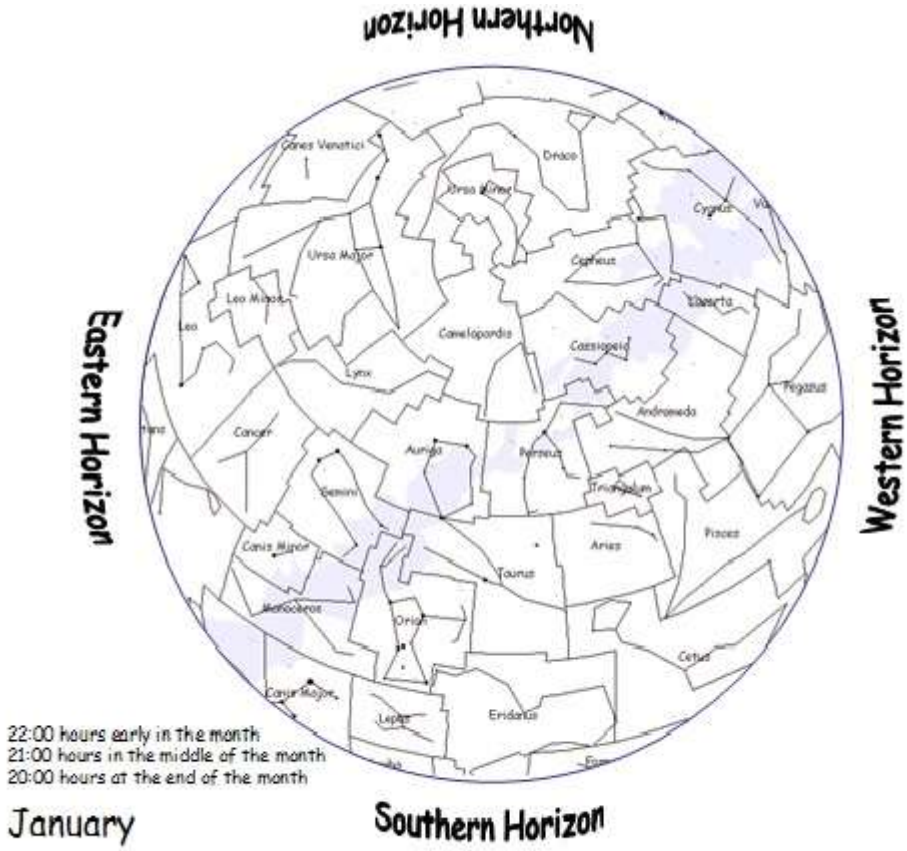
The Night Sky (January 2018)

UT (Universal Time) or GMT is used this month.



The General Weather Pattern

January is often a windy month. Rain is less obvious than in the previous two months, but it usually gets colder as the month ages. It can be very cold at night, often reaching freezing temperatures with clear skies. Snow can be expected in cold years. Wrap up warm with a warm hat, socks and shoes and wear multiple layers of clothes. An energy snack and a flask containing a warm drink wouldn't go amiss.

From Earth

The Earth is at perihelion (closest to the sun) in its elliptical orbit on the morning of the 3rd of January. The word perihelion derives from the Greek words, *peri* meaning 'near' and *Helios* the Greek god of the sun.

The winter sky, dominated by Orion, presents itself due south, late in the evenings for most of this month. In the first half of the month, the Milky Way stretches right across the sky from east to west through the zenith at the end of evening twilight.

Sun

Due to the equation of time the latest sunrise of the year occurs around New Year's Eve; the mornings start to lighten, but you may not notice until near the end of the month.

The Sun moves from Sagittarius to Capricornus during the night of the 19th/20th. It is also beginning its journey towards more northerly latitudes once more, and will eventually become better placed for observing as the days get longer. Use appropriate, safe methods to observe the Sun and notify other members if you observe any sunspot activity. Auroral activity is quite transient, so share information with other members ASAP.

Moon

The first Full Moon is on 2nd at about 02:25 in the constellation of Gemini.

The Last Quarter is on 8th at about 22:25 in the constellation of Virgo.
The New Moon is on 17th at about 02:20 in the constellation of Sagittarius.
The First Quarter is on 24th at about 22:20 in the constellation of Cetus.
The second Full Moon is on 31st at about 13:30 in the constellation of Cancer.
The Moon is at perigee (nearest Earth) on the 1st and is the closest perigee this year. The next closest perigee occurs, as it happens, on the 30th of January, a 'Blue Moon' follows on the 31st, completing a trilogy of perigee-syzygies. The Moon is at apogee (most distant from Earth) on the 15th.
The total lunar eclipse of the 31st is not visible from the UK.

The Planets


Mercury is at greatest western elongation on the 1st and is best observed early in the month emerging an hour and a half before the Sun. Mercury is less than 1° south of Saturn on the 13th. A very thin crescent Moon joins them on the morning of the 15th. Take great care when observing such objects in the morning. At this time of year the ecliptic is shallow at sunrise, and even low down, the Sun can be quite dangerous to your eyesight.


Venus is at Superior Conjunction on the 9th, and is unavailable throughout this month.


Mars appears at around 04:00 early in the month and rises together with Jupiter on the morning of the 7th. It can first be found, above the horizon, just south of east at sunrise throughout the month. Mars moves from Libra into Scorpius on morning of the 31st. On the morning of the 11th a waning crescent Moon escorts Mars and Jupiter for a photo-opportunity.


Jupiter can be found in the constellation of Libra throughout the month of January, and is well placed for serious observers before the dawn twilight. By the end of the month Jupiter will rise about 02:30 and culminate about 06:45. As opportunities for observing Jupiter improve through the year, there is much to see in a decent telescope. Jupiter rises together with Mars on the morning of the 7th at around 04:00. On the morning of the 11th a waning crescent Moon joins Jupiter and Mars.
On the 5th, between around about 03:45 and 07:00, first Europa then Ganymede transit Jupiter, during which time Io emerges from occultation. A lot will be going on between 05:00 and 05:30.


Saturn emerges from conjunction in the morning twilight of mid-January. It is to be found in Sagittarius throughout this month, rising unhelpfully in the twilight at about 08:00 at the start, and 06:00 at the end. Apart from the photo-opportunities with Mercury on the morning of the 13th, and on the 15th with the Moon and Mercury, Saturn is not well placed. It is in opposition on the 27th June, so better observing to be had later this year.


Uranus is best observed at the beginning of the month. It can be found in the constellation of Pisces at RA 1h 31m 56s, Declination 8º 59' 26". At a magnitude of 5.78 it may well be found with a good pair of binoculars. You may also just see the planet's cyan (blue-green) hue in a small telescope. Uranus usually has few features visible at such a distance, so little else may be seen even with a larger amateur instrument or astrophotograph.


Neptune is best observed early in the month, low down in the south-west, early evening. It fades into the evening twilight later in January. It can be found in the constellation of Aquarius all month, and on the 1st it will be at RA 22h 54m 44s, Declination -7º 55' 51", at a magnitude of 7.93. A thin crescent Moon can be seen to approach within 3° south of Neptune on the 20th at 6:00 making it slightly easier to find.

Meteors

The **Quadrantids** can be seen from 1st to 6th January. The ZHRs varies between 40 and 110 and they are at their best on the evening of the 3rd; the maximum is in the evening at around 21:00. The radiant, in northern Boötes, is circumpolar and lies, towards Alkaid the last star in the tail of Ursa Major, in a part of the sky that once contained a constellation called Quadrans Muralis; the Mural Quadrant! These meteors are relatively slow, but brighten just after maximum with occasional green, yellow or blue hues. This year the waning gibbous Moon in the east, in Virgo, renders this shower unfavourable. The Quadrantids associated comet is not known for certain.

Constellation Culminations from Usk

A celestial body or region of the sky is said to culminate when it crosses an observer's meridian (an imaginary line drawn overhead and through both poles). All other things being equal objects are usually best observed in this position as the light from them travels through the least amount of atmosphere.

Constellation	Convenient Culminations	Midnight Culminations	Observability
Cetus	19:00 Early January	Late October	Whole
Triangulum	19:00 Mid-January	Late October	Whole
Aries	19:00 Mid-January	Early November	Whole
Fornax	19:00 Late January	Early November	Unfavourable - partially hidden
Perseus	19:00 Late January	Mid-November	Whole - at zenith upper culmination

Orion (Pronounced oh-RYE-un)

In Welsh Orion *nm.*
Astronomy

Orion is a magnificent constellation, which stands out amongst the southern stars in winter time. Finding Orion should be no problem; its stars are some of the most familiar in all the heavens and lie due south at 20:00 in mid-February. The famous Orion's Belt marks the centre of the constellation and helps us find other stars of interest. When Orion is orientated in this way, follow the line of the belt south-easterly to find Sirius, the brightest star in the night sky, and north-westerly to find the Pleiades nebula, a magnificent open cluster.

As well as dominating the winter sky with its size, and definition of shape, Orion has more to offer the observer than most other constellations. Observe the glorious red giant Betelgeuse, the equally brilliant blue-white giants, Rigel and Bellatrix, and the nebulous beauty of the Great Orion nebula in the sword.

Orion's bright, right shoulder is famously called Betelgeuse, one of the largest and most luminous of observable stars. The name derives from the Arabic *Jad al-Jauza* meaning 'Hand of Orion'. Betelgeuse, which lies about 640 light years away, is a red supergiant with a luminosity some 100,000 times that of the Sun and a diameter 1,000 times that of the Sun. This star is reaching the end of its life and pulsates, both in size and brightness.

Another famous star in Orion is his left foot, Rigel, from *Ar-risha'* meaning 'the foot'. This bright star is different to Betelgeuse as it shines blue rather than red. This is due to the surface temperature of the star, blue stars are much hotter, and Rigel is about 16,000 ºK, whilst cooler Betelgeuse averages 2,700 ºK. Rigel is a multiple star system of at least three stars, although you'd need a small telescope to separate them.

Take a look at the three stars that make up the belt, the one on the right is known as Mintaka, and the one on the left is Alnitak. Both names derive from the Arabic meaning 'the Belt'. Alnilam, the central star means 'The string of pearls'.

Even with the naked eye, it can be seen that the central 'star' in the three 'stars' marking the dagger hanging from Orion's belt appears to be a fuzzy patch rather than a star. This is the Orion Nebula (M42), perhaps the most photographed deep sky object in the heavens, a vast nebula of gas and dust exquisitely lit by the internal and surrounding stars. This is a stellar maternity ward, in which more young stars will appear from this wealth of cosmic matter during the next tens of millions years. Take a pair of binoculars to this part of the sky, inside the nebula can be found a small, fascinating four-star asterism known as The Trapezium.

There are plenty of nebulous (cloudy) regions in and around Orion. In larger telescopes the semi-circular Bernard's Loop and just a smidgen south of Alnitak, the Horsehead Nebula, presents rewarding challenges for the observer. At around 1,500 light-years from the Sun, the Horsehead Nebula appears to be a region devoid of stars and surrounded by a distinguishing cloud of stars. However, in reality, it is a dark molecular cloud which is obscuring the starlight from the brighter nebula, IC 434, situated beyond it. The prominent horse-head portion of the nebula is another popular target for amateur astronomers and is really part of a larger Orion cloud of dust embedded in this region of the vast and complex nebulae in Orion.

Associated with it and enveloping it is Barnard's Loop, which can be seen extending from the centre of the picture, around toward the bottom. Although it was named the 'Orion Loop' by E. E. Barnard, and then renamed in his honour for its discovery, it was possibly detected by William Herschel in 1786.

Positioned about 1600 light years away and stretching several hundred light years across, there are a number of speculations as to the origin of this huge bubble. It may be a supernova remnant or possibly it was formed by a series of supernova explosions. It could also have developed when a density wave, associated with the structure of the Milky Way, moved through the Galactic disk. While difficult to observe visually, it can be effectively photographed on long exposures as can be seen in the above (top) image by Nick Busby, chair of Usk Astronomical Society.

The Orionid meteor shower can be seen emanating over the eastern horizon at about 11.00 pm between 16th to 27th October.

Myths

In mythology, this constellation has been associated with the human form since ancient times, however, a belief that Orion's name originated with the Sumerian sun-god *Uru An.na*, meaning 'light of the heaven' is largely unsupported. Sumerian versions are associated with *Sipa.zi.an.na*, the 'True Shepherd of Heaven'. It is in Greek myth we find a man of gigantic stature, unrivalled good looks and a hunting prowess celebrated throughout the ancient world named Orion.
He was, according to Eratosthenes, the son of Euryale and Poseidon and consequently could walk on water. One day, on a visit to the island of Chios he fell in love with Merope, beautiful daughter of the goddess Dionysus. He sought her hand in marriage from her father Oenopion and was promised this in return for ridding the island of the many dangerous beasts that troubled the inhabitants.
Orion exercised his skills with great success against the wildlife of the island but Oenopion began to delay the marriage by inventing more and more tasks for Orion to undertake. Eventually, in a fit of desperation and self-pity Orion consumed a flask of his unwilling father-in-laws most potent wine. With his senses dulled by the wine, Orion forced his intended to consummate the marriage prematurely. Incensed by this, Oenopion plied Orion with even more wine until the great hunter was insensible, and then put out his eyes.
Orion sought the help of the oracles to regain his sight and was instructed to seek the morning sun. He set off with his loyal crew of sailors for the east and docked at the Isle of Lemnos, where Vulcan, the gods' blacksmith, aided him. He gave him Cedalion, an apprentice, to sit on his shoulders and guide him to the furthest ocean, where he found the sun god Helios. Orion appealed to Helios to restore his sight. His plea was granted and with his sight restored Orion enjoyed a love affair with Eos, sister of Helios and goddess of the Dawn.
Eventually his desire for Eos was overtaken by his desire for revenge against Oenopion and Orion once more set off on his journey. In Crete he met Diana, goddess of the moon and also an ardent hunter. They rejoiced in their common love of hunting and Diana now accompanied Orion on the chase. However, their closeness caused great concern to Apollo, Dianas' brother, who feared that his sister would become Orion's next conquest, and he waited for an opportunity to discredit the hunter.
Orion had one great weakness. He boasted injudiciously about his achievements and claimed that there was no animal that he could not slay. Apollo seized his opportunity and repeated these boasts to Mother Earth. She was not only annoyed at his wantonness, but also fearful that he would destroy all predators (as he had on the island of Chios) and decided to halt his exploits by producing a monstrous scorpion under his feet, covered in armour so thick that it could never be slain.
For the first and last time in his life Orion was totally defenceless and died from the sting of the terrible beast. Diana was distraught at the loss of her friend and companion and begged the gods to allow her to immortalise Orion among the stars. Her wish was granted and Orion was sent to the mid-heavens.
As a reward for conquering such a hero, the scorpion was also granted immortality, but was sent to the southern skies so that the two enemies should not be seen in the sky at the same time, and Orion should not be reminded of his ignoble defeat. To give the hunter some sport in his permanent abode the gods thoughtfully provided him with Taurus the bull to fight, and Canis Major and Minor, his loyal hunting dogs for company.