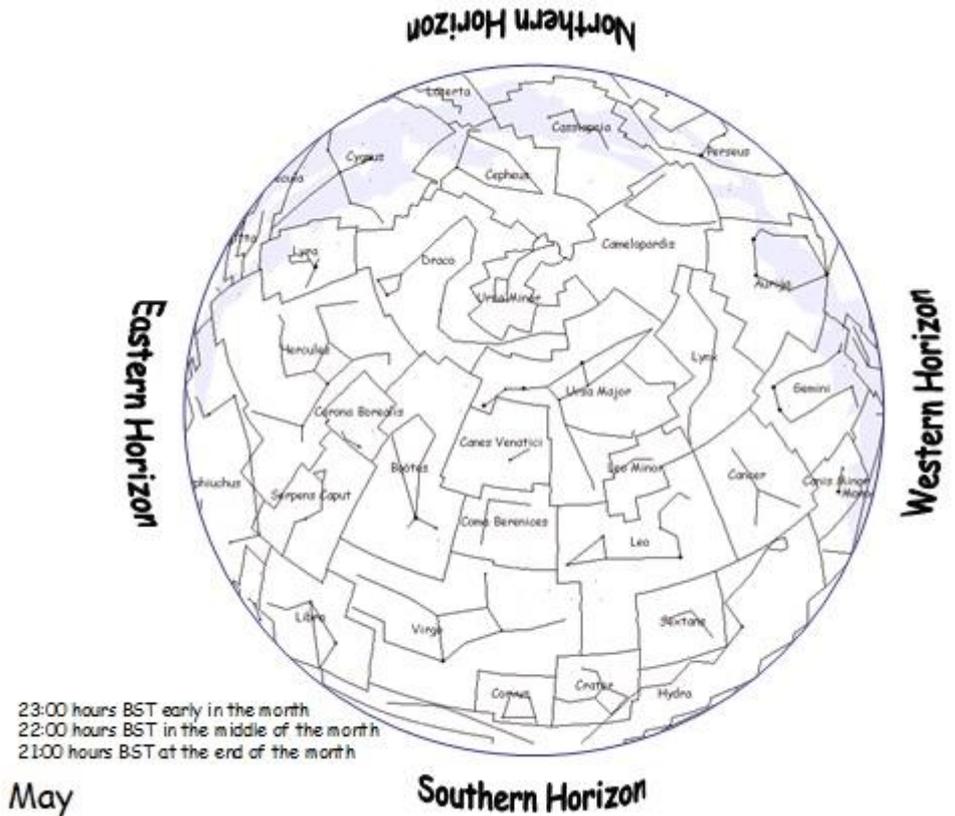




The Night Sky (May 2019)

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



The General Weather Pattern

May often contains some of the driest and clearest nights of the year; however, squally storms are much more frequent than in April. A warm spell can occur towards the end of the month, but clear nights can still be frosty. Seasonal noctilucent clouds, high in the Earth's atmosphere, begin to display themselves in the last week or so of the month. Be prepared to wrap up warm and wear multiple layers of clothes, with a hat and sturdy shoes. 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.

⊕ Earth (E)

As the Earth moves towards the summer solstice in June, night-time is short. Astronomical twilight encroaches on the amount of time available to observers, particularly to astro-photographers. Twilight for astronomers, at the latitude of Usk, lasts all night by the last ten days in May. In mid-May at 22:30 the North Galactic Pole can be found due south in the constellation of Coma Berenices. At this time of year, it's nice and high, around 65°, at a convenient time of night. Its official position, as defined by the International Astronomical Union in 1959, is RA 12h 49m, Declination 27° 24'. This varies very slightly for different applications.

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

Nautical twilight exists when the Sun is between the horizon and 12° below the horizon. Astronomical twilight ends or begins when the centre of the Sun reaches 18° below the horizon. In the last ten days of May, all through June and until the last ten days in July, the Sun doesn't reach that far and officially, astronomical twilight lasts all night at the latitude of Usk.

As a consequence, during the summer months at higher latitudes, the midnight sun inhibits observations of dimmer phenomena and objects such as aurorae, nebulae and galaxies as the night skies need to be dark and clear. Brighter, high contrast objects such as star clusters, planets and of course the moon can still be observed. In fact summer is a good time to observe the moon as it is high enough in the sky to be relatively unaffected by the atmosphere, which is very important when looking for small details.

The same goes for observing the Sun; needless to say it is best when high in the sky. It is always 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 use the society's solar telescope. Ask experienced members for help.

As discussed in February, the beginning of solar cycle 25 is imminent and 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.



Moon

New Moon is on 4th at about 22:45 in the constellation of Aries; on the border with Cetus.

First Quarter is on 12th at about 01:15 in the constellation of Leo.

Full Moon is on 18th at about 21:15 in the constellation of Libra.

Last Quarter is on 26th at about 16:35 in the constellation of Aquarius.

The Moon is at apogee (most distant from Earth) on the 26th, and perigee (nearest Earth) is on the 13th.

This continues to be a good time of year to observe a first quarter Moon. The Moon is still high in the south-western sky at night-fall and with the weather becoming milder, even with hand-held binoculars there are rich pickings of selenological features to study at the terminator. When observing the moon the worst time is when it is full and for a couple of days either side – this is because the direct illumination from the Sun generates very little contrast. If you are interested in observing the Moon and want more details on what you are observing the “Virtual Moon Atlas” is excellent and free software <https://www.ap-i.net/avl/en/start>.

The Planets



Mercury (Me) is mostly unfavourable this month; ascending only about 20 minutes before the Sun in the glare of the morning sunrise throughout May and is at superior conjunction on the 21st.



Venus (V) is also unfavourable this month; ascending only about 30 minutes before the Sun in the glare of the morning sunrise on the 1st, and setting just 60 minutes after the Sun at the end.



Mars (Ma) emerges, early in the month, due west between the horns of the Bull, Taurus. By the 16th it moves into Gemini where on the 19th it associates with M 35 for a while before heading on to Mebusta (ε Gem) at the end of May. Mars is best observed early in the month as we on Earth move away from it on the other side of the solar system; it appears to close in on the Sun. A thin crescent Moon appears close to Mars on the evening of the 7th.



Jupiter (J) becomes more convenient to observe as it moves towards opposition on the 10th June. It can be found in the constellation of Ophiuchus from 00:30 at the beginning and throughout the night at the end of this month, moving retrograde. Even though it rises no more than 16° above the horizon, there is much to see in a decent telescope, the Galilean Moons (which are relatively easy to see with binoculars) with their accompanying phenomenon are often to be observed passing across the face of the planet from east to west. There are transits and shadow transits to behold, and if you have good seeing you may well make out the North and the South Equatorial Belts, at low magnification they can appear almost like pencil lines across the planet either side of the equator, high magnification can reveal complex vortices and other features. The Great Red Spot is visible about every 10 hours and to calculate when the great red spot will transit across the face of Jupiter and plan your observing there is a calculator here <https://www.skyandtelescope.com/observing/interactive-sky-watching-tools/transit-times-of-jupiters-great-red-spot/> and a monthly list here https://www.projectpluto.com/jeve_grs.htm#may.



Saturn (S) Unfortunately for us in Wales, **Saturn** is poorly placed in its orbit so that even at its best it is low in the night sky during summer. Saturn rises, also in retrograde motion, around 02:00 in the beginning of May and culminates about 16° above the southern horizon just after sunrise. Devoted observers will be pleased with the open ring system, but for less eager and relaxed observers, Saturn becomes more convenient over the next few months as it moves towards opposition on 9th July. By the end of May, Saturn will rise at about 24:00.



Uranus (U) Early in the month, **Uranus** rises about 10 minutes before the Sun in the morning twilight, and at a magnitude of 5.90, is far too dim and dangerous to observe under these conditions. By the end of May, even though it rises around 1½ hours before the Sun, it is still very unfavourable.

♆ **Neptune (N)**, at a magnitude of 7.94, is far too dim to observe even with a telescope in the morning twilight, and is unfavourable throughout May.

Dwarf Planets

Dwarf planets are most usually very dim. However, the brightest, Ceres, at a visible magnitude of about +7.02, can be found at opposition on the 28th in the constellation of Ophiuchus throughout May. A decent telescope is best used, but at the end of the month it will present itself north-west of Jupiter and due north of Antares at around 01:20 at RA 16h 32m 32s, Declination -18° 20' 21".

The second brightest, Pluto gets no brighter than +14.8 at opposition which is in July.

Galaxies

As mentioned earlier, the north galactic pole of our Galaxy is found in the constellation of Coma Berenices and there is a corresponding south galactic pole in the southern constellation of Sculptor, and when we look out through these Galactic Polar Regions, the view into inter-galactic space is much clearer than along the plane of the Galaxy; the Milky Way.

The 'Season for Galaxies' runs from February through to early July, when, amongst the constellations of Coma Berenices, Virgo and behind Leo there is much to see in the northern hemisphere. This month, the most convenient time of night for observing 'the Realm of Galaxies', on the meridian, is in early May. As evenings get lighter it becomes increasingly difficult to observe any but the brightest of galaxies before midnight and by the end of the month (when the sun sets at 9:20pm) even after midnight it can be difficult as they tend to be so low in contrast and need a dark transparent sky. The sky does not get astronomically dark after the 18th May and by the end of the month nautical twilight is only about an hour in length from 3am. When trying to observe galaxies start with a low magnification, this increases the contrast and helps reduce the effects of light pollution.

Meteors

The Eta Aquarids are best seen between 1st and 8th May. This year the maximum ZHR is near 45 at around 6th/7th. The radiant is in Aquarius. Associated with Comet P/Halley, the shower has been observed since about 74BCE. This shower varies in intensity in a cycle lasting twelve years or so with a ZHR between 35 and 80. It appears to be just past its least active. Like Comet P/Halley, the shower travels in a retrograde direction and so these meteoroids hit the Earth's atmosphere at around 67 km/s and very fast meteors can be seen (the fastest meteors are the Leonids in mid-November at 72 km/sec). The trails of some of these meteors persist in the sky for a longer time as a consequence. Unfortunately the shower rises with the morning twilight and seeing only lasts until the radiant is only about 10° above the horizon, making for an unfavourable event, even though the Moon sets just after the Sun this year. This shower is more noteworthy in more southerly latitudes. However, look out for 'grazers', meteors that skim the upper atmosphere, these happen earlier in the evening when the direction of approach of the meteors is at an angle to the direction of travel of the observer on the Earth.

Culmination of Constellations

Culmination, the highest point an astronomical target like a constellation can reach in the sky, occurs on the north-south line, the local meridian, at your observing site. All things being equal, this is the best position in which to observe the constellations. Northern circumpolar constellations, those that circle around the north celestial pole, will cross the meridian above and below the pole, it is the upper culmination that is best.

Constellation	Convenient Culminations	Midnight Culminations	Observability
Corvus	23:00 Early May	Mid-April	Whole
Coma Berenices	23:00 Early May	Late April	Whole - high
Canes Venatici	23:00 Early May in twilight	Late April	Whole - at zenith
Virgo	23:00 Mid-May in twilight	Late April	Whole
Boötes	24:00 Late May in twilight	Late May	Whole - at zenith
Libra	24:00 Late May in twilight	Late May	Whole but poor - low down
Ursa Minor	23:00 Late May in twilight	Late May	Whole - face north upper culmination

Virgo (pronounced ver' go)

In Welsh

Traditional history; seems associated with 'the lady of Llyn y Fan Fach'.

Modern name; Y Forwyn *nf.* literally 'the Virgin'. Welsh for Virgo, The International Astronomical Union's designation.

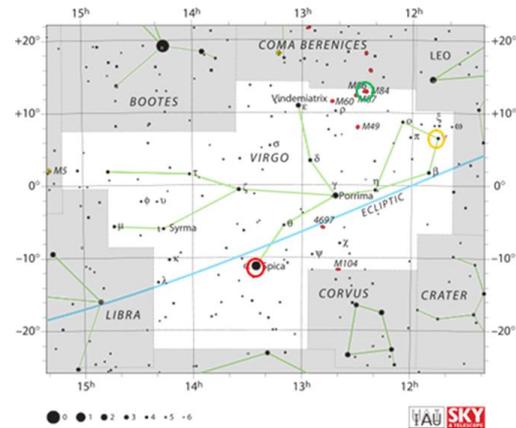
You can find Virgo due south at eleven in the evening in mid-May, a little towards the south-east of Leo. Virgo is not very distinctive so apart from using Leo as a guide, you can also follow a curve (centred on Regulus) from the 'tail' of the Great Bear, Ursa Major, through Arcturus in Bootes to Spica (○) in Virgo. 'Follow the arc to Arcturus and speed to Spica'. In this position Virgo is orientated on her left side.



Spica, the brightest star in Virgo, is a first magnitude star and is easy to see on a good clear night about 25° above the southern horizon. It is a glorious B1 type star that shines at apparent magnitude 0.97.

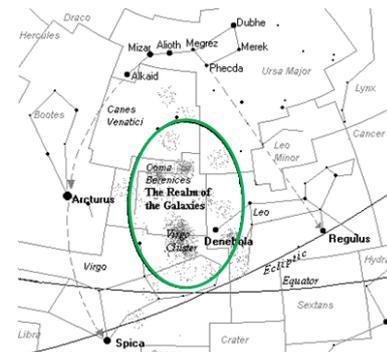
Zavijava, (♁) despite its Beta Vir designation, is the fifth brightest star in Virgo, has a magnitude of 3.58. It is a spectral type F8 and lies at about 35 light years from us. In Arabic its name, *Zawiyat al- Awwa*, means 'Angle of the barker'; the corner for the dogs.

A notable feature of Virgo is the Virgo Cluster, centred on the northern border of the constellation and extending into the adjoining constellation of Coma Berenices, behind Leo's tail. The cluster contains about 2,500 galaxies and is receding from us at a speed of 1,150km/sec.



Its most famous member is the elliptical galaxy M87 (♁) thought to be near the core of the Virgo Cluster as seen in this image, taken by the Palomar Observatory on Mount Palomar in California. M87 is also known as the radio galaxy Virgo A. With the present-day uncertainty placing the Virgo Cluster around 55 million light years distance, it is the nearest galactic cluster to our own Local Group. Found at RA 12h 31m 41s, Declination 12° 18' 16". At a magnitude of 8.60 it may well be seen with a good telescope.

The supercluster of galaxies to which we belong is centred on the Virgo Cluster.



'The Realm of the Galaxies' is a region of space we can observe through the north galactic pole, where fewer stars interfere with our view of deep space. It is here from Coma Berenices in the east to Leo in the west and Virgo in the south to Canes Venatici in the north we find many more galaxies than in the plane of the Milky Way.

Myths

Virgo has appeared as a maiden to many civilisations in a bewildering array of identities.

Egypt

In ancient Egypt Virgo appeared in the zodiacs of Denderah and Thebes. She was often associated with Isis, the great Egyptian goddess who was credited with forming the Milky Way from the magic ears of corn that she carried as she fled from her evil brother Set, a belligerent thunder god.

Chaldea

She was the Chaldean Ishtar or "Queen of the stars" named "Ashtoreh" in the First Book of Kings.

India

In India she was Kauni or "maiden", mother of the great god Krishna.

Central Asia

Further west, across Asia in Turkoman mythology she was Dufhhiya Pakhiza, "the pure virgin".

Greece

In Greek mythology Virgo has occasionally been associated with the neighbouring constellation Bootes through its identity as the Athenian Icarus. His daughter was Erigone, who is thought to be Virgo, who hanged herself in despair after his death and was transported with him to the skies.

However, the most celebrated representation is as Persephone, daughter of Zeus and Demeter (sometimes known as Ceres), goddess of the harvest. Having been kidnapped by Pluto, king of the underworld, Persephone was transported to his kingdom in his chariot (sometimes represented by the stars of nearby Libra) to become Queen of Hades.

Her mother was so distraught that she prevented all seed from sprouting, sending the earth into a permanent winter. However, Zeus was alarmed by the loss of his agricultural tributes (and rather less by the loss of one of his daughters) and ordered Pluto to return her to the mortal world. Pluto though claimed Persephone as his bride on the basis of six pomegranate seeds she had consumed in the underworld whilst his captive. Zeus resolved the situation by decreeing that Persephone should spend part of the year in the underworld, and



then return to the mortal world for the rest of the year.

Overjoyed at her daughter's return Demeter joyfully lifted her curse from the plants of the earth and each spring henceforth the plants of the world shoot into life to celebrate Persephone's return, and then die back in the winter as she endures her periodic return to Hades.

Canes Venatici

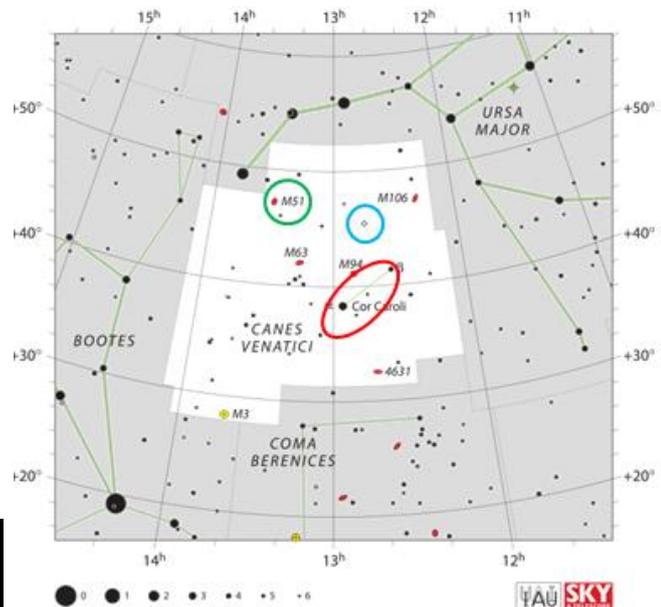
(Pronounced CANE-eez ve-NAT-iss-eye)

The Hunting Dogs

In Welsh

Venatici Ffyn, Welsh for Canes Venatici, The International Astronomical Union's designation.

Canes Venatici is a small, diffuse constellation with faint stars, found south of the tail and east of the hind legs of the Great Bear, Ursa Major. The brightest of its stars, α CVn – Cor Caroli has an apparent magnitude of only 2.9 and second brightest β CVn - Chara only 4.2. These two stars define the line representing a 'stick figure'; the two hunting dogs of Boötes.



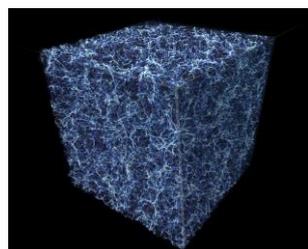
There are some interesting and historic objects to be found

within this constellation. La Superba **O**, a deep red star found in Canes Venatici, is a semi-regular variable star; one of the brightest of carbon stars.

M51a the Whirlpool Galaxy **O** was the first 'nebula' to have its curled structure identified in 1845, although it took until the early twentieth century to classify it as a spiral galaxy. It can be found even with binoculars in the north-east of the constellation.



The 3rd Earl of Rosse built and used the then world's largest reflecting telescope, with a 72 inch (1.83 m) aperture, at Birr Castle, Ireland. At a time when images were still sketched 'at the eyepiece, the rendition was a true likeness of the galaxy we know today.



In the neighbourhood of Canes Venatici there is a gargantuan region of the universe which has considerably fewer galaxies than average, a huge void appropriately called the Great Void **O**. It was discovered in 1988 and is, one of the largest known voids in the Universe, which appears to be made up of such voids surrounded by huge walls of galaxies forming foam-like bubbles.

History

To cut a very long story short, to Ptolemy this region of sky was part of Ursa Major, not a constellation in its own right, and not even an asterism but a region without a form. However, some of these stars have been referred to in his *Almagest* as 'the club of Boötes'.

Throughout the Middle Ages a catalogue of mistranslations from Greek to Arabic and then to Latin finally led Gerard of Cremona an Italian translator (from an Arabic copy of the *Almagest* into Latin c.1175) to mistranslate its name to mean 'dogs'.

Petrus Apianus, Peter Apian, a humanist and astronomer amongst other things, illustrated Boötes with two dogs in his *Horoscopion Generale* (1533). The evolution of the hunting dogs into an association with Boötes was complete.

It was left to Johannes Hevelius in the 17th century (*Firmamentum Sobiescianum sive Uranographia* - 1687) to transform this region into a constellation. Its name Canes Venatici is Latin for "hunting dogs",

Of the ten constellations he introduced seven are still in use. They are Canes Venatici of course, Lacerta, Leo Minor, Lynx, Scutum, Sextans, and Vulpecula.