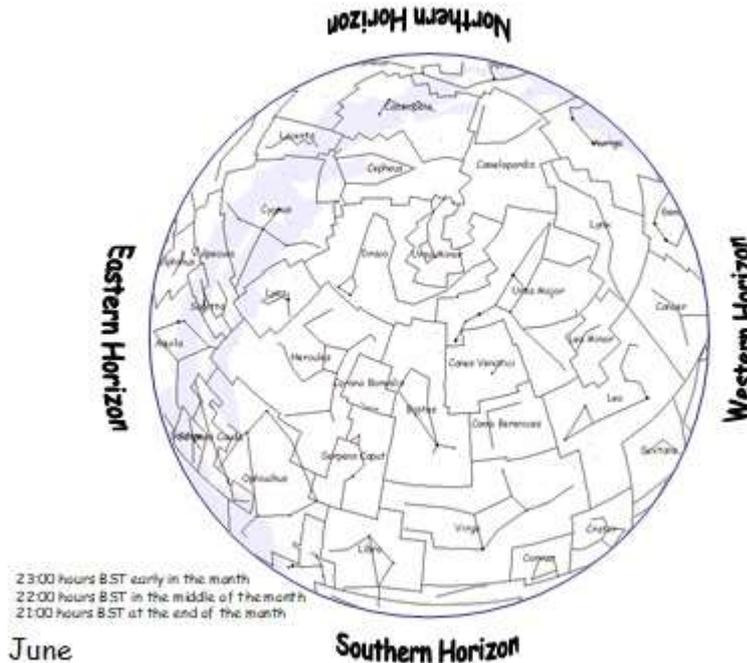




The Night Sky (June 2018)

BST (Universal Time plus one hour) is used this month



The General Weather Pattern

June is usually the driest month of the year. Inland, however, cumulous clouds can develop to great heights giving way to thunder storms which signal the end of a dry spell. Here in Wales a coastal fog can sometimes mar an evening. Temperatures are usually above 10 °C at night, but always prepare for the worst.

From Earth

The ecliptic is low throughout the night in June and the first half of July. Since the Moon and planets appear to closely follow this path, they will be found low in the night sky too, causing problems for observers combating astronomical twilight and the murk and disturbance of a thicker atmosphere at that elevation. Consequently, planets do not present themselves at their best at this time. However, if that is where they are situated we must make the best of it.

In keeping with the equation of time the latest sunset is on the 25th June this year, and the earliest sunrise is on the 17th June. The summer solstice, when daylight lasts longest, is at 10:08 on the 21st June, and darkness is short-lived here in South Wales. Technically, astronomical twilight lasts until the centre of the Sun reaches 18° below the horizon. Most of this month and until mid-July, the Sun doesn't reach that far down and officially, astronomical twilight lasts all night.

For this reason, the season for noctilucent clouds is well under way this month. In the twilight, sunlight can reach underneath the ice crystals around 80km up in the Earth's atmosphere and is reflected off them to form some beautiful and photogenic displays. Noctilucent clouds commonly occur for a few hours after sunset and before sunrise, when the Sun is between 6° and 16° below the horizon, and this time of year is perfect.

However, during the summer months at higher latitudes, the midnight sun inhibits observations of aurorae; the night skies need to be dark and clear. Even as far south as Wales, observations are restricted.

Sun

The Sun culminates highest each year around the time of the solstice on the 21st June this year, and is often the subject of observation in the summer. It is worth reminding members that sunlight contains harmful radiation across the spectrum and that the projection method should be used to protect your eyes. Alternatively, ask experienced members for help to correctly use the society's solar telescope.

It should be noted that the Sun is heading towards solar minimum.

Moon

The Last Quarter is on 6th at about 18:35 in the constellation of Aquarius.

The New Moon is on 13th at about 19:45 in the constellation of Orion.

The First Quarter is on 20th at about 10:50 in the constellation of Leo.

The Full Moon is on 28th at about 04:55 in the constellation of Ophiuchus.

The Moon has two apogees this month. The first apogee (most distant from Earth) occurs on the 2nd, followed by a perigee (nearest Earth) on the 14th and a final apogee (most distant from Earth) on the 30th.

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



Early in June, **Mercury** creeps up just ahead of the Sun in the morning twilight. It achieves superior conjunction on the 6th. By the 30th it descends in the evening twilight, so this is not a favourable month.



Venus moves towards greatest eastern elongation at a shallow angle by mid-August. Even on the last day of this month, it sets two hours after the Sun in the evening twilight. Beware of the setting Sun, if you are tempted to observe.



Mars rapidly moves towards opposition which is at the end of July. It rises just after 01:00 at the beginning of June and about 23:40 at the end. It becomes more convenient to observe later in the month and into next, when it starts to become an evening object. Unfortunately for observers at this time of the year, the ecliptic is low at best and Mars is slightly below that so observing is not the best.



Jupiter can be observed for most of the night in Libra, since it has just past opposition in May. It can be easily found in the south at around 23:00 in the evening twilight at the beginning of June. This is the best time to see it this month when it is at its highest when it culminates at 23°. Jupiter is in retrograde motion at this time. Use a decent telescope to find the Great Red Spot and the Galilean Moons with their accompanying shadows. A photo-opportunity presents itself when a gibbous Moon accompanies Jupiter at sunset on the 23rd. By the end of the month Jupiter will be in the south west low in the western morning sky.



Saturn is at opposition on the 27th (when it culminates at around 01:15 BST) and can be seen throughout the night in the constellation of Sagittarius this month. It is situated just above the ecliptic, which of course is low at this time of night in June, and Saturn only culminates at about 16° above the southern horizon. Dedicated observers will be pleased with the open ring system and for casual or less enthusiastic observers; Saturn can be observed at a more convenient time at the end of the month when it culminates earliest. Saturn and the Moon pair up twice this month. In the early morning of the 1st the near-full Moon rises in very close proximity to Saturn and on the morning of the 28th, the full moon approaches very close to Saturn as they descend into the western twilight.



Uranus rises around 01:40 at the end of June; in the early morning twilight. It is in the constellation of Aries at RA 1h 59m 57s, Declination 11° 39' 21". It is not favourably placed to observe, with a magnitude 5.84 at this time, its observed time and position can only improve as the year progresses.



Neptune rises in the morning, three hours or so before Uranus, and is slightly better placed for dedicated observers. It is located in the constellation of Aquarius at RA 23h 11m 47s, Declination -6° 12' 46"; in the south-east. It has a magnitude 7.88 at this time and by 03:30 the twilight overpowers seeing. Neptune can be observed earlier in the morning as the year progresses but is not a well placed in June.

Meteors

This is a quiet time of the year for meteor showers so we anticipate the meteor shower 'season' beginning in July.

Stars

Throughout June, Cygnus the Swan dominates the eastern horizon as the stars become visible. At the head of the constellation, Albireo is the primary star of a magnificent double with a separation of 34 arcseconds from its companion star β2 Cygni. It is still unclear if they are a gravitationally interacting binary or not, but even a small telescope can separate them so that you can distinguish their individual gold and blue colours.

Deneb, the star at the tail of the Swan combines with Vega in Lyra and Altair in Aquila to form the asterism known as the Summer Triangle.

Constellation	Convenient Culminations	Midnight Culminations	Observability
Serpens (Caput)*	24:00 Early June in twilight	Early June	Whole
Lupus	24:00 Early June in twilight	Early June	Very unfavorable - mostly hidden
Corona Borealis	24:00 Early June in twilight	Early June	Whole
Draco	24:00 Mid-June in twilight	Mid-June	Whole - at zenith upper culmination
Hercules	24:00 Late June in twilight	Late June	Whole - high
Scorpius	24:00 Late June in twilight	Late June	Unfavorable - partially hidden

*Serpens is a divided constellation which occupies regions either side of Ophiuchus. The eastern area was traditionally known as Serpens Cauda meaning 'serpent's body' and the western zone was Serpens Caput meaning 'serpent's head'.

Corona Borealis (pronounced kor oh' nuh boar ee al' iss)

In Welsh

- 1) Coron y Gogledd, literally the 'North Crown'.
- 2) Caer Aranrhod, (also Arianrhod) was the mythical 'Castle of Aranrhod', where dead, lost souls awaited their fate.
- 3) Caer Aranrhod, (also Arianrhod) was the mythical 'Castle of the Silver Circle' or the 'Palace of Arianrhod'.

Astronomy

There are no Messier objects in Corona Borealis, and few galaxies which can be observed with amateur equipment.

Recorded in the 2nd century by Ptolemy purely as Corona; Crown. Corona Borealis means Northern Crown and, unsurprisingly, there is a Southern Crown known as Corona Australis. (Borealis derives from Greek through Latin in reference to the north and Australis alludes to the south, hence we have Australia). Corona Borealis is a very small constellation between the constellations of Hercules and Boötes, and whilst there are no visually outstanding stars in the region, a discernible coronet is evident. It can be found high in the south west very early on June mornings and by mid-October at a more reasonable time (around 19.00) it is due west.

Even with a pair of binoculars it should be possible to see two stars in the bowl, R Coronae at mag, 5.8 and SAO 64808 at mag. 6.5. If you can see SAO 64808 only then R Coronae is hiding. R Coronae Borealis is by far the brightest star of its class. It is a variable red supergiant of the type which ejects huge clouds of carbon soot from its atmosphere, hiding it in the process. Every few years it disappears from view. You may find that worth looking out for.

The brightest star, Alphecca or Gemma, is a spectral type A0 star, 78 light years distant with a magnitude of 2.23. It is an eclipsing binary, but its companion is so close it cannot be separated with ordinary amateur equipment. They have a radial velocity away from us of 2 km/sec. The next star found anticlockwise around the circlet is the second brightest star in the constellation, Nusakan, β Coronae, a spectral type F0 star at 59 light-years distance. Nusakan is travelling towards us at the speed of 19 km/sec.

Like all constellations the stars in Corona Borealis are within our region of the Milky Way, and produce a configuration, in this case a 'crown', from our unique vantage point within our Galaxy. The independent movement of those stars through space, however, will eventually change that pattern.

The universe is a huge, three-dimensional web, constructed of clusters of galaxies which have assembled into superclusters of galaxies, great walls of superclusters, vast filaments interconnected to other great walls, are thought to form the universal foam of matter and dark energy which is our universe. In recent years a number of these walls have been detected in the deepest regions of space far beyond our local group of galaxies.

In 2013, in the region between the constellations of Hercules and Corona Borealis, astronomers have found the largest known structure in the universe (as of Feb 2016). At ten billion light-years, it is six times larger than the previous record held by the Sloan Great Wall. The Hercules-Corona Borealis Great Wall as it is known may well prove to be a node of intersecting strands of superclusters of galaxies which describe the general structure of the universe.

Greek Myths

The tale of Corona Borealis, the Northern Crown, begins long before the Crown's supposed appearance in the heavens, and begins with one of the many stories surrounding Taurus, the bull.

Minos, one of the many sons of Zeus, was married to Pasiphae, daughter of the sun god Helios. Minos had designs on the throne of Crete and in his quest to take the throne he was assisted by the gods who miraculously sent a white bull as an omen to those who doubted his claim. Minos soon forgot the favour done to him, and failed to sacrifice the bull, instead corralling the magnificent beast with his own herds in order to improve the breeding stock.

This failure incurred the wrath of Poseidon and in vengeance Poseidon caused Pasiphae to fall in love with the great white bull.

In her passion Pasiphae sought the help of one of the court craftsmen, Daedalus, to help her in her quest for love. Daedalus constructed a hollow wooden cow, complete with a real hide skin, folding doors and hidden wheels, inside which Pasiphae hid while waiting for her deception to overcome the white bull. Eventually the great beast was smitten and as a result of the consummation a monstrous child, the Minotaur, was borne, in human form but with a great, bovine fire-breathing head. Minos was, not unnaturally horrified by this, but out of pity for his wife the creature was not slain immediately, but was instead exiled to spend its life in a prison constructed by Daedalus, the Labyrinth, at Knossos.

The Labyrinth was an underground maze of numberless passages that wound and turned back on each other without beginning or end, without any hope of escape.

Following a dispute with Aegeus, King of Athens over the death of his son Androgeos, Minos extracted a bloody penalty from Athens by requiring seven Attic youths to be sent to Knossos every year to be fed to the Minotaur. Sickened by this cruel and vindictive penalty Aegeus' son Theseus, who was renowned for his heroic exploits, resolved to put an end to it and one year he journeyed to Knossos as one of the intended victims. Exhibited before the King and his court Theseus was seen by Minos' beautiful daughter, the princess Ariadne, who instantly fell deeply in love with him. Together with her sister Phaidra, they gave Theseus a sword and a spool of silken thread, one end of which they fastened at the entrance to the labyrinth.

As he descended into the labyrinth Theseus played out the thread, and after slaughtering the unfortunate creature he was soon able to return to the entrance, a feat that no one else had ever managed.

That night Theseus escaped the island by ship after first boring holes in the bottom of Minos' ship to prevent any vengeful reprisals. He took with him the besotted Ariadne, to whom he had promised marriage as a condition of her help. Soon after setting sail Ariadne became ill and the ship anchored at the island of Dia (later Naxos) where Ariadne was put ashore to recover. When she awoke from a long, deep sleep she was distraught to find that Theseus had abandoned her.

There are different versions of what followed. Some believe that the grief stricken princess hanged herself, believing herself to have been tricked by Theseus. Others say that he was prevented from returning by a great storm that blew his ship out to sea and prevented his return for several months, by which time he was distraught to find that his intended bride had died in childbirth.

The most popular account has a happier ending. As Ariadne bemoaned her fate the wine god Bacchus and his party of celebrants arrived on the island in their eternal quest for pleasure. Bacchus was smitten by the charms of Ariadne and passionately wooed and won her. His wedding gift to her was a golden crown encircled with precious stones. They had a long and happy marriage, but being mortal Ariadne eventually died. In his grief Bacchus hurled her crown into the sky where it flew higher and higher as the gemstones grew more and more brilliant and turned into the constellation now known as Corona Borealis, which has ever since nestled between Hercules and Bootes, the Herdsman.