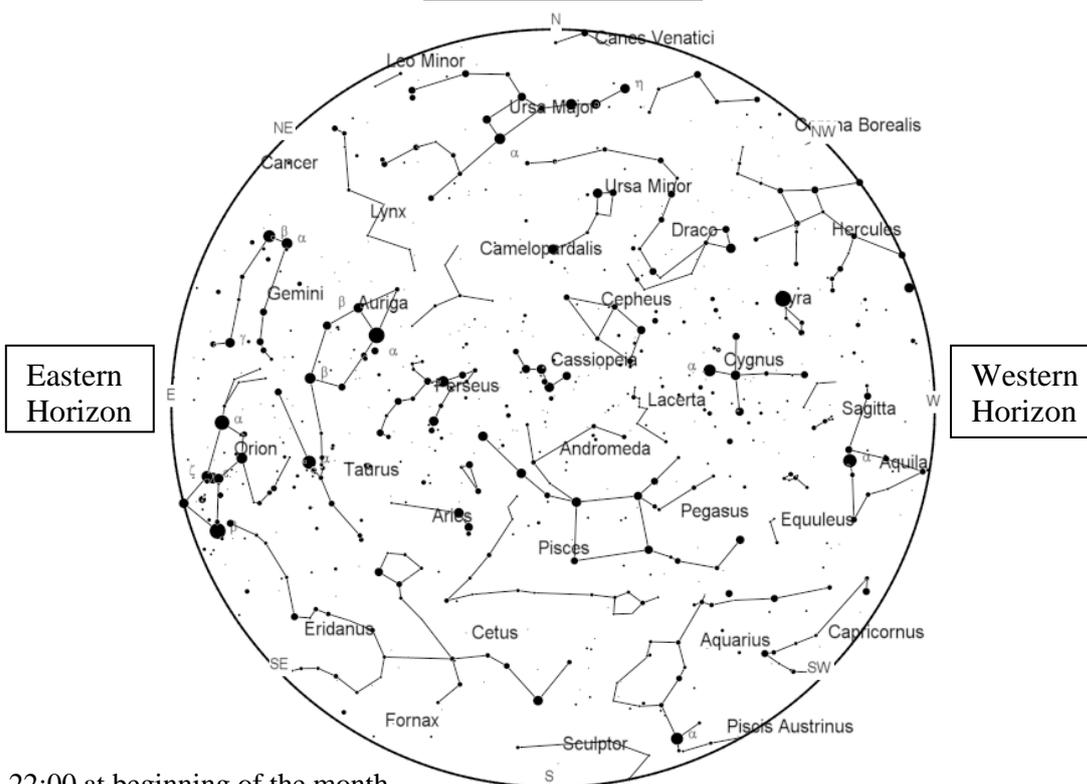




# The Night Sky (November 2019)

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

Very occasionally an Indian summer will mellow the temperatures in the day, but the nights are then misty and foggy. Mostly, however, November is wet and temperatures seldom fall below zero.

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](https://www.meteoblue.com/en/weather/forecast/seeing/usk_united-kingdom_2635052) and acquire up-to-date information.

## From the Earth

Throughout this month, the ecliptic becomes steeper at sunset; rising from a shallow angle of about  $18^\circ$  at the beginning to about  $26^\circ$  at the end of the month, and evening twilight is shortening. Temperatures of around  $4^\circ\text{C}$  at night are not unusual at this time of year so greater care should be taken to wrap up appropriately. The night skies are lengthening less rapidly now, and the Andromeda Galaxy is overhead, in the best position to observe it mid-evening. M31 as the Andromeda Galaxy is also known is given the accolade 'the furthest the naked human eye can see', but there are three other contenders, all of which present difficulties for the most experienced amateurs never mind the general public. M33 the Triangulum Galaxy is one example as stated below,

The glorious winter skies are showing their promise with the arrival of Orion in the east, fully above the horizon by 21:30 in the middle of the month. The belt of Orion points north-west to the Pleiades and south-east to Sirius (below the horizon at this time) which will become available next month at a reasonable time in the evening.

## Artificial Satellites or Probes

You may be interested in observing the International Space Station or other spacecraft, carefully log on to <http://www.heavens-above.com> to acquire up-to-date information for your observing site.



reminding members that sunlight contains radiation 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 or Mercury's transit of the Sun on the 11<sup>th</sup>.

Solar activity is expected to hover around solar minimum; however, a reminder, solar activity is quite unpredictable at times. Although the next solar minimum has been expected around 2019 – 2020, with some uncertainty, some scientists on The Solar Cycle Prediction Panel have come to the conclusion that cycle 25 is already underway, but this is a new science and as yet there is no clear definition with which to compare. It is clear, however that it is imminent.

You can receive aurora alerts automatically from the web. Search AuroraWatch uk for an app suitable for you. If you have any news of aurora or sunspot activity your colleagues would be interested, so let us know.

### Moon

The moon of course does the converse to the Sun and is culminating higher in the sky at night.

First Quarter is on 4<sup>th</sup> at about 10:25 in the constellation of Capricornus.

Full Moon is on 12<sup>th</sup> at about 13:35 in the constellation of Taurus.

Last Quarter is on 19<sup>th</sup> at about 21:10 in the constellation of Leo.

New Moon is on 26<sup>th</sup> at about 15:05 in the constellation of Libra.

The Moon is at perigee (nearest Earth) on the 23<sup>rd</sup> and at apogee (most distant from Earth) on the 7<sup>th</sup>.

### The Planets



This month, **Mercury transits the Sun on Monday the 11<sup>th</sup> starting just before 12:30 until sunset**, from when it precedes the Sun across the sky. Mercury's infrequent transits of the Sun can only occur in May and November and the next transit of Mercury is on 13<sup>th</sup> November 2032! At the steeper morning elevation and greatest western elongation on the 28<sup>th</sup> this is best time for observing. **Be mindful of the Sun; see above.**



**Venus** follows the Sun across the sky throughout the month. By late November, Venus will be between Saturn and Jupiter, and indeed surpassing Jupiter in brightness. You will find it in the south-west, in the evening twilight for less than an hour and a half hours after the Sun sets.



During November and for the next six months, **Mars** rises steeply around 04:50, and fades into the morning twilight about an hour later, at an altitude of not much more than 10°. The cause of this phenomenon is that we on Earth (on an inner orbit) are chasing after Mars (on an outer orbit) around the Sun.



**Jupiter** begins moving rapidly towards the Sun during the month, and we will be losing it in the evening twilight by late-November, early-December. Take a shot at observing it very early before its season ends; it moves towards conjunction with the Sun in late December.



**Saturn** appears 15° above the horizon, low in the south-south-west as the Sun sets and is best observed at the beginning of the month. Saturn is coming to the end of its observing season as it moves towards conjunction on 2<sup>nd</sup> January.



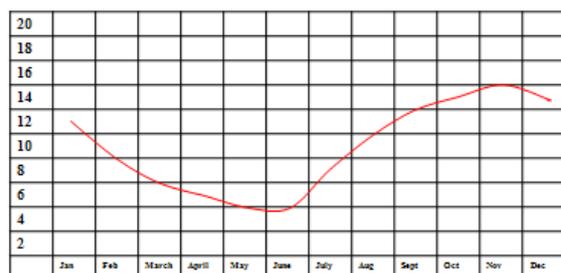
**Uranus** appears after twilight when it is low down and due east at the start of November. It is visible all evening and into the morning during November and is well placed to observe. At a magnitude of 5.68 it may well be seen, star-like, with binoculars. A small telescope might show a green/blue (cyan) hue, but since Uranus usually has few features, little else may be seen even with a larger amateur instrument. It can be found culminating at 49° at around 22:20 in the constellation of Aries at RA 2h 7m 12s, Declination 12° 19' 18", in the middle of the month. It reaches opposition on the 28<sup>th</sup>.



**Neptune** is also visible, with a blue hue, in the evenings of November and might be worth a look with a 150mm telescope at decent magnification. On the 16<sup>th</sup> at around 19:15, it can be found culminating at 31° in the constellation of Aquarius at RA 23h 9m 57s, Declination -6° 30' 00". It has a magnitude of 7.86. On the 27<sup>th</sup> Neptune reaches its second stationary point after which it reverses direction to prograde (direct).

### Meteors

Average fall rates throughout the Year



November is the high season for sporadic meteors, but they require much more patience to observe than do showers because they are not associated with any one part of the sky.

Mean annual sporadic rates as seen under dark skies, from Usk.

Numbers may be as low as 6 per hour in the spring and up to 16 per hour in the autumn.

The **Taurids** are in fact two meteor showers with a wide range from late September to late November. Both are considered challenging. The **Southern Taurids** have a ZHR of just 5, as do the **Northern Taurids**.

The **Leonids** can usually be seen emanating over the eastern horizon from about 11:00 pm on; from the 15th to 20th November. Its maximum is in the morning of the 18<sup>th</sup> when the waning gibbous Moon is near Leo, making for an unfavourable event this year. The Leonid meteor shower is not one of the best, but it does produce a spectacular meteor storm every 32/33 years when the Earth passes through its meteor swarm. Many thousands of meteors per hour can be seen for a short period of time, shooting across the sky. However, the next such storm is expected in the 2030s. The Leonids are associated with Comet P/Tempel-Tuttle.

### 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
Aquarius	19:00 Mid-November	Mid-September	Whole constellation
Cepheus	19:00 Mid-November	Mid-September	Whole - face north upper culmination
Lacerta	19:00 Mid-November	Mid-September	Whole - at zenith upper culmination
Piscis Austrinus	19:00 Mid-November	Mid-September	Whole but poor; very low in the murk
Pegasus	19:00 Late November	Late September	Whole constellation - high

### Cepheus and Cassiopeia

(Pronounced SEE-fee-us and CASS-ee-uh-PEE-uh)

#### Cepheus in Welsh

Seffews *mn.* The standard International Astronomical Union (Latin) name, Cepheus, is used with Welsh spelling.

#### Cassiopeia in Welsh

- 1) Llys Don. literally 'Don's Court', the home of the Welsh sky-goddess, Don
- 2) Cadair Don. literally 'Don's Chair', the chair of the Welsh sky-goddess, Don.

#### Astronomy

**Cepheus** is a circumpolar constellation. He sits atop the Milky Way on a throne near his queen Cassiopeia. The legs and seat of his throne make a rough square. On the Ursa Major side of Cassiopeia, it looks like a house (or throne) sitting on the Milky Way. The back of the seat comes to a point at the top above his head.

As legend suggests, Cepheus is a fairly innocuous constellation and its brightest star, Alderamin, has a magnitude of only 2.4. In 5000 years it will become the pole star, as it was in 18,000 B.C.

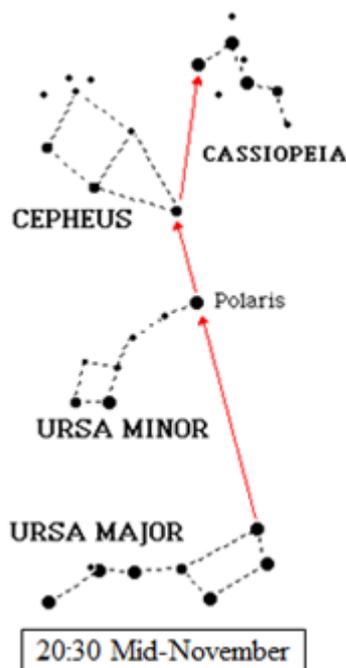
However, it was in this constellation in 1784 that English astronomer John Goodricke first measured the regular variations in brightness of  $\delta$  Cephei (○). His measurements were included in a report to the Royal Society and  $\delta$  Cephei became the definitive Cepheid variable, in honour of Goodricke's work. Goodricke himself was something of a tragic figure. He was born a deaf-mute and died at the age of only 22 years, without ever seeing the importance of his work realised. Although in his paper to the Royal Society he had forecast that, "Such enquiries may probably lead to some better knowledge of the fixed stars, especially of their constitution and the cause of their remarkable changes." He is best known for his observations of the afore mentioned variable star Algol (Beta Persei) in 1782.

In the early years of the twentieth century Henrietta Leavitt established the relationship between the brightness of these stars and their period of variability. This period-luminosity relationship made it possible to find the distance to celestial objects as far away as the nearest galaxies.

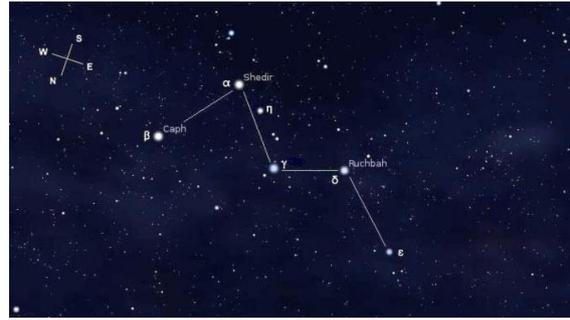
To find **Cassiopeia**, trace an imaginary line from the Plough's pointers on past Polaris. At an equal distance and a little clockwise, on the opposite side from the Plough, is Cassiopeia. This constellation is circumpolar and therefore visible no matter what the season or time of night.

In early May at around 23:00, look due north, Cassiopeia is low down, in the shape of a **W**. At the same time in the evening in early November also looking north, and nearly overhead, it is in the shape of an **M**.

The constellation has five main stars forming its distinctive shape; from the left of the **M** we have Caph, a white F2 type star at a distance of 54 light-years. Caph is a binary star with a faint companion. Next is Schedar, a yellow KO type star, 228 light-years away, which is the primary component of a multiple star system.

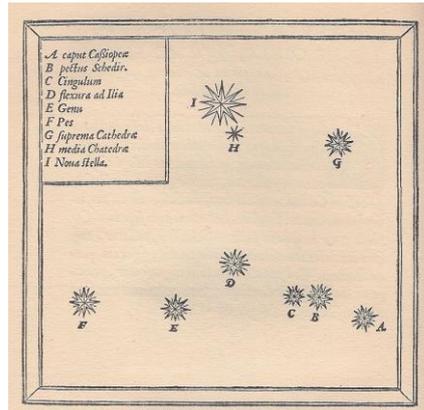


Cih also known as Navi is an unpredictable blue-white B0 type variable star at 613 light-years distant. Cih was the first Be (emission) star to be identified, and it seems to be rotating at around 150 times faster than the Sun. Ruchah is an A5 type star, 99 light-years away as measured by parallax. It is also an eclipsing binary. Finally, there is Segin, a giant B2 star with a blue-white hue about 310 light-years away as measured by parallax. As a W, reverse the names!



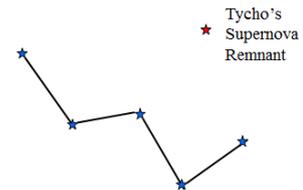
Tycho Brahe was inspired by the arrival of a new star (stella nova) that appeared in November 1572, about 5° north-west of Caph. His measurements of the object exhibited no parallax so he

concluded that it was at a great distance above the Earth, up amongst the stars. Consequently he speculated that the heavens were not unchanging as was commonly believed and that accurate observations would improve his understanding of that realm.



The letters F, E, D, B and G delineate the star positions of the Cassiopeia W.

### Cassiopeia



An illustration from Tycho Brahe's *De nova et nullius ævi memoria prius visa stella* (1573), "Concerning the Star, new and never before seen in the life or memory of anyone", clearly displays his observational position of the 'new star'.

Tycho's Star is identified I. In modern times it is designated SN 1572 or just Tycho's Supernova Remnant. Nearby is a faint star, Kappa Cassiopeiae, marked H.

### Myths

Cepheus, said to be the king of Aethiopia (the upper Nile region), was one of the Argonauts who, with at least one of his sons, travelled with Jason on his epic journey in search of the Golden Fleece. Cepheus was married to Cassiopeia and the fertile couple were said to be blessed with many sons and two beautiful daughters, Aeropa and Andromeda. Andromeda was particularly beautiful, inheriting her mothers' renowned good looks. Now, in those days many gods, both greater and lesser, inhabited the earth, the better that they might oversee mortal affairs. Even the sea had ears.

Poseidon, the god of the sea, was surly and quarrelsome by nature and easily angered, and was offended by remarks made by Cassiopeia. In his wrath he commanded a great flood and a sea monster (believed to be Cetus) to devastate the coastline of their kingdom. In his desperation King Cepheus sought the advice of the oracles who told him that his only hope was to sacrifice Andromeda to the monster.

Cassiopeia was a beautiful black queen, wife to Cepheus. In her vanity Cassiopeia carelessly boasted that both she and Andromeda were more beautiful than the fair Nereids, or sea nymphs. These resentful spirits overheard Cassiopeia's remarks and complained bitterly to their protector, Poseidon, the god of the sea, brother of Zeus and Hades. By good fortune, Perseus, son of Zeus, was returning home from Greece having recently slain the Gorgon, a creature so ghastly that the mere sight of her face ossified those unlucky enough to gaze upon her countenance. Carrying the severed head of the Gorgon in a magic bag and wearing winged slippers, gifts of three Stygian nymphs, Perseus flew over the coast of Phoenicia when he witnessed a strange spectacle on the shore far below.

He saw an angry mob calling for the immediate sacrifice of the princess Andromeda, while the distraught King and Queen stood near the water's edge. Above them, clad only in her Royal jewellery Andromeda had been chained to the rocks awaiting the monsters approach. Perseus was at once smitten by Andromeda's loveliness and flew down to her parents offering to slay the monster, albeit on his own terms. They agreed that should he slay the monster then Andromeda would become his wife and go with him to his home in Greece. After a brief battle Perseus beheaded the monster.

Andromeda was happy to honour her parents' agreement but Cassiopeia conspired with Poseidon's son Agenor who had previously claimed Andromeda's hand in marriage. As the wedding festivities continued, Agenor and his armed troop interrupted them in an attempt to kill Perseus and take Andromeda as his own. However, they were no match for Perseus' supernatural abilities and were themselves turned to stone when Perseus once again produced the Gorgon's head.

In one account Perseus spent his early married life at the court of his father-in-law, before he and Andromeda set off for Seriphos. Ancient myths frequently come down to us in a confused fashion and in this tale, Cepheus is said to

have had no heir of his own. He adopted his own grandson, Perses, who became the king of Aethiopia when Cepheus died and according to Plato, subsequently became the ancestor to the Persians.

After their deaths Poseidon himself transported both Cepheus and Cassiopeia to the heavens. The treacherous Queen was seated on her W-shaped throne and circles round and round the pole. She is forced to spend half the time hanging upside down. Cepheus, who is circumpolar too, can be seen nearby, helpless and ineffectual, marked by stars of the third and fourth magnitude.

The Arabs called Cassiopeia *Al Dhat al Kursiyy*, 'the Lady in the Chair'.