



The Night Sky (March 2020)

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

Northern Horizon



22:00 at beginning of the month.
21:00 in middle of month
20:00 at end of month

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, gloves, socks and shoes. As always, an energy snack and a flask containing a warm non-alcoholic 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

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° at sunset, the maximum angle occurs at the Spring Equinox on the 20th. 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 29th this year, and the clocks are reset at 02:00; spring forward.

From Earth

The winter sky can be observed culminating at the end of evening twilight early in the evening, and Orion, with his retinue, is due south at 18:30 UT early in the month. The Milky Way is a fine sight still stretching high across the sky just after twilight disappears, but losing its position at the Zenith. Follow a line south-eastwards along Orion's belt and you will find Sirius the brightest star in the night sky.

Mars, Jupiter and Saturn are morning objects rising at a low angle just before the Sun.

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 from Usk at a reasonable time, between 19:00 and 22:45, no less than 21 times in March!



Sun

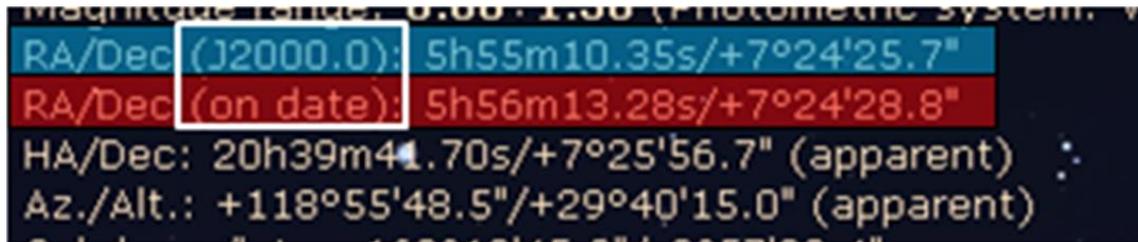
On the morning of the 12th, the Sun moves from Aquarius into Pisces. On the 20th at 03:50 UT, this year, the centre of the Sun crosses the celestial equator marking the First Point of Aries; the 'prime meridian' for right ascension. It was defined in 130 BCE by Hipparchus when it was located in the constellation 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 20th 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 equatorial coordinate system commonly used by both amateurs and professionals; 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 slowly changes.

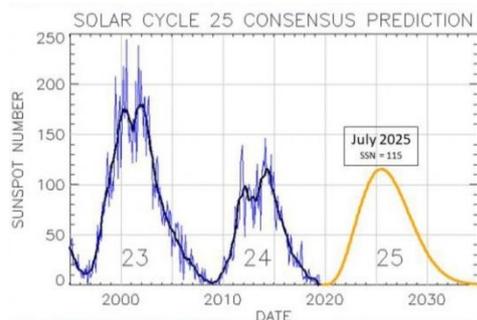
For this reason you will often see two sets of coordinates, 'of date' and 'epoch' quoted against the coordinates, for instance;



Of date (or on date as exemplified here) refers to the correct position of an object at the current date and time.

The epoch (J2000.0 as exemplified here) refers to a position at a fitting moment during a period of variability i.e. January 1, 2000, 11:58:55.816 UTC; the Julian epoch. Its predecessor being B1950, the "B" indicating it was the Besselian epoch, devised by Friedrich Wilhelm Bessel and superseded in 1989.

As discussed in February, with the Sun in transition, during the solar minimum, it will display sunspots of both polarities. At this time, most analysts are predicting a weak cycle 25. Time will tell.



The NOAA/NASA Solar Cycle prediction panel has issued an official statement in December with news about the upcoming Solar Cycle 25.

Solar minimum predicted to occur in April, 2020 with an uncertainty range of +/- 6 months.

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. There is no activity at the time of writing.



Moon

The First Quarter is on 2nd at about 19:55 in the constellation of Taurus.

The Full Moon is on 9th at about 17:45 in the constellation of Leo.

The Last Quarter this month is on 16th at about 09:35 in the constellation of Ophiuchus.

The New Moon is on 24th at about 09:30 in the constellation of Pisces.

The Moon is at perigee (nearest Earth) on the 10th and at apogee (most distant from Earth) on the 24th.

You will have noticed that the full Moon on 9th is nearly coincident with the Moon at perigee (nearest Earth) on the 10th.

This is commonly called a supermoon, but is much derided by astronomers. Supermoon is an astrological and not an astronomical term and has no weight in astronomy: it is not a scientific expression, although I suspect it will one day become so. It was conceived as late as 1979 by Richard Nolle, an astrologer to describe an astrological event. For him it describes the moment when the Moon, at perigee (when closest to Earth) or arbitrarily, within 90% of it, is also full or even new!

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 Moon with Saturn, Jupiter and Mars lie within 10° of each other in the constellation of Sagittarius on the morning of the 18th. Otherwise the three planets are in the same region throughout March.

On the evening of the 29th, the Moon occults Ain (ε Tau in the Hyades) at 20:25 here in Usk.

The Planets

In March, Venus is a glorious evening object, whilst Mars, Jupiter and Saturn lie in the south-eastern dawn.

♿ **Mercury (Me)** is at greatest western elongation on the 24th and is very poorly placed in the morning twilight this month.

♀ **Venus (V)** can be found shining brightly, high in the west throughout the month. It is at greatest eastern elongation on the 24th and sets at a steep angle. This is a good time to observe Venus. On the 28th a thin crescent Moon enhances the scene. On the evenings around the 6th Venus passes about 2° north of Uranus.

♂ **Mars (Ma)**, a morning object, can be found very low down in the south-east for around a few hours before the twilight overwhelms it. It will do so for the next three months or so, before eventually rising at midnight in July and progressing into the evening later in the year.

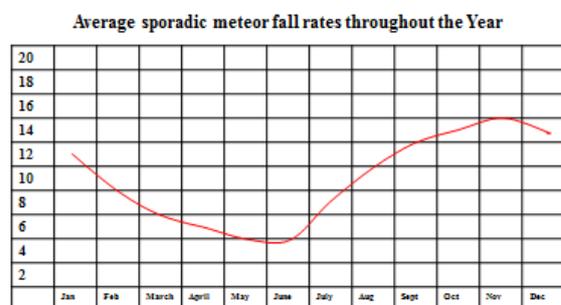
♃ **Jupiter (J)** is a morning object this month and maintains its location in Sagittarius throughout March; appearing in the south-east at around 04:40 at the start of the month and 03:55 at the end. Its motion eastward is slow against the background stars. At this point in its orbit, and as seen from Usk, 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 06:15. At the end of March it rises nearer to 04:15 but still disappears in the twilight around 06:00. The ring system is nicely displayed for observing so dedicated observers may spend some time on Saturn. Less enthusiastic observers might try in July; Saturn will rise earlier as the year progresses reaching opposition in mid-July.

♅ **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 by the end of the month.

♆ **Neptune (N)** is unobservable this month. It is in conjunction with the Sun on the 8th and rises in its glare for the rest of March.

Meteors



Based on data by Robert Lunsford

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.

ZHRs vary from a low of 6 per hour in late spring to 16 per hour in late 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)

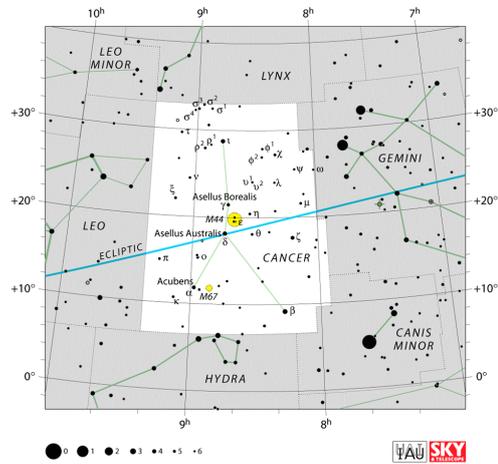
In Welsh

y Cranc *nm.* literally the 'Crab'. Old Welsh connections to this constellation are difficult to establish.

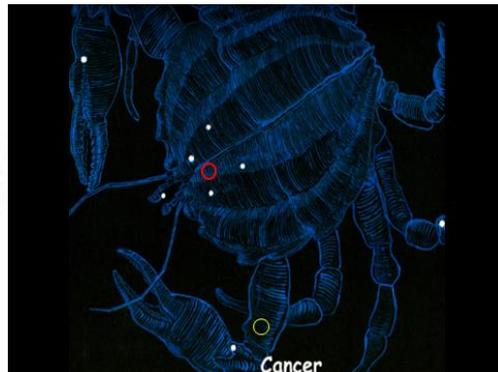
21:00 Mid-March

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) (O) 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 30% of which are Sun-like, F, G and K type and about 68% are red dwarfs; M type stars. 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.



Praesepe – M44



Cancer



M67

About 8° south of M44 is found a smaller but denser open cluster called M67 (O), 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.

Leo (pronounced lee' owe)

In Welsh

Y Llew *nm.* literally 'the Lion'.

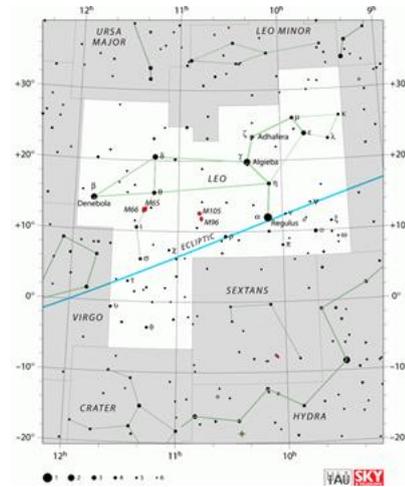
This constellation may have an association with a mythical wild boar, Twrch Trwyth and King Arthur.

Astronomy

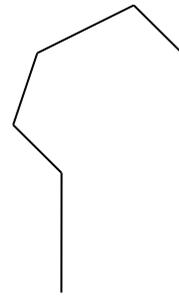
Leo, the spring and the twelfth largest constellation, has a distinct outline that looks something like the animal it is supposed to represent, the lion. Finding it should be no problem during the spring in the northern hemisphere. At ten in the evening in mid-April you will find the Great Bear, Ursa Major, immediately above you at the zenith. Follow the 'pointers' due south (in the opposite direction to the pole star) to find Leo. It culminates around 55° elevation at about this time.



Leo has within it the well-known asterism the 'Sickle', which comprises the most luminous stars in the face, mane and chest of the lion's image.

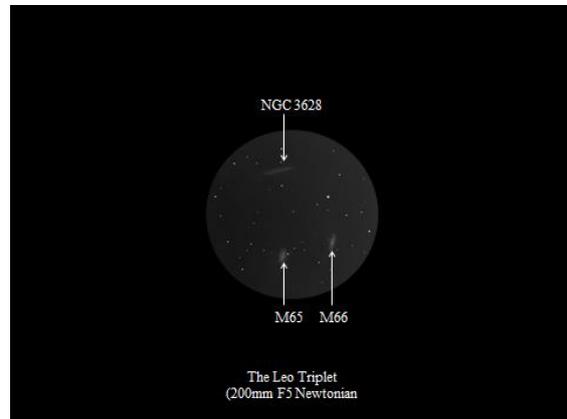
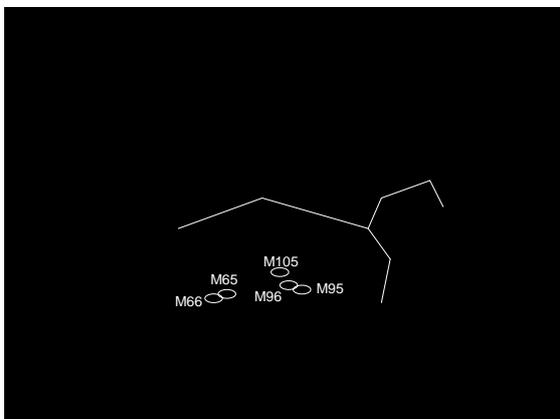


At the end of the handle of the sickle is the prominent and brilliant star, Regulus, lying within half a degree of the ecliptic at some 85 light-years distance. In this position it is occulted occasionally by the Moon. It is a blue-white star of spectral type B7, radiating about 130 times as much light as the Sun and seen from Earth at magnitude 1.35. Regulus has an orange K1 companion which has the same proper motion suggesting they formed in the same cloud. They appear as a wide double, and, with a magnitude of 7.7 the companion is easy to separate with a small telescope. The companion is itself a close double but this is more difficult to separate because of the glare from Regulus and the low magnitude of the star.



Denebola the A3 type star at the end of Leo's tail is about 39 light years away, and, in these times, shines with a magnitude of 2.14. However, up until about 400 years ago, Denebola was recorded as a first magnitude star. The reason for this is still something of a mystery. Were observations inaccurate, or has Denebola diminished in luminosity? Since A3 stars do not usually behave this way, the former seems most likely. Amateur astronomers sometimes observe Denebola in the hope that they may detect changes that will shine light on this apparent anomaly.

Gamma Leonis (γ Leonis) also called Algieba is a showcase binary star and a very popular target for observers with telescopes; it is the star at the base of the neck of the lion (even though its name is believed to come from *Al-Jabhah* – Arabic for the forehead). It is a bright binary system with an orange-red and yellow or greenish-yellow pair that are just over 4" apart, so quite close but generally easy to separate with modest power. The pair are a true binary, orbiting each other every 500 years or so. They are about 130 light years away.



There are a number of galaxies to be found in Leo; five of them are Messier galaxies with magnitudes between 9 and 10 in the region between Denebola and Regulus. M105 is an elliptical galaxy, and close to it is another pair of spiral galaxies M95 and M96.

The pair of spirals M65 and M66 can be just seen using decent binoculars in good seeing conditions. In a 200mm telescope, NGC 3628 makes up a trio, the Leo Triplet. Use low power to see the triplet – say 20 to 30x magnification; it is then usually possible to get all three in the same field. NGC3628 can be a bit tricky if the transparency is not good, in an inverting telescope such as a Newtonian it will appear below M65 and M66 at the edge of the field. The figure above shows the galaxies as they appear in the sky. Try gently tapping the telescope, to move it slightly and the faint galaxy will often reveal itself. The eye notices things that move more than stationary objects. You will also find that it is easier to see when you are not looking directly at it. Using peripheral vision like this is called averted vision.

If you are interested in observing galaxies then behind Leo, that is to the east of Denebola, lies the Virgo Cluster, which at around 55 million light years distance is the nearest galactic cluster to our own Local Group. The Supercluster of galaxies to which we belong is centred on the Virgo Cluster.

The reason that so many galaxies are observable in the spring skies looking south is not that there are particularly more galaxies in that part of the sky but because we have now moved away from the Milky Way, that passes between Orion and Gemini and up through Auriga (hence we find many open clusters there). The Milky Way contains interstellar dust and gas and that hides the galaxies that lie beyond it.

The Leonid meteor shower can be seen emanating over the eastern horizon at about 11:00 pm from the 15th to 20th November. Its maximum is on the 17th. With a ZHR ~ 15, the Leonids can provide very fast, magnificent displays, with persistent trains from its radiant around the neck of Leo. The rates are variable, but generally good. 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. The next such storm is expected in the early 2030s. The Leonids are associated with Comet P/Tempel-Tuttle.

Leo is a very ancient constellation; there is archaeological evidence of its existence six thousand years ago. It was the eighth sign of the Babylonian zodiac, and known to them as ‘the Great Lion’, and Regulus was ‘the Star of the King’. In their time, this region of sky presented a strong connection with the Sun; the summer solstice was located within it.

Greek Myth

According to Greek and Roman legends, Heracles (Latin Hercules) was obliged, as penance, to serve King Eurystheus of Mycenae for some twelve years and was given twelve tasks referred to as the Labours of Hercules. The first labour involved that progeny of monsters, the Nemean lion, reared by Hera. The lion’s skin was resistant to all known weapons so Hercules, who had phenomenal strength, strangled the creature to death. The impenetrable pelt he removed with the lion’s own claws and made into armour and its head he wore as a helmet. Amongst other legends, Leo is commonly said to be that Nemean lion. Other authors refer to Leo simply as the King of Beasts.

There are a number of stars in Leo which have Arabic names making reference to its feline origins. The highest star in the head is Rasalas from *Ra’s al-Asad* meaning ‘Head of the lion’. Forward of the face is Alterf, *At-Taraf*, which means the ‘Glance’ (of the lion). In the mane of the Greek constellation is Algieba translated into ‘Forehead’ (of the lion) from Arabic *Al Jabhah*. Regulus, *Qalb al-Asad*, is the ‘Heart of the Lion’, and we must not forget Denebola, *Dhanab al-Asad* meaning ‘Tail of the Lion’.