold and my thanks go to Trevor Pitt for forgoing his own observing to help set up some telescopes that were brought for help. I must admit I was put off by the cloud and poor transparency early on and did not make the most of the better conditions later.

Spacewatch now comes in two versions the print version and the PDF version downloadable from the website. Unfortunately I could not fit the whole Night Sky guide into the four pages we have available for the print edition so to see the whole magazine please download the version from the website <http://www.abingdonastro.org.uk/aas%5Fblog/>



Abell 71 – Ian Smith

THE NIGHT SKY THIS MONTH

by Steve Creasey

Well Christmas is now over and obviously most of you got new astronomy equipment from Santa, judging by the amount cloudy nights we have had since.

Hopefully we all managed to get a look at comet 46P-Wirtanen, it didn't quite turn out to be the naked eye object we were all hoping for but it was impressive none the less.

The Geminid meteor shower also didn't disappoint, with a couple of weeks of meteor activity peaking around the 13/14th Dec. I managed to see 36 meteors in around half an hour on the 13th.

Plenty to look at in the sky this January, just wrap up warm.

The Planets

Mercury - February 27th will see Mercury at Greatest Eastern Elongation. The planet reaches greatest eastern elongation of 18.1 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.

Venus – will be at Greatest Western Elongation on January the 6th. The planet reaches greatest western elongation of 47 degrees from the Sun. This is the best time to view Venus since it will be at its highest point above the horizon in the morning sky. Look for the bright planet in the eastern sky before sunrise.

Mars – Mars is becoming distant and small when seen from Earth however the rise of the ecliptic towards mid-winter means that the red planet appears much higher in UK skies than it did at opposition back in July.

By New Year's Eve transit time is in evening twilight at more than 35 degrees. After this Mars

can still be followed into full darkness at considerable elevation with transit over 40 degrees up by the end of the month. Brightness falls from magnitude 0.0 to +0.8 and apparent size from 9 arc-seconds to 6.

Jupiter – By January Jupiter is rising 2 hours before the Sun and this stretches to nearly 3 hours late in the month. Its brightness increases slightly from magnitude -1.7 to -1.9 and its apparent size grows from 31 to 33.5 arc seconds
On New Year's Day Mercury forms the lowest and most easterly element of a spectacular line up in the morning sky. Look for the waning crescent Moon, Venus, Jupiter and Mercury drawing a descending diagonal from due-south down to the south-eastern horizon

Saturn – You may glimpse Saturn right at the end of January, rising due south-east at around 0715UT, 40 minutes before the sunrise on the 30th.

Uranus – Transiting the meridian around 1925Ut during the Christmas period and at the end of January in early twilight rather than darkness, at 1730UT. Transit is at over 45 degrees of elevation from the UK so Uranus is well placed for imaging throughout the period.

Neptune - Neptune is best observed in December or early in the New Year as it transits, due- south, at 1825UT in early December and at 1700UT by Christmas At these times it will still have some 30 degrees of elevation above the horizon but declines sharply to the west later in the period.

Meteor Showers

The Quadrantids - are usually active between the end of December and the second week of January, and peak around January 3-4 at around 02:00. The zenithal hourly rate (ZHR) of this shower can be as high (Up to 120 meteors per hour) as that of two other reliably rich meteor showers, the Perseids in August and the Geminids in December, yet Quadrantid meteors are not seen as often as meteors in these other two showers, because the peak intensity is exceedingly sharp, sometimes lasting only hours.

Unlike other meteor showers that tend to stay at their peak for about two days, the peak period of the Quadrantids only lasts a few hours.

The shower owes its name to the now-defunct constellation Quadrans Muralis. The constellation was left off a list of constellations drawn out by the International Astronomical Union (IAU) in 1922, but because the shower had already been named after Quadrans Muralis, its name was not changed. The Quadrantids is also sometimes called Bootids after the modern constellation, Boötes.

The Quadrantids are associated with asteroid 2003 EH₁. The asteroid takes about 5.5 years to orbit around the Sun.

Deep Sky Objects

NGC 1637 - is a barred spiral galaxy that lies about 38 million light-years away in the southern constellation of Eridanus (the River) while it is receding from us at approximately 717 kilometers per second.

NGC 1964 - is a barred spiral galaxy in the constellation Lepus. The galaxy lies 65 million light years away from Earth, which means, given its apparent dimensions, that NGC 1964 is approximately 100,000 light years across, at its centre lies a supermassive black hole.

NGC 1964 is the main galaxy in a group of galaxies, known as NGC 1964 group, which also includes the galaxies NGC 1979, IC 2130 and IC 2137.

IC 418 – The Spirograph Nebula is a planetary nebula in the constellation of Lepus. The name derives from the intricate pattern of the nebula, which resembles a pattern which can be created using the Spirograph, a toy that produces geometric patterns (specifically, hypotrochoids and epitrochoids) on paper.

NGC 2022 - is the brightest planetary nebula in Orion. It is a tiny 12th magnitude disk that lies near Orion's western shoulder.

M42 – The Orion Nebula, also known as Messier 42, M42, or NGC 1976) is a diffuse nebula situated in the Milky Way, being south of Orion's Belt in the constellation of Orion. It is one of the brightest nebulae, and is visible to the naked eye in the night sky. M42 is located at a distance of $1,344 \pm 20$ light years and is the closest region of massive star formation to Earth.

The M42 nebula is estimated to be 24 light years across. It has a mass of about 2,000 times that of the Sun. Older texts frequently refer to the Orion Nebula as the **Great Nebula** in Orion or the **Great Orion Nebula**. The Orion Nebula is one of the most scrutinized and photographed objects in the night sky, and is among the most intensely studied celestial features. The nebula has revealed much about the process of how stars and planetary systems are formed from collapsing clouds of gas and dust. Astronomers have directly observed protoplanetary disks, brown dwarfs, intense and turbulent motions of the gas, and the photo-ionizing effects of massive nearby stars in the nebula.

M43 - Messier 43, also known as De Mairan's nebula, is a star-forming region located in the constellation Orion. M43 has an apparent magnitude of 9.0 and lies at a distance of 1,600 light years from Earth. It has the designation NGC 1982 in the New General Catalogue.

De Mairan's Nebula is part of the larger Orion Nebula (M42), a famous emission-reflection nebula located just under Orion's Belt. M43 is separated from the main nebula by a large, dark dust lane. Both nebulae are part of the Orion Molecular Cloud Complex

M78 - Messier 78 is a reflection nebula located in the northern constellation [Orion](#), the Hunter. It is the brightest diffuse reflection nebula in the sky. It has an apparent magnitude of 8.3 and lies at an approximate distance of 1,600 light years from Earth. It has the designation NGC 2068 in the New General Catalogue. Messier 78 occupies an area of 8 by 6 arc minutes, which corresponds to a linear

diameter of about 10 light years. The nebula is pretty easy to find as it is located only about 2 degrees north and 1.5 degrees east of Alnitak, the easternmost star of [Orion's Belt](#).

NGC 2112 - is a magnitude +9.1 open cluster located 3066 light-years away in the constellation Orion.

The cluster visually appears embedded within a section of the Barnards Loop. **Barnard's Loop** is an emission nebula in the constellation of Orion. It is part of the Orion Molecular Cloud Complex which also contains the dark Horsehead and bright Orion nebulae. The loop takes the form of a large arc centered approximately on the Orion Nebula. The stars within the Orion Nebula are believed to be responsible for ionizing the loop.

The loop extends over about 600 arcminutes as seen from Earth, covering much of Orion. It is well seen in long-exposure photographs, although observers under very dark skies may be able to see it with the naked eye.

The cluster was discovered by German-British astronomer William Herschel using a 47.5 cm (18.7 inch) f/13 speculum reflector at Clayhall Farm House in Old Windsor, on the 1st January 1786.

M79 – Also known as **Messier 79** or **NGC 1904**, is a globular cluster in the constellation Lepus. It was discovered by Pierre Méchain in 1780 and is at a distance of about 42,000 light years away from Earth and 60,000 light years away from the Galactic Center.

Comets

46P/Wirtanen – Still well placed for observing and imaging, the comet will be heading into the constellation of Lynx from the 29th of December, and decreasing in magnitude to +10.9 by the 4th of January.

38P/Stephan-Oterma - Is also now in the constellation of Lynx, its magnitude is also decreasing and will be around +11.5 on the 4th of January.

C/2018 Y1 Iwamoto

Possibly 6th mag in early Feb See <https://www.britastro.org/node/16796> for more information

Lunar Eclipse information

2019 Jan 21 02:36	Enter Penumbra	+01°36'37"	48°
2019 Jan 21 03:06	Penumbra First Visible	+01°19'39"	44°
2019 Jan 21 03:33	First Contact	+01°03'51"	40°
2019 Jan 21 04:40	Second Contact	+00°29'58"	30°
2019 Jan 21 05:13	Mid-eclipse	+00°22'48"	25°
2019 Jan 21 05:45	Third Contact	+00°29'51"	20°
2019 Jan 21 06:52	Last Contact	+01°03'14"	11°
2019 Jan 21 07:20	Penumbra Last Visible	+01°19'01"	7°
2019 Jan 21 07:50	Exit Penumbra	+01°35'41"	3°

Moon

New moon 5th January
First quarter 13th January
Full moon 20th January
Last quarter 26th January

LAST MONTHS TALK

by Gwyneth Hueter

December's talk: 'Mars, the prohibition planet?'

Dr Jon Wade of the OU is an example of the mature student who got hooked on Earth Sciences - and has that typical enthusiasm of someone who has come late onto his subject. Some intriguing stuff for starters: the nebula history of planet formation goes back to Immanuel Kant, 1755, but it was Pierre-Simon Laplace who supposed that the nebula had to be rotating round the baby Sun, developing concentric rings from which the planets formed. It appears he got this idea from a rather unusual character, Emanuel Swedenborg, who got the idea from a dream...(look the rest up.)

So we think we know about how gravity caused all nebula bits to coalesce then wham, you have your planetesimals then planets. But how the little bits of stuff start to aggregate is still not well understood. Once the bits get bigger then you start to get radioactive decay of Aluminium 26, then the lumps get bigger and differentiation starts, so you get a denser iron rich core and silicates on the surface. This happens when the lumps get to about 100km across, he says. Look up Pallasites - odd and lovely meteoritic lumps that have come from these

planetesimals where you get iron and silicates (usually olivine) mixed up in them.

There is a lot of rust in this talk: the cores of Mercury, Earth and Mars are similar but iron in the mantle is hardly seen in Mercury, more in the Earth's and even more in Mars' (weight/atomic percentages being roughly 1%, 8% and 18% respectively). This means that the planets nearer to the Sun lost their oxygen more easily.

So, is core formation the key to planetary habitability? (His words) How long did the water last? How significant is this rustiness? And why is Mars so lopsided? Mars' northern boundary is lower than the southern, which has lots of craters and a high level of minerals that have reacted with water. The northern bit is an old ocean basin, the result of a massive impact. It has a long dead volcano 22km in height. Why no evidence of tectonic activity? The implication is that there was a lot of water on Mars between about 4 billion years ago and 3.5 billion years ago, which means a lot of sedimentary activity took place on Mars in the first 500 million years of its life. Its magnetic field was weak, as were its tectonics, and there may have been as much as 3km depth of water at one point. The presence of the iron (more of his lively speculations) means the water was taken up in the rocks and sediments. Easy to understand why Mars is the colour it is - yes, it really is the rust - and why the lack of water prevented life from evolving. Luckily the constant upheavals in the Earth's mantle mean that new stuff keeps coming to the surface, so it never went the way of Mars. Copper, nickel, iron, manganese, all stayed stuck deep in Mars' core. Iron is very important for life on Earth. However, we did have a boring billion years (his words) around 2.5 billion years ago, where there was major oxidation (too much iron again) and a large upsurge in methane in the atmosphere, which killed off any attempt at incipient life formation. Look at the surface basalts. He says Earth's core is gradually growing, but that it's crystallisation that's keeping the heat going, rather than radioactivity. He says radioactive elements don't like staying in the core.

Perhaps we should bring him back soon as he seems to have given us more questions than answers?

FURTHER DISCUSSION

If you are not already on our internet mailing list, then why not log on to YahooGroups. The list is called 'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous

messages click on:

<http://groups.yahoo.com/group/abingdonas/> .

To join the abingdonas list, please go to <http://www.yahogroups.com> . You can also unsubscribe from the list here.

More information on society activities can also be found on the Facebook page - <https://www.facebook.com/AbingdonAstroSoc/> Although confusingly we seem to have two groups on Facebook.

DATES FOR YOUR DIARY

28th January 8pm Beginners' Meeting in the Main Hall., talks to include Astronomy Apps, HR Diagram and a constellation of the month (although subject to change)

Observing evening: The next observing session will be on the FCN 4th – 6th Feb 2019 at Frilford Heath Tubney Golf driving range, note that this is a new location and maps will be on the website. As always go/no go notes will be posted on the newsgroup as well as the Facebook page so please look there for more info or contact Trevor Pitt or Steve Creasey for details.

Total Lunar Eclipse 20/21st Jan 2019. Visible in the morning of 21st Jan.

RAL Stargazing Friday 25th Jan 2019. The website for this is not yet up but keep looking for it as it is a popular day out. More details at <https://www.eventbrite.co.uk/e/stargazing-2019-at-rutherford-appleton-laboratory-tickets-51402479199>

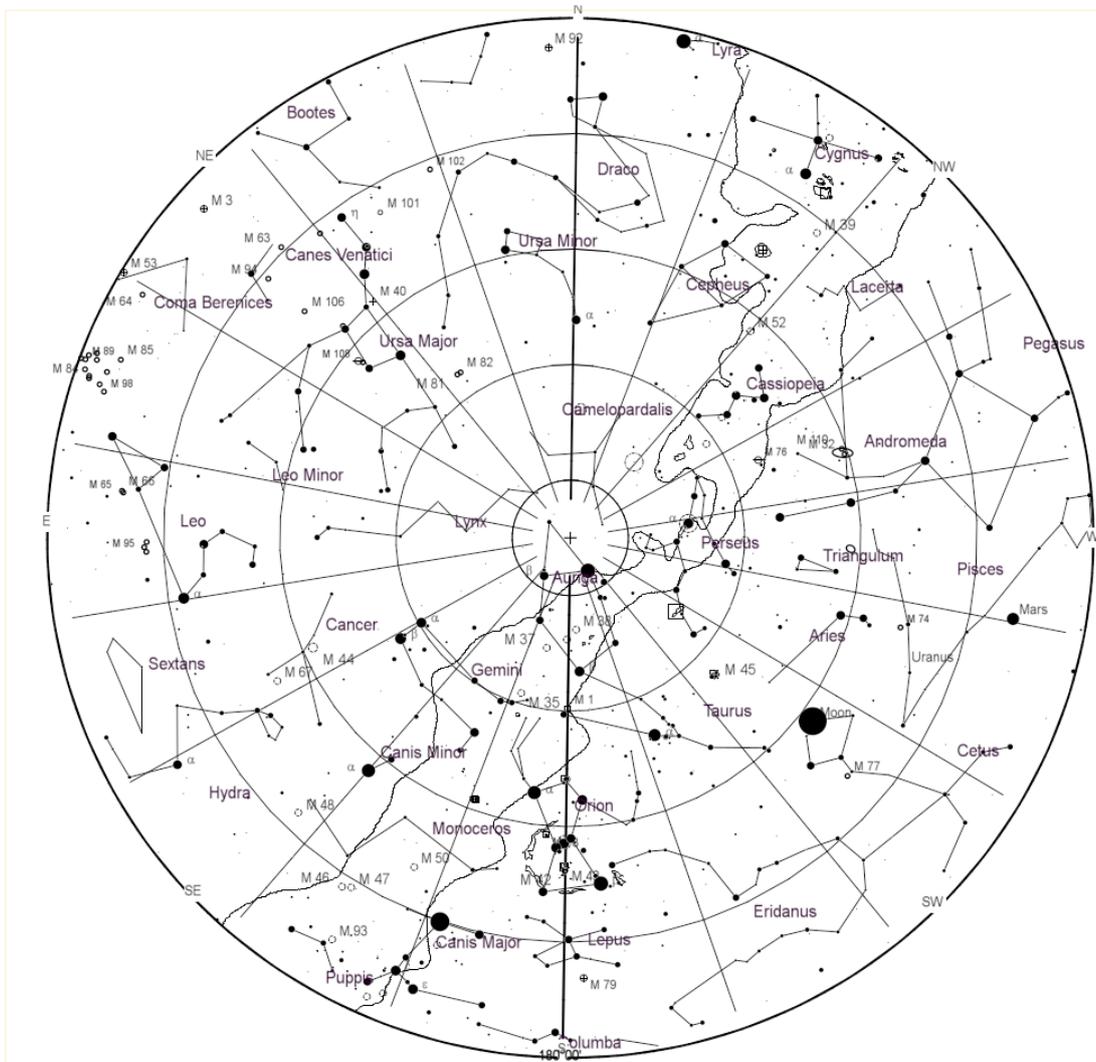
Oxford University Stargazing Saturday 26th Jan 2019. See <https://www2.physics.ox.ac.uk/events/2019/01/26/stargazing-oxford-2019> for more details.

AstroFest Feb 8/9 at Kensington Town Hall details at <http://europeanastrofest.com/>

Practical Astronomy Show 9th March at Kettering details at <https://practicalastroshow.com/>

STAR CHART

The night sky at 22:00 Tuesday 15th January 2019



MOON PHASES: 2019

