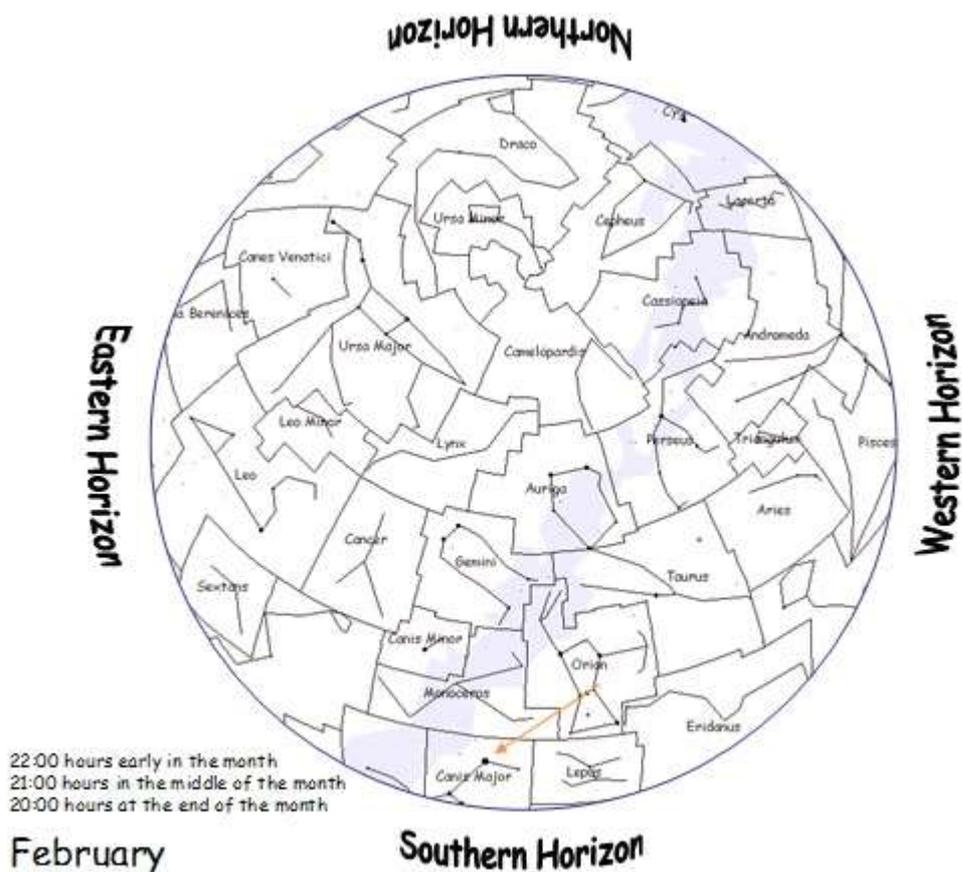




# The Night Sky (February 2018)

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



## The General Weather Pattern

The first week in February trumpets the middle of the winter, and February is usually the coldest time of the year, especially early in the month. It can be very cold at night, often with freezing temperatures in the day. Snow and ice can be expected in cold years. Don't underestimate how cold it can be at this time of the year, and dress for it. Wrap up warm and wear multiple layers of clothes, with a warm hat, socks and shoes. An energy snack and a flask containing a warm drink wouldn't go amiss.

## From Earth

The winter sky can be observed culminating early in the evening, and Orion, with his retinue, is due south at 20:00 UT early in the month. In the middle of the month, the Milky Way stretches right across the sky from the south-east to north-west through the zenith just after twilight disappears. Follow a line south-eastwards along Orion's belt and you will find Sirius the brightest star in the night sky.

## Sun

The Sun moves from Capricornus into Aquarius around noon on the 16<sup>th</sup>, as it moves towards more northerly latitudes. The partial solar eclipse of the 15<sup>th</sup> is not visible from the UK.

Once again, it is worth reminding members that sunlight contains radiation right across the spectrum that is harmful to our eyes and that the projection method should be used, or else, use the society's solar telescope. Ask experienced members for help if you want to observe the Sun.

## Moon

Interestingly, there is no Full Moon this month. There were two in January and two will occur in March. Last Quarter is on the 7<sup>th</sup> at about 15:55 in the constellation of Libra. New Moon is on the 15<sup>th</sup> at about 21:05 in the constellation of Capricornus. First Quarter is on the 23<sup>rd</sup> at about 08:10 in the constellation of Taurus. The Moon is at perigee (nearest Earth) on the 27<sup>th</sup> and at apogee (most distant from Earth) on the 11<sup>th</sup>.

At this time of year the first quarter Moon is well placed, high in the southern sky at night-fall. It can be observed through less air than when it is lower down. Binoculars will enhance many impressive selenological features found at the terminator.

On the 22<sup>nd</sup> from around 16:30, an optical effect known as the Werner 'X' can be seen. It can be found on the rims of the craters Purbach, Blanchinus and La Caille, and takes its name after another adjacent crater, Werner. It is commonly known as Lunar 'X'. The phenomenon is a clair-obscur effect in which contrasting light and shadows generate and enhance an image, in this case of a letter 'X' formed by sunlight hitting the tops of the crater rims.

The X is evident for about four hours around First Quarter, aim a small telescope just inside the shadow of the terminator.

The Moon moves through the Hyades during late afternoon on the 23<sup>rd</sup> and Aldebaran appears from behind the Moon just after sunset at around 17:40, a possible photo-opportunity in the early twilight.

A photo-opportunity presents itself on the morning of 9<sup>th</sup> when a waning crescent Moon joins Mars, with Saturn and Jupiter close by.



## The Planets



**Mercury** is at superior conjunction on the 17<sup>th</sup> and so is poorly placed for observation. It sets at a steep angle about an hour after the Sun at the end of February, but may not immerse into the evening twilight. It presents itself farther away from the Sun in the darker conditions in the evening sky in mid-March.



**Venus** climbs slowly away from the Sun each sunset from superior conjunction in January. This is not a good month for Venus, but it is best observed later in the month when its eastern elongation is slightly greater.



**Mars** moves from the constellation of Scorpius on the 8<sup>th</sup> into Ophiuchus for the rest of the month but because the planet is moving in the same direction around the Sun as we are, it lies due south throughout the month, as the sun rises. Mars culminates a little higher at the beginning of February. On the morning of the 9<sup>th</sup> a waning crescent Moon escorts Mars, with Saturn to the east and Jupiter to the west, and Antares, 'the Rival of Mars' to the south for comparison.



**Jupiter** can be found in the constellation of Libra, and hardly changes its position against the background stars throughout February. Jupiter also culminates a little higher at the beginning of February, and is well placed for the more serious of observers; rising steeply around 2:15 on the 1<sup>st</sup>. By the end of the month Jupiter will rise about 00:40 and culminate about 05:00. As opportunities for observing Jupiter improve for more casual observers; it is at opposition on the 9<sup>th</sup> May, it is worth reminding members that there is much to see in a decent telescope. On the morning of the 8<sup>th</sup> the Moon, just passed last quarter, escorts Jupiter. On the morning of the 10<sup>th</sup>, just after Jupiter rises, start observing Jupiter's moon Ganymede as it approaches transit. Two shadow transits also occur this month, one on the morning of the 17<sup>th</sup> and another on the morning of the 24<sup>th</sup>.



**Saturn** is to be found in Sagittarius throughout February. It rises at about 06:00 at the start, and 04:30 at the end. Dedicated observers may stay up to observe Saturn's rings, but with an opposition on the 27<sup>th</sup> June, more casual stargazers may like to wait until later this year.



**Uranus** is best observed early in the month in the south-west when it is highest in the sky in night-time. It can be found in the constellation of Pisces, at RA 1h 33m 21s, Declination +9° 09' 04", but at a magnitude of 5.84, is too dim to see with the naked eye. A telescope might show a cyan (blue-green) hue, but since Uranus usually has few features, little else may be seen even with a larger amateur instrument. On the evening of the 20<sup>th</sup> the waxing crescent Moon lies 7° to the east of Uranus.



**Neptune** closes in on the Sun from our perspective, and is unobservable as it moves through its glare.

## Meteors

February is a poor month for meteor showers, and it will be quite quiet until mid-April. Sporadic meteors can of course be spotted, but require much more patience to observe than do showers because they are not associated with any one part of the sky. The **Virginids** are only just evident from February through to April, becoming a little better in March and again in April.

### 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
Eridanus	19:00 Early February	Late November	Only northern stars visible
Taurus	19:00 Mid-February	Late Nov. /Early Dec.	Whole
Lepus	20:00 Mid-February	Mid-December	Whole but quite low
Orion	20:00 Mid-February	Mid-December	Whole
Columba	20:00 Mid-February	Late December	V unfavourable; partially hidden
Puppis	20:00 Mid-February	Mid-January	Unfavourable - partially hidden
Auriga	20:00 Late February	Late December	Whole - at zenith

**Gemini** (pronounced gem' in eye)

#### In Welsh

yr Efeilliaid *npl.* literally 'the Twins'.

#### Astronomy

In mid-February Gemini culminates at around 21:30. Gemini is Latin for 'twins' and although the stars of this constellation can be joined up to make stick figures of the twins, they are usually seen with the naked eye simply as the twin stars Castor and Pollux, following Orion across the night sky.

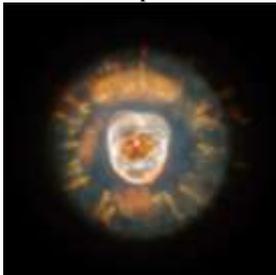
Appearing to the naked eye as a single white star at a distance of 46 light-years, the right hand star, Castor, is actually a complex system. It was in fact, in the 18th century, the first binary system recognised; Castor A and Castor B. In 1895 Castor A was then discovered to be a spectroscopic binary, its two components having a separation of only 6.4 million km. Both are class-A main sequence stars, about twice the size of the sun. They can be separated with a good small telescope.

Castor B is now also known to be a spectroscopic binary whose components are even closer, at only 4.5 million km distance and having an orbital period of only three days. A distant 9th mag. companion star was also discovered 150 billion km (1000 AU) distant from the A-B pair. Designated Castor C, it was also detected as a spectroscopic double but its components are red dwarfs, completing one orbit about their common centre every 19½ hours. 'Castor' therefore actually comprises six stars, four considerably larger than our sun and two much smaller.

By contrast, Pollux the left hand star is a loner, spectral type KO, orange in colour and approximately ten times the diameter of our own sun. It is closer than Castor, being only 36 light-years distant.

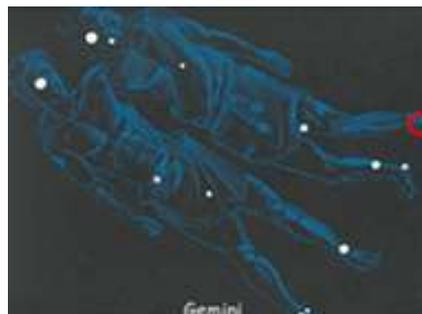
Stars usually conform to the modern convention of having the brightest stars in a constellation denoted as  $\alpha$  (alpha) and using the next letter of the Greek alphabet  $\beta$  (beta) for the next dimmer, and so on. Interestingly Castor ( $\alpha$  Geminorum) with a magnitude of 1.58 is dimmer than Pollux – ( $\beta$  Geminorum) which has a magnitude of 1.13.

Gemini lies about 30° east of the Galactic anticentre which is found in Auriga at about R.A. 05h 46m, Dec. +28° 56'; in the equatorial coordinate system. Facing out from the core and above the plane of the Galaxy in Gemini, is not the easiest place to find bright nebulae. However, there are some nice objects of delight.



NGC 2392, the Eskimo Nebula lies about two degrees to the south-east of Wasat, near the right wrist of Pollux. William Herschel thought that many of these nebulae looked similar to planets in his telescopes. They are still miss-named planetary nebulae to this day. We now know such an object is made up of glowing shells of predominantly ionised gas, resulting from the instability of some stars pulsating at the end of their lives. As the outer layers expand and escape from the exposed core, ultraviolet radiation ionises and accelerates the gas. Consequently the core contracts into a white dwarf and for a short time the expanding gas re-emits the energy in frequencies we can see.

With a magnitude of about 10 the Eskimo Nebula it is not an easy object to observe even with a good amateur telescope. But photographed with a big telescope, or by an amateur astrophotographer, it is seen to be one of the glories of the heavens.



The open star cluster M35 (NGC 2168) has an area equal to that of the Moon and lies at the left foot of the figure of Caster. Find Tejat in a low-power instrument to find M35 in the same field of view, with an apparent magnitude of 5.30. It is a worthy target for amateurs, even with binoculars.

### **Greek Myth**

Although Castor and Pollux are almost universally known as twins, they are in fact half-brothers. Leda, princess of Aetolia, was given in marriage to Tyndareos, the King of Sparta. Zeus was also particularly attracted to the beautiful Leda and visited the young bride on her wedding night disguised as a swan, seducing her. She also consummated her marriage to Tyndareos the same night and as a result she bore two pairs of twins. Each pair enclosed in a single, huge egg; one containing Polydeuces (later Pollux) and Clytemnestra who were Zeus's children and immortal; the other Castor and Helen, the mortal children of Tyndareos.

Castor and Pollux were both outstanding athletes and became devoted to each other. Among their many exploits they sailed with Jason and his Argonauts and were instrumental in saving the fleet of the Argo during a fierce storm. Castor and Pollux were seen as the guardians of sea-farers and were thought to cause St Elmo's fire, so Gemini was known to sailors as the 'protector of ships', hence the term 'by Jiminy'.

The twins became celebrated throughout Greece and Rome. Their likeness appeared on coins, a temple was erected in the Forum in their honour and they were even the inspiration for the formation of the cult of the Dioscuri. Revered as they were, they were not without the weaknesses of men. They were strongly attracted to their cousins Phoebe and Hilaira and when the two young women were married the Twins, having been properly invited to the wedding, behaved quite outrageously in seizing the young brides from the reception and taking them by force to Sparta.

Later, the Twins resolved their differences with the aggrieved husbands, Idas and Lynceus who were also brothers and to whom they were distantly related. Together they carried out a successful cattle raid in Arcadia (cattle were, of course, far more important than women). Feasting after the raid, Idas and Lynceus had already finished most of their meat when Idas announced that there should be a contest, and that whoever finished his meat first should take half the cattle as a prize, and the runner up should take the other half.

The Twins were enraged at this treachery and drove the entire herd of cattle back to Sparta, hotly pursued by Idas and Lynceus. Encumbered by the cattle, the Twins were quickly caught. Idas killed the mortal Castor with a spear, while Pollux exacted revenge by killing Lynceus in a similar manner. Zeus also joined in the melee and killed Idas with a thunderbolt.

Zeus then offered Pollux eternal life on Olympus, but he rejected this unless his beloved brother could join him. It had never been possible for a mortal to join the gods in their hallowed halls but Zeus made a special arrangement whereby both brothers would spend alternate days on Olympus and in Hades, the underworld and normal destination for the mortal dead. Eventually they were both transferred to their heavenly resting-place.