



The Night Sky (February 2020)

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

Northern Horizon

Eastern
Horizon



Western
Horizon

Southern Horizon

22:00 at beginning of the month.
21:00 in middle of month
20:00 at end of month

The General Weather Pattern

The first week in February trumpets the middle of the winter, and February can be 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. I'm sure you won'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, gloves, socks and shoes. An energy snack and a flask containing a warm non-alcoholic drink wouldn't go amiss.

Should you be interested in obtaining a detailed weather forecast for observing in the Usk area, log on to

https://www.meteoblue.com/en/weather/forecast/seeing/usk_united-kingdom_2635052

Other locations are available.

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.

Mars, Jupiter and Saturn are morning objects rising at a low angle just before the Sun.

Artificial Satellites or Probes

Should you be interested in observing the International Space Station or other space craft, carefully log on to

<http://www.heavens-above.com> to acquire up-to-date information for your observing site.

Sun

The Sun moves from Capricornus into Aquarius just after midnight on the morning of the 17th, as it moves towards more northerly latitudes.

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. Do not look directly at the Sun either with observing equipment or with your naked eyes.

For those that do have the correct equipment and expertise to observe the Sun it is disappointing at present as we come to the end of Solar Cycle 24 (which began in December 2008). The cycles are numbered starting from 1755. The transitional phase to solar Cycle 25 is in progress but prolonged. The magnetic poles of the Sun reverse with each new cycle, a process that includes a period of confused polarity, signs of which occurred in December.

To see if it's worth getting the solar telescope out, the site which shows the present state of the Sun's disk in various wavelengths is: <https://sdo.gsfc.nasa.gov/data/>

Moon

First Quarter is on the 2nd at about 01:42 in the constellation of Aries.

The Full Moon is on 9th at about 07:33 in the constellation of Leo.

Last Quarter is on the 15th at about 22:17 in the constellation of Libra.

New Moon is on the 23rd at about 15:32 in the constellation of Aquarius.

The Moon is at perigee (nearest Earth) on the 10th. The Moon is at apogee (most distant from Earth) on the 26th.

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.

The Planets

 **Mercury** may be visible for over an hour in the west around the 10th of February. It is at greatest eastern elongation at that time, but may not emerge from the evening twilight at much more than 10° above the horizon.

 **Venus** sets at a steep angle about three hours after the Sun throughout February and is blazing away in a dark sky. The planet is heading for greatest eastern elongation in late March, so appears to move away for the Sun as the month progresses. A thin crescent Moon lies close to Venus on the evening of the 27th.

 **Mars** rises in the south-east throughout the month and may be seen for about 2 hours before the twilight overwhelms it. On the 11th it goes from the constellation of Ophiuchus into Sagittarius for the rest of the month. On the morning of the 18th a waning crescent Moon accompanies Mars to the west, and to the east of it Jupiter and Saturn can be found by the end of February.

 **Jupiter** hardly changes its position against the background stars in the constellation of Sagittarius throughout the month of February. It appears early in the morning twilight in the south-east, and is available for an hour or so. On the morning of the 20th the thin, crescent and waning Moon, lies in the same region also with Saturn and Mars.

 **Saturn** starts to become visible mid-February rising in the early morning twilight. By the end of the month you may be able to find it low down with Jupiter and Mars. I'm sure you remember that Saturn has 82 known moons.

 **Uranus** is best observed early in the month in the south-west when it is highest in the evening sky. It can be found in the constellation of Aries, at RA 2h 3m 17s, Declination +12° 0' 53", but at a magnitude of 5.80, is just too dim to easily see with the naked eye. Binoculars or 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.

 **Neptune** closes in on the Sun from our perspective; it is in conjunction with the Sun in early March and becomes unobservable as it moves through its glare, so observe it early in the month.

Meteors

February is a poor month for meteor showers; 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 there are generally less of them. Meteor showers appear to originate or radiate from one part of the sky as the Earth passes through streams of meteoroids which themselves orbit the Sun.

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 great circle of constant longitude passing through an observer's location on the earth's surface and the terrestrial poles; as well as directly overhead, the zenith, and directly opposite that, the nadir. 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

Monoceros (pronounced muh-NAH-ser-us)

Astronomy

Paradoxically Monoceros is easy to locate but really hard to see. It is the patch of the sky to the east of Orion. It is hard to see because all its stars except for two have magnitudes dimmer than 4 and even the two brightest are only just brighter than magnitude 4. Even on a clear night a bit of mist will hide the constellation. However it does contain some interesting objects.

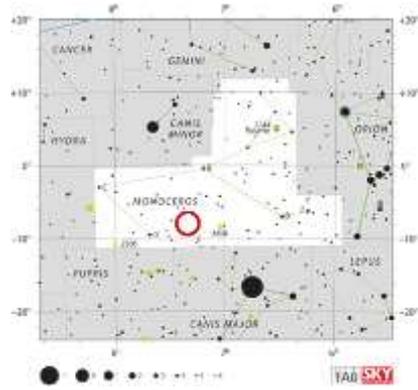
February is an opportune time to find the location of an interesting 'star' in the constellation of Monoceros. Evidence was presented in March 2018 that a now faint binary system, probably interacted with the outer reaches of the solar system about 70,000 years ago, and came within 10 light months of the Sun! It is now about 20 light years away at RA 07h 20m 03.25s, Dec -08° 46' 50", and with an apparent magnitude of 18.3 it is far too dim for easy observation.



Illustration Credit: Michael Osadciw/University of Rochester.

Scholz's star, the primary of the binary system is a red dwarf and the secondary is a brown dwarf with 8% and 6% solar masses respectively.

The Sun's encounter (bright star, left) with Scholz's star (centre) and its companion (right) at a distance of just 52,000 AU was likely to have disturbed the Oort Cloud (also known as the Öpik–Oort cloud), which may after all extend out to around 200,000 AU. In order to verify this hypothesis the trajectories of 339 cometary objects were analysed with the result that the orbits of 36 of them had a statistically significant over-density in the direction of the constellation of Gemini. A greater effect upon the



Oort Cloud than was initially thought, and lending weight to the idea.

The constellation has one Messier object, M50. This is an open cluster that has the nickname 'heart-shaped cluster'. It is quite a large and easy binocular object. It is around 3,200 light years away and is estimated to be quite young at 72 million years. With a modest telescope it can be resolved into individual stars with a nice mix of hot blue and more mature red stars.



Image Credit: Jeremy Perez



Photograph Credit: Nick Busby

Monoceros also contains an object which is very popular with astrophotographers, the Rosette nebula. This nebula comes in two parts (in fact five NGC numbers are associated with the complex): a star cluster that is reasonably easy to see in a small telescope and an HII region or emission nebula. This nebula emits mainly red light that is really difficult to see in anything less than ideal conditions. Ultra high contrast (UHC) filters may help; they cut out light pollution and allow the light of ionised hydrogen and oxygen to pass. Also use low magnification to increase the contrast - it is about one degree across.

Digital cameras are much more sensitive to the wavelengths emitted by such

objects and the Rosette nebula is a relatively easy target being large and bright.

Gemini (pronounced gem' in eye)

In Welsh

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

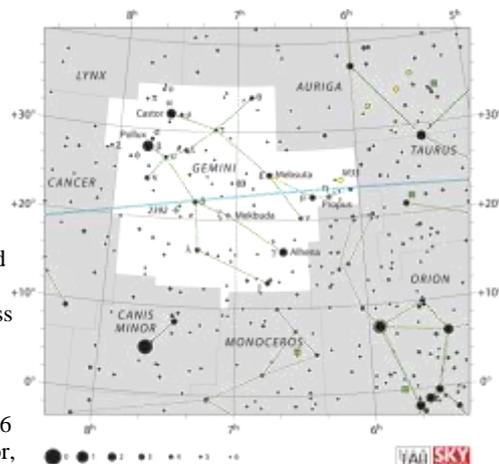
Astronomy

Gemini lies north-east of Orion, and in 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.

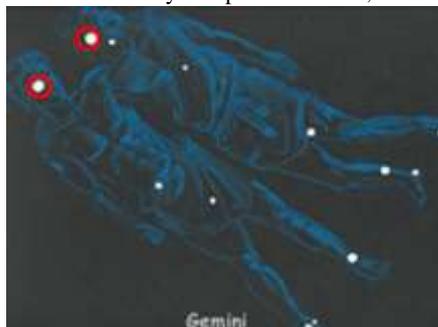


Castor A & B

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.

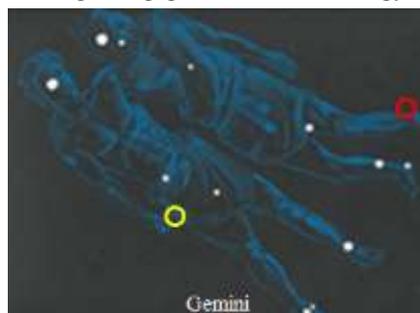
Stars usually conform to the modern convention of having the brightest stars in a constellation denoted as α (alpha) and using the next letter of the Greek alphabet β (beta) for the next dimmer, and so on. Interestingly Castor (α Geminorum) with a magnitude of 1.58 is dimmer than Pollux – (β Geminorum) 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. $+28^\circ 56'$; 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. However using ultra high contrast filters as described above is usually very successful with planetary nebulae, William Huggins was the first to demonstrate that planetary nebulae typically emit lines of ionised hydrogen (HII) and ionised oxygen (OIII) in 1864 when he obtained a spectrum of the Cat's Eye planetary nebula in Draco. These are the lines passed by UHC filters. Like many planetary nebula it is quite small being less than 1" across, however when photographed with a big telescope, 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, the only messier object in Gemini, in the same field of view, with an apparent magnitude of 5.30. It is a large and rather loose open cluster, a worthy target for amateurs, even with binoculars.

Babylonian Myth



Castor and Pollux were known to the Babylonians as the Great Twins (MUL.MASH.TAB.BA.GAL.GAL). They were considered to be the minor gods Meshlamtaea and Lugalirra, meaning 'The One who has arisen from the Underworld' and the 'Mighty King' respectively. They used to dismember the dead as they passed through the gates to the underworld, and are associated with Nergal, the King of the underworld and the major Babylonian god of plague and pestilence.

One of two MUL.APIN cuneiform tablets consisting of lists of astronomical data

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, and seducing her. She also consummated her marriage to Tyndareos the same night and as a result she bore two sets 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.