



# The Night Sky (November 2021)

UT (Universal Time) is used this month.

Northern 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 the second wettest month of the year, beating January by a smidgen. Temperatures seldom fall below zero, but make good plans.

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.

## Earth (E)

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

## The Milky Way

By the middle of November the core of our galaxy lies on the south-western horizon at 18:00; the end of twilight. At this time, the Milky Way can be found directly above our heads at the zenith, but lowering quickly in the west to 45° before dawn. This is still a wonderful time of the year to observe our Galaxy in the evening, but it is best done early in the month. The four types of nebulae mentioned in previous sky notes can be found within our Galaxy, consequently most can be observed along the band of the Milky Way.

Get a beginners guide, a planisphere and telescope or binoculars out and see if you can find:

A dark nebula (e.g. the Cygnus Rift).

An emission nebula (e.g. Orion Nebula – M42 in the Sword of Orion) naked eye but better with binoculars.

A reflection nebula (e.g. region around stars in the Pleiades) with binoculars, on a good night with good transparency and low light pollution.

A planetary nebula, a remnant of a nova, once confused with planets (e.g. Ring Nebula in Lyra) with binoculars.

A supernova remnant (e.g. Crab Nebula in Taurus) with a telescope.

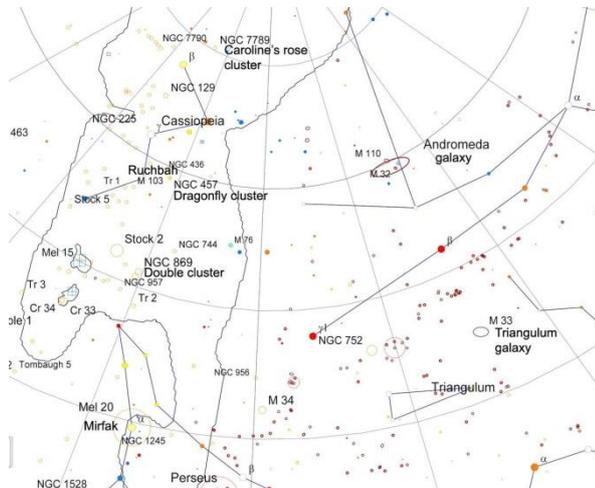
## Star Clusters

Star clouds such as **open clusters** consisting of hundreds or thousands of gravitationally bound stars are most commonly found within the Galactic Plane too. It follows that since the Galaxy is so high in our sky, we are now in the open cluster season. The clusters in Auriga M36, M37 and M38, are all binocular objects and are even better with a telescope of any size. The Pleiades in Taurus are, of course, the most famous.

For Nick Busby, our chair, who is an avid observer, the two things that herald the emergence of the winter sky are the rise of the Pleiades and the rise of Capella in Auriga.

Cassiopeia is a wonderful constellation in which to search for open clusters; it is packed with them and at this time of year is almost overhead. Many have fanciful names such as the “Dragonfly cluster” aka “ET” aka NGC457 and Caroline's Rose cluster (aka. the Screaming Skull cluster, Ghost cluster, Crab cluster, Herschel's Spiral cluster, Star Mist cluster, NGC 7789 – take your pick!). A star chart or planetarium software such as Stellarium will help you to locate many others.

Of course this is also a great time to view the showpiece “Double Cluster” in Perseus (NGC 884 and 869). You can find this easily with the naked eye as it lies about half way between Ruchbah in Cassiopeia and Mirfak in Perseus. It is fabulous in binoculars and is also wonderful to peruse in a telescope as the clusters have stars with a wide range of brightness and colours. The two clusters are part of a system but not as close to each other as they look, that is a line of sight effect, they are around 7500 light years away and believed to only be around 13 million years old. The Double Cluster has been known since ancient times and has been said to represent the jewel in the handle of Perseus' sword.



**Galaxy** M33, the Triangulum galaxy which often gets overlooked can be great in binoculars on a dark night. It's too big and diffuse to observe easily with a telescope. However, some amateurs test their eyesight by trying to view M33 with the naked eye; you may need to use averted vision. It can be found just inside the western boundary of Triangulum with Pisces; at RA 1h 34m 58s, Declination +30° 44' 46". The constellation Triangulum is an obvious isosceles triangle pointing west and sandwiched between Andromeda and Aries. The galaxy M33 is just above and to the west of the tip of the constellation. At between 2.4 and 3 million light-years it is one of the most distant objects visible to the naked eye. Incidentally many ET fans believe that the little creature that is lost 'three million light-years from home' came from the galaxy M33. More scientifically, it is thought that more than 54 Globular clusters orbit M33.

**Globular Clusters** containing tens of thousands to millions of old, tightly gravitationally bound stars can be found orbiting in halos surrounding cores of galaxies. The Milky Way Galaxy has about 150 known Globular clusters in its halo. Most can be observed towards and around the galactic core since those travelling through the plane of the galaxy are obscured by dust lanes etc. However some can be found between us and the core in Sagittarius.

## Sun

The centre of the Sun passes from Libra into Scorpius around 10:00 on the morning of the 23<sup>rd</sup> and into Ophiuchus in the evening on 29<sup>th</sup> of the month. Even though the Sun no longer reaches the elevation it does in the summer, it is worth 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.

NASA has confirmed that solar cycle 25 is now underway, supporting the conclusions of the Solar Cycle Prediction Panel Solar. Activity is expected to increase for the next four years or so, but bear in mind, this is a new science and as yet there is no clear definition with which to compare, and solar activity is quite unpredictable at times.

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. A good place to check out the solar activity "today" is this NASA website <https://sdo.gsfc.nasa.gov/data/>.

### Moon

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

The New Moon is on 4<sup>th</sup> at about 21:15 in the constellation of Libra.

The First Quarter is on 11<sup>th</sup> at about 12:45 in the constellation of Capricornus.

The Full Moon is on 19<sup>th</sup> at about 08:55 in the constellation of Taurus.

The Last Quarter is on 27<sup>th</sup> at about 12:30 in the constellation of Leo.

The Moon is at perigee (nearest Earth) on the 5<sup>th</sup> and it is at apogee (most distant from Earth) on the 21<sup>st</sup>.

The Partial Lunar Eclipse on the 19<sup>th</sup> is unlikely to be visible here in Usk; the Moon sets at the beginning of the event.

### The Planets (From the Greek ἀστὴρ πλανήτης (astēr planētēs), meaning wandering stars)

Jupiter and Saturn are easy evening objects to find; in the south at sunset. Venus, Mercury and Mars are close to the Sun.

Neptune and Uranus are available in the evenings, using appropriate equipment. Even Ceres can be found all night long for most of the time, but only as a pin-point.

**Mercury (Me)** Rises just before the Sun early in the month when it can be found rising just after the waning crescent Moon (on the 9<sup>th</sup>). It is not best placed for observing later in November; it reaches superior conjunction on the 29<sup>th</sup>.

**Venus (V)** is an evening object throughout this month, appearing briefly in the twilight at the end of November. It is best observed later in the month, but great care should be taken to avoid the Sun.

**Mars (Ma)** appears in the morning twilight, closer to the Sun than even Mercury as it moves westward away from conjunction in October. Later in the month of November is best, however the Sun is a constant danger.

**Jupiter (J)**, at the beginning of the month when it is best observed, culminates at above 23° in the constellation of Capricornus. A photo-opportunity presents itself just after sunset in the evening of the 11<sup>th</sup> when the first quarter Moon accompanies Jupiter.

**Saturn (S)** culminates at above 19° in the constellation of Capricornus in the evening twilight, early in the month. By the end of the month Saturn slowly appears around 16:30 a little to the west of Jupiter, but at a slightly lower altitude. That couple of degrees altitude may make it worthwhile observing earlier in November. The open ring system through a telescope is interesting to observe. A photo-opportunity presents itself just after sunset in the evening of the 10<sup>th</sup> when the first quarter Moon accompanies Saturn.

**Uranus (U)** is best observed in the evenings at the beginning of the month around 23:30 when it is at opposition on the night of the 4<sup>th</sup>/5<sup>th</sup>. At this time it can be found in Ares at RA 2h 42m 2s, Declination 15° 16' 57", at a magnitude of 5.65. It will appear as a small disk coloured with a greenish hue in a 150mm or greater telescope.

**Neptune (N)** is in retrograde motion at this time, and culminates at about 33° throughout the month in the constellation of Aquarius. In the middle of the month it can be found at RA 23h 26m 49s, Declination -4° 50' 18" when it culminates at 19:30. It only has a magnitude of 7.85 and needs a 150mm or greater telescope with decent magnification to even get a glimpse.

### Dwarf Planets

On the 10th November **Ceres** can be found smidgen north-west of Aldebaran in Taurus at RA 4h 30m 48s, Declination 17° 04' 01", at a magnitude of 7.09. It reaches opposition on the 27<sup>th</sup>. However, no disc will be discerned due to its distance.

**Meteors** 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.

Conditions apply

Average fall rates throughout the Year



## Meteor Showers

The **Taurids** are in fact two meteor showers with a wide range from late September to late November, with low ZHRs. Both are considered challenging

The **Southern Taurids** are expected to peak around the 5<sup>th</sup> November and are very favourable but only with a ZHR ~ 5 expected this year.

The **Northern Taurids** are associated with the asteroid 2004 TG<sub>10</sub>. These usually peak around the 12<sup>th</sup> November, with limits of activity of 20<sup>th</sup> October and 10<sup>th</sup> December. This shower can produce slow, but brilliant meteors with a ZHR ~ 5 expected this year. Otherwise this event is very favourable this year.

The **Leonids** can usually be seen emanating over the eastern horizon from about 23:00 on; from the 6<sup>th</sup> to 30<sup>th</sup> November. Its maximum is in the night of 17<sup>th</sup>/18<sup>th</sup> with a maximum ZHR of 15. The Leonid meteor shower is not normally 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. However, this year, the near full Moon interferes with observing conditions making for an unfavourable event.

From our Chair;

If you want some easy things to look for with your telescope in the coming weeks these are my suggestions. Perhaps you could look them up on the internet beforehand to understand what it is you will be seeing.

Messier 31 (aka M31), M57, M27, and M52 (tricky but nice).

Two favourites of mine - NGC869 and NGC884 (NGC is just another catalogue name).

The star albireo in Cygnus, Jupiter, Saturn, NGC457, NGC7789 and if you look just after dark before they set in the west M13 and M92.

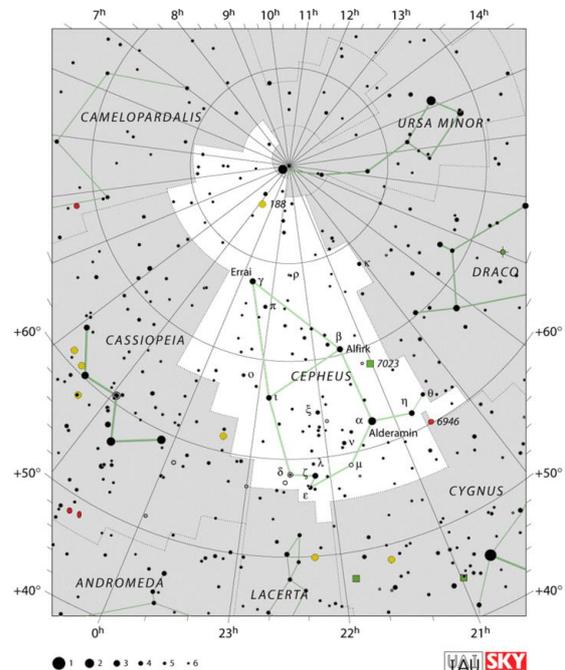
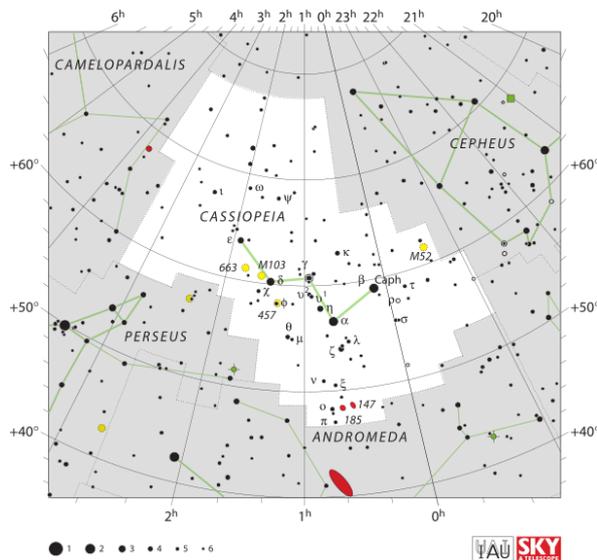
There are lots of other things but that would be my pick for an easy October/November night.

## Constellation Culminations from Usk

The observability of constellations can be found in the article called 'Culminations of Constellations'.

### 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 BCE.

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.

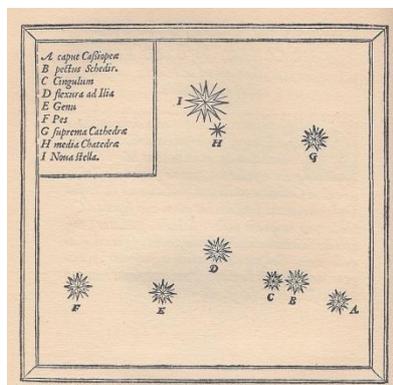
To find **Cassiopeia**, trace an imaginary line from the Plough's pointers on past Polaris. At an equal distance and a little clockwise, on the opposite side from the Plough, is Cassiopeia. This constellation is circumpolar; it circles the North Star and therefore visible no matter what the season or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



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.

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

