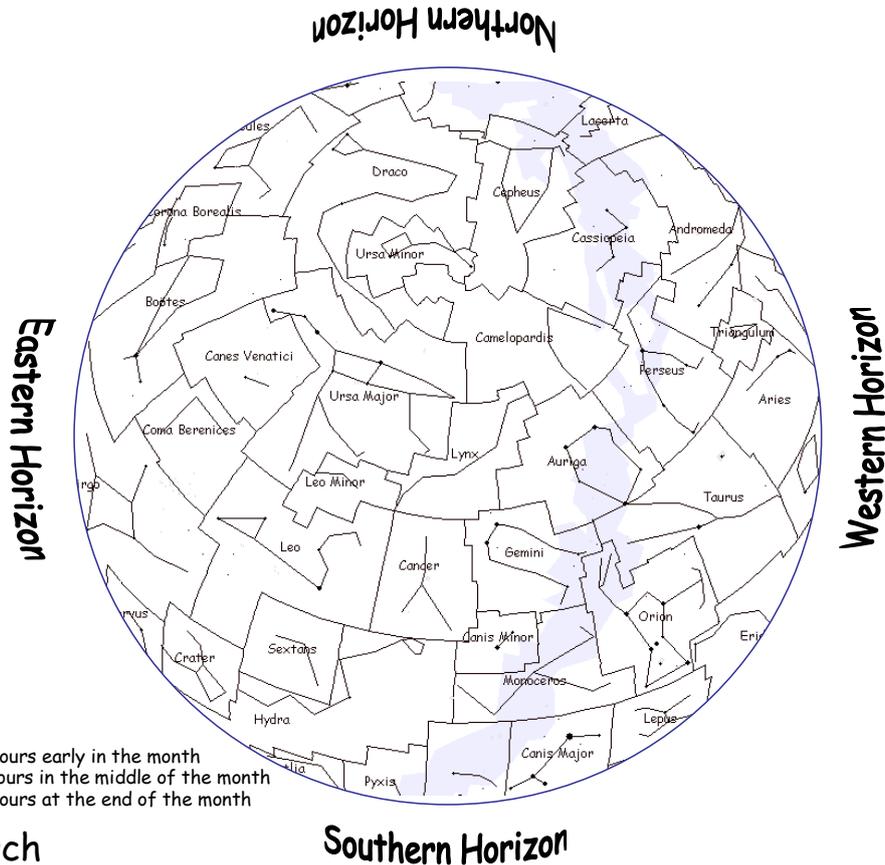


# The Night Sky (March 2019)

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



22:00 hours early in the month  
21:00 hours in the middle of the month  
20:00 hours at the end of the month

March

Southern Horizon

## The General Weather Pattern

March can be quite still and dry but it is renowned for its strong winds and occasional fog. Even though daytime temperatures are usually better than the previous months, it can still be freezing at night. 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. As always, an energy snack and a flask containing a warm 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](https://www.meteoblue.com/en/weather/forecast/seeing/usk_united-kingdom_2635052)

Other locations are available.

Astronomical symbols are shown before an object's name. The International Astronomical Union (IAU) abbreviations for an astronomical body are displayed in parenthesis after its name.

## ⊕ Earth (E)

Throughout this month, the ecliptic is at a steep angle of about  $63^\circ$  at sunset, the maximum angle occurs at the Spring Equinox on the 20<sup>th</sup>. In this configuration, the angle of separation of a planet from the Sun translates into higher altitude at sunset, and inferior planets at greatest elongation are best observed when they occur at this time of year. The opposite is true of the dawn. Nights get shorter most quickly at the Spring Equinox, and the Sun sets later each day, consequently constellations appear to move more rapidly westward at sunset. However on clear nights the winter sky is still visible, whilst Leo, regarded by many as the spring constellation, appears in the south-eastern sky after sunset. The move to British Summer Time (BST) takes place at 01:00 on the morning of Sunday the 31<sup>st</sup> this year, and the clocks are reset at 02:00; spring forward.

## 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. The ISS is visible at a reasonable time, between 19:30 and 22:45, from Usk no less than 13 times in the last week of March!



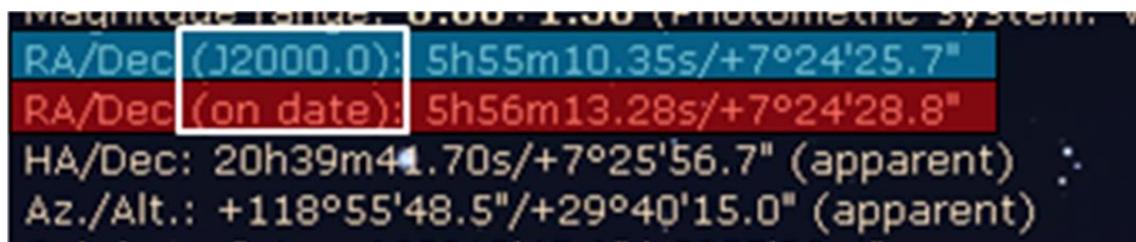
## Sun

On the 12<sup>th</sup>, the Sun moves from Aquarius into Pisces. On the 20<sup>th</sup> at 16:15 UT, this year, the centre of the Sun crosses the celestial equator marking the First Point of Aries; the 'prime meridian' for right ascension. It was defined in 130 BCE by Hipparchus when it was located in the constellation of Aries. Because of precession, it has migrated into the constellation of Pisces where we find it in modern times, also known as the Vernal Equinox.

Equinox derives from the Latin *aequinoctium*. *Aequus* meaning "equal" and *nox* meaning "night". Vernal from *ver* means spring, for the Spring Equinox, divulging its historical origins in the Northern Hemisphere.

The equinox on the 20<sup>th</sup> is a good time to get your bearings where you live or at your observing site; the Sun rises due east and sets due west.

The Prime Meridian (first point of Aries) is important because it is the basis for the celestial coordinate system, it is by definition 0 degrees Right Ascension and 0 degrees Declination. However, as the first point of Aries apparently slowly moves owing to the precession of the earth's rotational axis so does the celestial coordinate system. This means that the stated coordinates used to locate objects of interest also changes. For this reason you will often see the epoch quoted against the coordinates, for instance;



As discussed in February, being at the end of a cycle there are very few and on many days no sunspots, filaments or prominences to be seen. The Sun continues to quieten, but if you have any news of sunspot activity other members would be interested, so let us know. Ask experienced members for help if you want to observe the Sun.



## Moon

The New Moon is on 6<sup>th</sup> at about 16:05 in the constellation of Aquarius.

The First Quarter is on 14<sup>th</sup> at about 10:30 in the constellation of Taurus.

The Full Moon is on 21<sup>st</sup> at about 01:45 in the constellation of Virgo.

The Last Quarter this month is on 28<sup>th</sup> at about 04:10 in the constellation of Sagittarius.

The Moon is at perigee (nearest Earth) on the 19<sup>th</sup> and at apogee (most distant from Earth) on the 4<sup>th</sup>.

At this time of year the ecliptic is high in the southern sky at night-fall. A first quarter Moon found in this region will be at its best; light from it passes through less atmosphere to reach our telescopes than when it is low down. Many impressive selenological features can be observed at the terminator, where lunar night meets lunar day. Try it, even with hand-held binoculars.

## The Planets



**Mercury (Me)** is at inferior conjunction on the 15<sup>th</sup> and is poorly placed this month.



**Venus (V)** can be found shining brightly in the south-east very low down, in the morning twilight throughout the month. Venus rises a little earlier at the end of March as it closes in on the Sun and deeper into the morning twilight. If you try observing Venus, the Sun is not an ally in March!



**Mars (Ma)**, an evening object, crosses the Aries/Taurus border on the 23<sup>rd</sup> moving into the vicinity of the Pleiades in the last few days of March and early April. It diminishes in magnitude from 1.19 to 1.45 during the month as it makes its way towards the other side of the Sun in Early September,



**Jupiter (J)** is a morning object this month and maintains its location in Ophiuchus throughout March; appearing in the south-east at around 03:10 at the start of the month and 02:20 at the end. Its motion eastward is slow against the background stars. 5.05 magnitude Antares can be found less than 15° to the west of Jupiter. At this point in its orbit, Jupiter is low down even at best, but as we have said before, there is much to see in a decent telescope.



**Saturn (S)** shows itself each morning at around 05:00 early in the month, and can be seen in the twilight no later than 06:30. At the end of March it rises nearer to 04:00 but still disappears in the twilight around 06:30. The ring system is nicely displayed for observing so dedicated observers may spend some time on Saturn. Less enthusiastic observers might try in June/July; Saturn will rise earlier as the year progresses reaching opposition at the end of June.

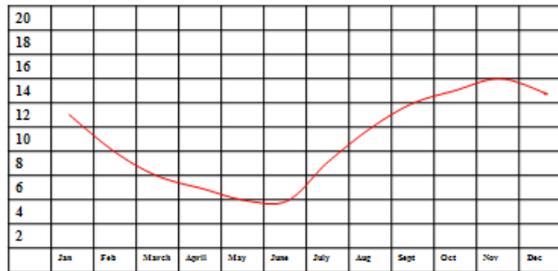


**Uranus (U)** lies in the south-western corner of Aries throughout the month of March. It is best observed early in the month. At each successive sunset, it closes rapidly on the Sun and is all but unobservable for most of the month.

♆ **Neptune (N)** is unobservable this month. It is at conjunction on the 7<sup>th</sup> and rises in the glare of the Sun for the rest of March.

### Meteors

Average sporadic meteor fall rates throughout the Year



Based on data by Robert Lunsford

The protracted tracks of the **Virginids** are only just evident from February through to May, but at 5 ZHR, become a little better around 20<sup>th</sup> in March (**the March Virginids**) and again in April. This series of diffuse radiants moves slowly from Leo into Virgo during this time.

March is a poor month for meteor showers, and it will be quite quiet until mid-April. Sporadic meteors can of course be noticed, but require much more patience to observe than do showers because they are not associated with any one part of the sky, and from March until the end of June is the low season for sporadic meteors.

Mean annual sporadic rates as seen under dark skies, from latitude 45° north.

Numbers vary from a low of 6 per hour in the spring to 16 per hour in the autumn.

Constellation	Convenient Culminations	Midnight Culminations	Observability
Camelopardalis	20:00 Early March	Early January	Whole in north upper culmination
Canis Major	20:00 Early March	Early January	Whole but low
Monoceros	20:00 Mid-March	Early January	Whole
Gemini	20:00 Mid-March	Mid-January	Whole - high
Ursa Major	23:00 Mid-March	Mid-March	Whole at zenith upper culmination
Canis Minor	21:00 Late March	Mid-January	Whole
Lynx	21:00 Late March	Late January	Whole - at zenith
Cancer	22:00 Late March	Early February	Whole
Pyxis	22:00 Late March	Early February	Whole but poor; v low in the murk

**Cancer (Cnc)** (Pronounced CAN-ser)

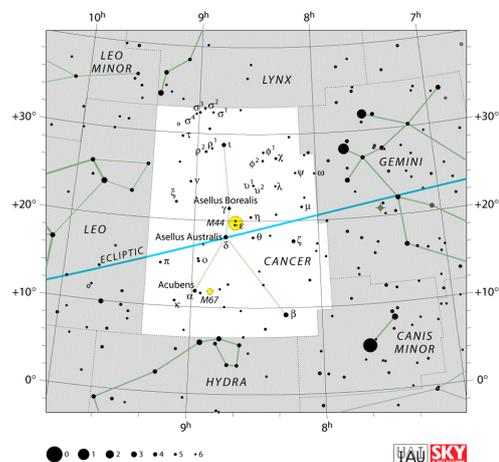
**In Welsh**

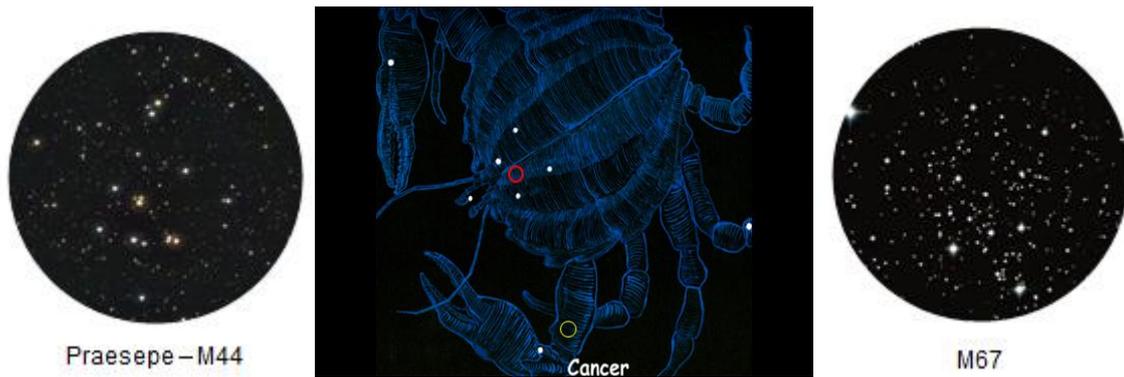
y Cranc *nm.* literally the 'Crab'.

### Astronomy

Lying between the two prominent constellations of Leo (the lion) and Gemini (the twins), Cancer is an inconspicuous constellation which inexperienced observers might overlook. A fuzzy patch just to the east of Gemini is often the easiest way to find it. The patch is the Beehive cluster (M44) It is spectacular in binoculars or a telescope on low power Praesepe (pronounced Prye-see-pee) (♁) as this star cluster is more properly known, can be seen with the naked eye. The cluster was known to Hipparchus as *Nephelion* meaning 'Little Cloud', in his star catalogue around 130 BCE and was known to Ptolemy who referred to it as 'the nebulous mass in the breast of Cancer'. It is therefore no surprise that it can be found at the centre of the constellation and is a popular object with amateurs. Praesepe is Latin for manger.

Galileo first turned a telescope on it in 1609, and it became one of the objects identified by Charles Messier in his catalogue and holds the designation M44. The cluster comprises over a thousand stars, about a third of which are Sun-like, and about 65% are red dwarfs. At 577 light-years Praesepe is one of our nearest open clusters and presents itself to us as one of the larger open clusters, with an area three times the size of the full Moon.





About 8° south of M44 is found a smaller but denser open cluster called M67 (○), about the size of the full Moon. The cluster holds around 200 stars over half of which are like the Sun with a smattering of red giants. Except for the 30 or so blue stragglers, nearly all these stars are the same age and are about 2500 light-years from us, which makes it an object of significance to astronomers interested in the lives of stars.

Here in the UK Cancer is best observed from February to May when it is high in the sky at a reasonable time. More serious observers, who play all night, have worthy opportunities from November to May.

As a matter of interest, the star Asellus Australis (δ Cnc) about 2° south-east of M44, holds a record for the longest name for a star, "Arkushanangarushashutu," which is derived from ancient Babylonian language, and translated to mean "the southeast star in the Crab."

### Greco-Roman Myth

Nearly all Greek and Roman sky myths are intertwined, for instance Heracles becomes Hercules, and Roman myths regarding the Crab are almost identical to the Greeks, with Latinised names.

Cancer is Latin for crab and in Greek mythology is associated with the account of the crab Karkinos in one of the Twelve Labours of Heracles. Heracles was an illicit son of Zeus and so was loathed by Hera the wife of Zeus. Whilst the hero Heracles is fulfilling his second task, battling with the Hydra, a serpent-like creature with many heads and lethal breath, Hera intervened. In the myth, Hera sends the crab Karkinos to confuse Heracles while the hero is fighting. As the crab attempts to kill him, Hercules kicks it high in the sky among the stars.

Another account has Karkinos pinching Heracles's toe, and Heracles merely stamps on the crab, crushing it. It is Hera who places it amongst the stars.

### Ursa Major (UMa) and Ursa Minor (UMi) (Pronounced er' suh may' jor) and (pronounced er' sa my' nor)

#### In Welsh

- 1) Arth Fawr *nf.* literally 'Great Bear'.
- 2) Arth Fwyaf. literally the 'Greater Bear'.
- 1) Arth Fach *nf.* literally 'Little Bear'.
- 2) Arth Leiaf. literally the 'Lesser Bear'.

#### Astronomy

**Ursa Major**, seen to the right at 22:00 BST in mid-April, is one of the most ancient and famous of the constellations in the Northern Hemisphere. At our latitude most of Ursa Major can be seen each night, all year round, circling the pole star, Polaris, in the north and is therefore known as a circumpolar constellation.

**Ursa Minor** was not recognised by the Greeks until about 600 BCE. Prior to that, the Phoenicians knew Ursa Minor as a navigational guide, and recognised that the close proximity of the Phoenician Bear to the then pole star (15° from Polaris) made Ursa Minor more useful than its larger relative.



Illustration Credit: David J Thomas.

At our latitude most of Ursa Major can be seen each night, all year round, circling the pole star and is therefore known as a circumpolar constellation.

The seven brightest stars in Ursa Major can be seen even from light-polluted skies, and so this group of stars is easily recognised, seen to the left as it looks at 20:00 in mid-December. Both Greek and Roman writings frequently mentioned this region as a bear. However, those seven stars have been given many names by many different cultures. They are also commonly associated with cups (ladles) and wagons (wains) amongst other things.

In the UK and Ireland it is commonly called the Plough, in the USA –

'the Big Dipper'; a ladle. A story from Arabia describes a coffin, with three mourners. In Scandinavia it is 'the Wagon'. Would you believe, in Dutch, it is commonly called *Steelpannetje* 'the Saucepan' even though its official name is the 'Great Bear' (*Grote Beer*). Among the Welsh, it is also known as *Y Sosban*, 'the Saucepan' which, I feel, it most resembles.

The Plough is not a constellation in its own right; it is a recognisable group of stars, known as an asterism, consisting of the seven brightest stars of the Great Bear, Ursa Major, in Welsh, *Arth Fawr* literally 'Great Bear'. Starting from the end of the handle of the pan (or the tail of the bear) the star names are: Alkaid, Mizar, Alioth, Megrez, Phecda, Merak and Dubhe.

Merak (the brightest) and Dubhe (the second brightest) are famous for being the pointer stars, pointing to Polaris, the North Star. To locate it, take the distance between the pointers as one step, and take five steps away from the lip of the saucepan; Dubhe. Visually Polaris is not an outstanding star, but it is the most significant in this region. It isn't precisely on the polar axis, but so close at  $89^{\circ}02'$ , that its minimal movement makes it well suited for some navigational purposes. Due to the earth's precession this will soon change in astronomical terms. In 8000 years Deneb ( $\alpha$  Cygni) will be the pole star, while 4000 years after that the closest visible star to the pole will be Vega, and even that will be  $12^{\circ}$  from the pole!

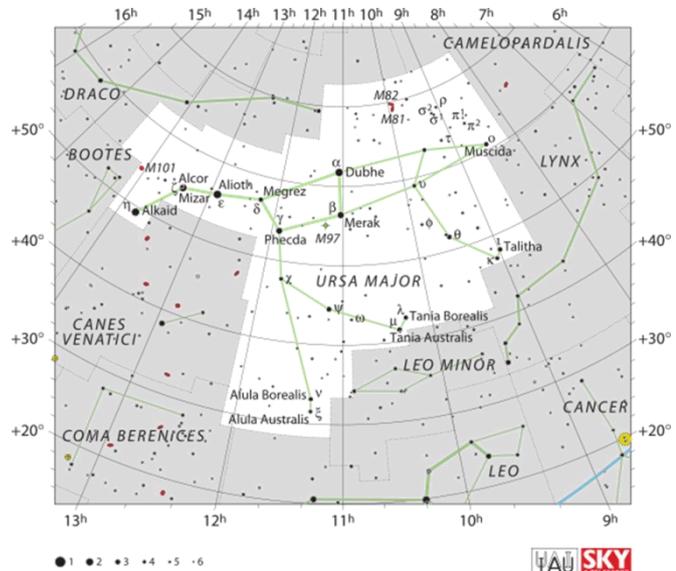
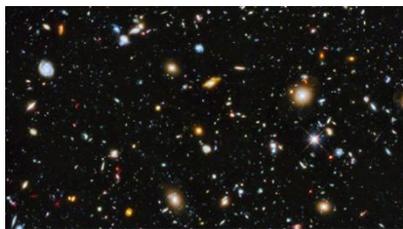
The second star from the start, Mizar, is famous for its companion star Alcor. They are a naked eye double; they look close together but are in fact about 6 light years apart. Mizar is the brightest star at Magnitude 2.27 and Alcor is Magnitude 4.01. Named the 'Horse and Rider' by the Arabians, these two were a test of vision to them; if someone could split the two with the naked eye, they were said to have good eyesight.

Historically, Mizar is a most interesting star; it was the first telescopic double discovered. In 1650 when the Italian Giovanni Riccioli aimed his primitive Galilean telescope at the 2nd mag. star he found it to have a 4th mag. companion (other than Alcor). Today we know Mizar is a double binary; a quadruple system, and that Alcor is itself a spectroscopic binary star system.

For extra-solar planet hunters there is a naked-eye star in the back leg of Ursa Major that has an eccentric giant planet. It is unlikely to support life due to its size, orbit and proximity to its star called HD 89744, but it can still teach us a great deal about the possibilities of extra-terrestrial life.

The bright planetary nebula, Owl Nebula (M97), can be found along the bottom of the pan of the saucepan, south-east of Merak.

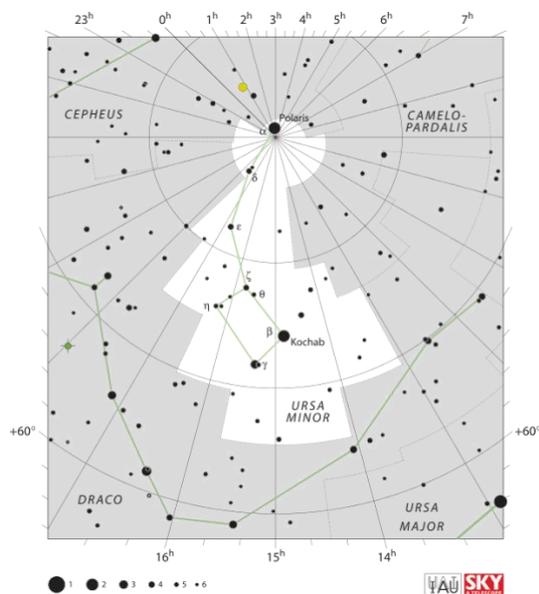
Ursa Major encloses a number of bright galaxies. One of the brightest, the spiral galaxy M81, can be found north of the bear's head, and close by and just a little further north, is the brightest infra-red galaxy M82, an irregular galaxy. These galaxies interact gravitationally and are members of next nearest galaxy cluster to our own Local Group of galaxies.



The position of the famous Hubble Deep Field lies to the northeast of Megrez ( $\delta$  Ursae Majoris).

At our latitude **Ursa Minor** too can be seen each clear night, all year round, circling the pole star and is also a circumpolar constellation. The seven brightest stars make up another, smaller, bear, and in the UK it is commonly called the Little Bear or Lesser Bear. In the USA it is 'the little Dipper', and in Wales it is known as *Y Sosban Fach*, 'the Little Saucepan' also *Arth Fach* literally meaning 'Little Bear'.

At the end of the of the 'handle' or 'tail' is Polaris,  $\alpha$  Ursae Minoris, the brightest star in the constellation. Its importance is that it is almost immediately above the northern pole of the Earth and as the Earth spins it maintains its position within  $0.75^{\circ}$  of north and lends itself to navigation. Polaris is a yellow-white supergiant and also the brightest Cepheid variable in the sky, with an apparent magnitude range of 1.97 to 2.00 during a 3.97 day period.



The second brightest star is Kochab, ( $\beta$  Ursae Minoris), which is just a little fainter than Polaris at 2.08. The Celestial North Pole just about rests on a line between Kochab and Polaris and is only 43' from Polaris, which is useful to those observers who need to set up a polar-aligned telescope.

Disappointingly, there are very few deep-sky objects of note in this constellation.

However the Ursids, a meteor shower associated with Comet 8P/Tuttle, can be seen emanating from a radiant near Kochab in Ursa Minor, on the 17th to 25th December each year. This shower is quite weak with a ZHR  $\sim$  5 but in some years occasionally  $\sim$  50.

### Greco-Roman Myths

Zeus, the supreme deity of the Greeks, had many lovers, both mortal and immortal. The Roman equivalent was Jupiter. His wife, Hera, the Roman Juno, spent most of her time persecuting these lovers and their children.

Artemis, or Diana, the goddess of the moon and mistress of the hunt surrounded herself with beautiful nymphs who accompanied her on her expeditions. One such companion was Callisto, who was such a beauty, Zeus fell instantly in love with her. He disguised himself as the brother of Artemis, Apollo and overwhelmed the unsuspecting Callisto, becoming her lover. In due course she bore him a son who Zeus named Arcas, after the Greek for bear *arktos*.

Zeus may have been a philanderer but he realised that he would have to protect Callisto from the wrath of both his wife, and the vengeful rage of Artemis who would brook no violation of chastity taken by her followers. In order to protect the young beauty, he turned Callisto into a bear.

Many years later Arcas, who had grown up to become an accomplished hunter, was hunting in the forest with a bow and arrow and happened across a great bear. The bear was none other than his own mother, Callisto who was constantly forced to flee all the other beasts and hunters. Recognising her son, she was overjoyed and paused in a forlorn attempt to greet him. Arcas, ignorant of his mothers' transformation, took aim with his bow.

Zeus, full of compassion for his erstwhile lover and their son, took pity upon them and changed Arcas into a little bear so that he might recognise his own mother. He then transported them to the heavens where they could enjoy a safe life together. Henceforth they have been known as the Greater and Lesser, or Great and Little Bears.

Hera, however, was far from satisfied with this turn of events. In their new stellar domain the Bears brightened the heavens and illuminated the pole that they now guarded. Hera beseeched the ocean god never to permit Arcas and Callisto to bathe themselves in his oceans' immortal waters. This spiteful wish was granted and the two bears are fated to circle the pole without ever descending to join the other constellations in reviving themselves in the oceans.

### Myths from around the world

The **Babylonians** knew Ursa Minor as the "Wagon of Heaven".

To the **Aztecs** Ursa Major represented one of their Gods, Tezcatlipoca (Tez-cat-lee-poka). He was a dark God associated with death. They saw him with three limbs, one of which was thought to have been devoured by a heavenly monster. If you mention this you can talk about rotation of the stars and that due to the Aztec Empires position on the globe, (South America), part of Tezcatlipoca's feet would, at times, be below the horizon so they would not be able to see it. This may be why they thought a limb was missing.

The **Chinese** considered the seven brightest stars as the seven openings of the heart or the Seven Astronomical Rectors, the masters of heavenly influences.

The **Finnns** sometimes call the asterism Otava, an old Finnish name which means 'Salmon Weir'.

In **Hindu** mythology the seven brightest stars of Ursa Major represent the homes of the seven Rishi, primordial sages.

The **Italians** call it 'il Grand Carro', the Big Cart and they call Ursa Minor 'Piccolo Carro', the Little Cart.

A **Norse** legend calls Polaris the 'World Nail' that holds the heavens together.

The **Iroquois**, a native North American tribe, also see Ursa Major as a bear, *Okouari*, who once terrorised local people. Three young braves set out to hunt him (the three stars that make up the handle of the Plough). The bear began to run in circles around Polaris which they called 'the star that never sets'. They kept chasing the bear but never got any closer. However, eventually they managed to shoot the bear with an arrow and some of the blood dripped onto the trees and turned the leaves red. The Iroquois believe this is why leaves change colour in the autumn.

To the **Pahutes (Paa-hoots)** another native North American tribe, Polaris was known as *Qui-am-i Wintook*, translated as the 'North Star'. They believed it to be a sheep, which one-day had reached the peak of a high mountain. The rest of the flock couldn't follow their leader; try as they might, because the path had collapsed behind it. They continue to walk around the slopes to this day, pursuing *Qui-am-i Wintook*. A Great Spirit saw this and placed the animals into the heavens, as a guide for all living things on Earth. The flock can be seen as circumpolar stars.