NEWBURY ASTRONOMICAL SOCIETY
MONTHLY MAGAZINE – FEBRUARY 2023

A NEW COMET IN THE NIGHT SKY – FEBRUARY 2023

Comet C/2022 E3 (ZTF) imaged using wide-field survey camera at the Zwicky Transient Facility

There is a new comet that may be a significant object to observe during February. This new comet is called C/2022 E3 (ZTF) and was only discovered last year. It has been dubbed as 'the green comet' as its coma has a green glow. It is a long period comet that has not passed by Earth since the Ice Age but will be at its closest and visible in the night sky during February. The comet will not be visible again for another 50,000 years, making seeing it a true once in a lifetime opportunity.

The comet has a long orbit that takes it from the outer reaches of the Solar System in toward the Sun over thousands of years. It will be closest to the Earth on 1st February, at a distance of about 42 million kilometres (26 million miles). In the weeks surrounding its closest approach it may be just visible with the naked eye or fairly easily seen using binoculars.

Comet C/2022 E3 (ZTF) was discovered as it moved inside Jupiter's orbit on its journey towards the Sun. It was discovered by the Zwicky Transient Facility, a public-private partnership that examines the night sky, in March 2022. Scientists first thought it was an asteroid but it has since got significantly brighter as it traversed across the northern constellation Corona Borealis.

The comet has a green coma – which is the cloud of gas surrounding the icy rock core and has a yellowish tail. In was first photographed in December. It was thought that the comet may become a 'naked eye' object on a dark and clear night but comets, like meteor showers, tend to be unpredictable. However, you will get a better view of it with binoculars or a small telescope using a low magnification. In the UK, observers were able to see the comet close to the north-eastern horizon in the early hours of the morning. But during February it will have moved into the evening sky and should be easier to find.

The comet is expected to be just bright enough to see with the naked eye in a dark and clear sky away from street lights. However it will not be quite the spectacle that Comet Neowise was back in 2020 but it will be rewarding if it can be found.

If seen with the naked eye it will appear as a small and faint patch of misty light. Using standard binoculars (9 x 50) it may be possible to see the greenish coma and the faint 'fan shaped' dust tail. It will still be an awesome opportunity to make a personal connection with an icy visitor from the distant outer solar system.

NEWBURY ASTRONOMICAL SOCIETY MEETING

6th January Latest Results from JWST

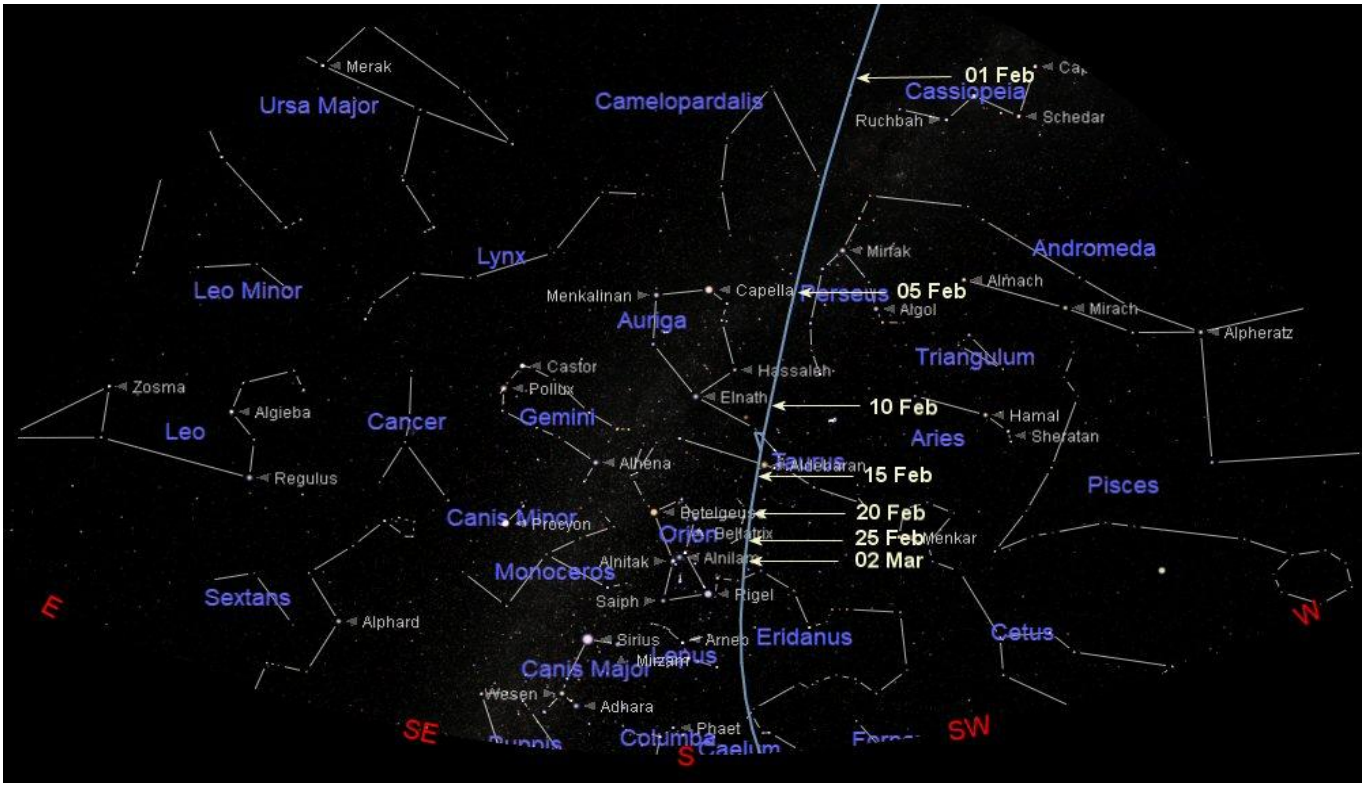
Website: **www.newburyastro.org.uk**

NEXT NEWBURY BEGINNERS MEETING

18th January The constellation of Orion (the Hunter)

Website: **www.naasbeginners.co.uk**

Tracking Comet C/2022 E3 (ZTF)



Location of Comet C/2022 E3 (ZTF) during February

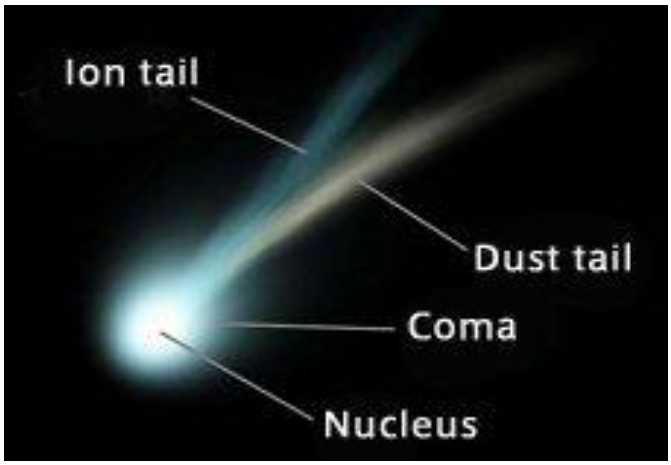
The chart above shows the night sky looking south during the month of February. The path of Comet C/2022 E3 (ZTF) is shown with the approximate location every five days during the month.

Comets are like dirty snowballs typically 5 to 25 kilometres across. They originate from two different areas way out beyond the orbits of the outer planets. There is a 'doughnut' shaped ring beyond the orbit of the outermost planet Neptune called the Kuiper Belt. This is comprised of millions of these Cometary objects. These objects are composed mainly of frozen water with some frozen gases such as Carbon dioxide and some dust.

Like the asteroids, occasionally some of these icy objects may have close encounters or even collisions. They may then be disturbed from their normal orbit around the Sun and begin to spiral in towards the Sun. As these Comets approach the Sun, the heat of the Sun will melt the ice. It sublimes (melts directly) into vapour and forms a tail on the comet.

Comet Hal;-Bopp 1997 imaged by Lee Mcdonald 1997

Other comets may originate from a vast halo beyond the Kuiper Belt. This halo is called the Oort Cloud and is made of millions of dusty ice balls left that were over when the Sun and planets formed. Sometimes one of these 'giant snowballs' may be moved out of its normal orbit and fall in towards the Sun. As it moves closer to the Sun gravity begins to pull it in faster. Once inside the orbit of Jupiter, the heat from the Sun begins to melt the ice. The ice (mainly H_2O and $CO_{2)}$ sublimes directly into gas, due to the lack of pressure in space.

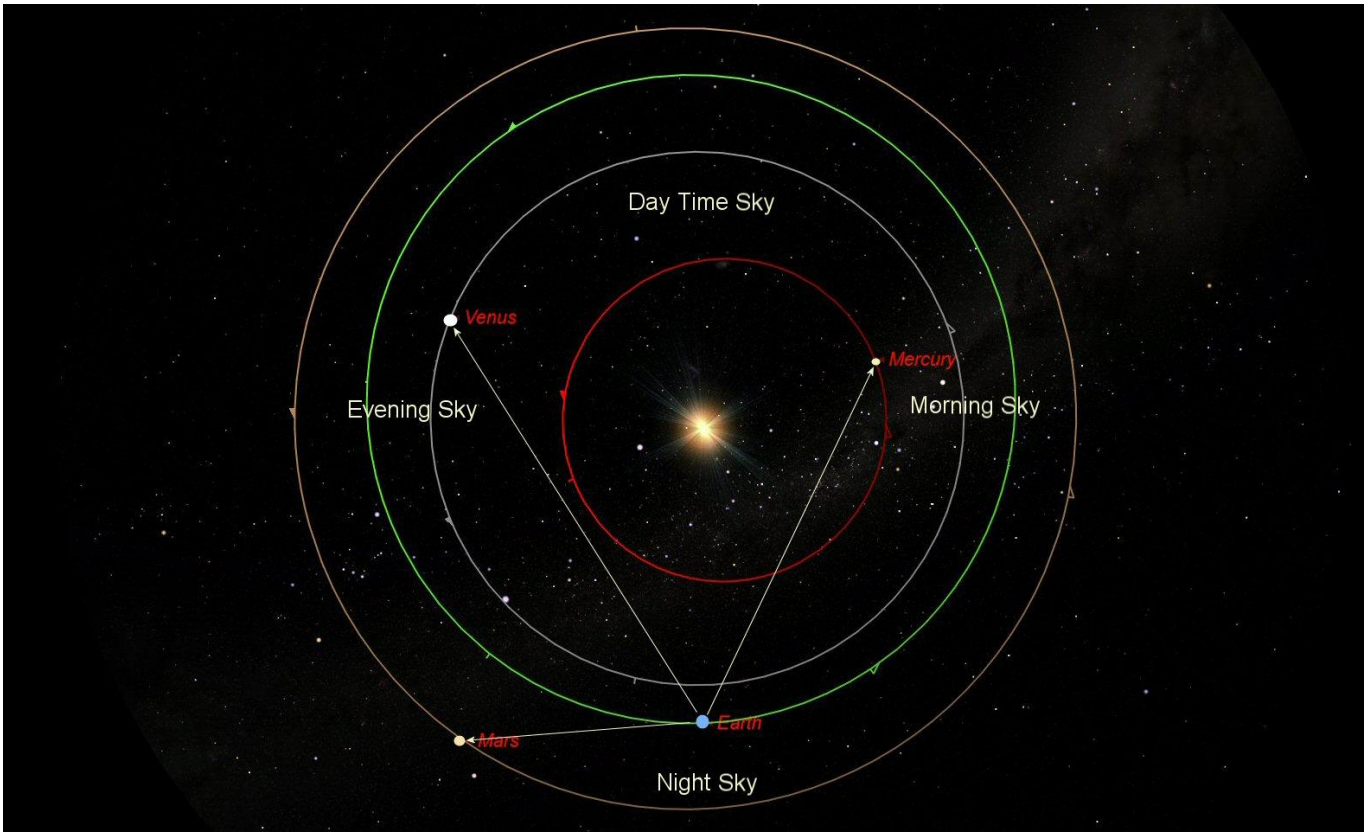


The parts of a typical comet

The gas produced by the melting ice is blown out behind the comet into straight ion tail, pointing away from the Sun by the radiation. The heavier particles form a curved tail left behind and along the path of the comet.

The Comet will loop around the Sun and back out to the edge of the solar system. Some comets return to become regular comets like Halley's Comet which returns every 76 years but some may have periods of thousands of years like C/2022 E3 (ZTF).

VENUS – EARTH's 'EVIL TWIN'



Location of the Planets of the Inner Solar System

Venus is the second planet out from the Sun and in many ways the twin of our planet Earth. Venus is 12,104 kilometres in diameter so is slightly smaller than Earth that is 12,756 kilometres in diameter. It orbits 108.2 million kilometres from the Sun compared to Earth's orbit 149.6 million kilometres from the Sun. It is thought that the two planets have similar composition with one exception being the amount of water they have. The amounts of water may have been similar in the past but Venus appears to have lost nearly all its water.

Venus showing the very faint cloud formations

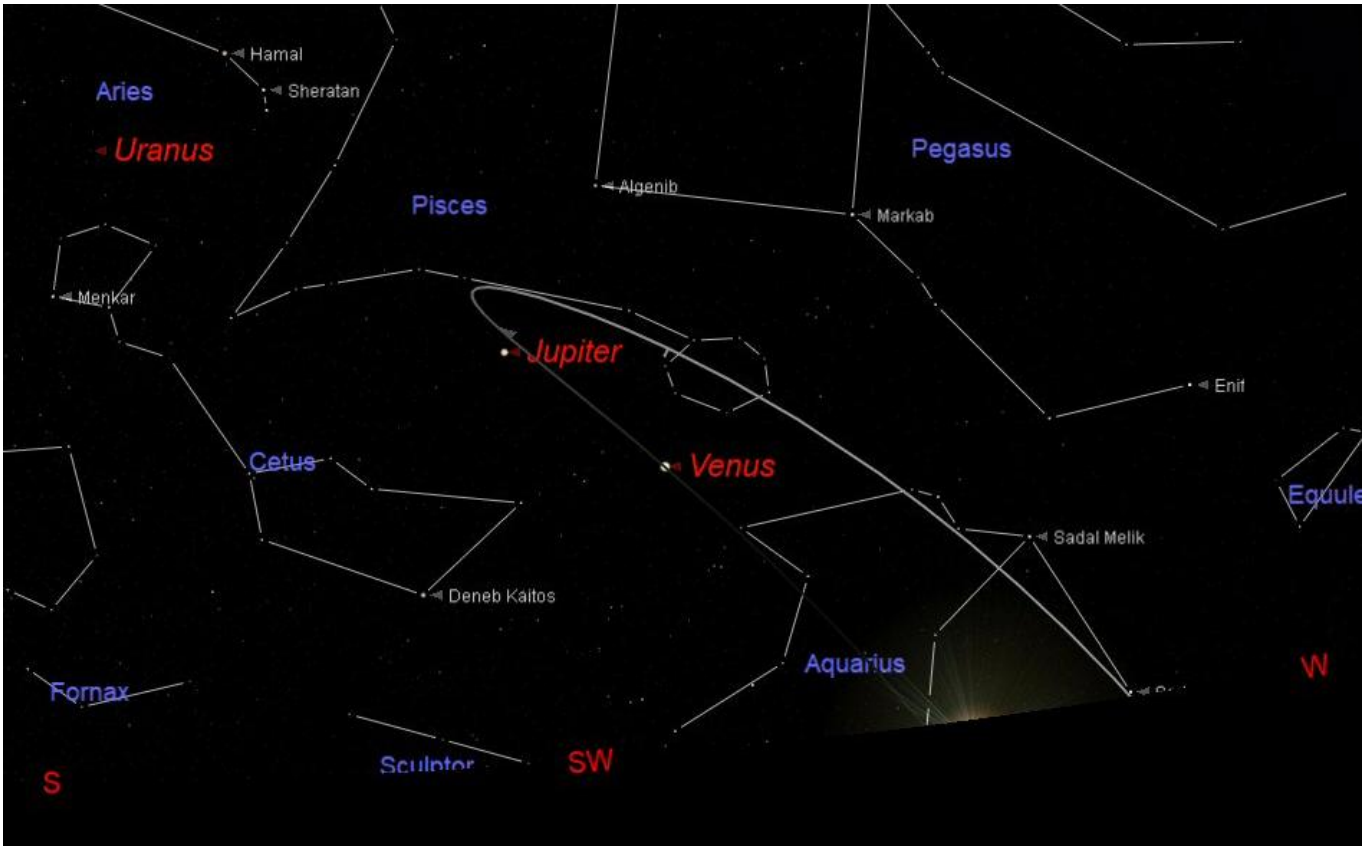
Venus is closer to the Sun and appears to have suffered a 'runaway greenhouse effect'. The additional heat from the Sun may have caused the surface temperature to rise and the Carbon that is trapped in the rocks on Earth was released into the atmosphere on Venus to form Carbon Dioxide (CO_2). The Carbon Dioxide allows the heat from the Sun to reach the surface but prevents it from being radiated back into space. The temperature then steadily increased in a runaway manner until it reached the 463°C surface temperature we see on Venus today.

The Carbon Dioxide (CO_2) atmosphere on Venus is not only hot but is very thick as well. The atmospheric pressure at the planet's surface is 90 times that on Earth, or roughly the pressure found 900m (3,000ft) underwater on Earth. If it was possible to stand on the surface of Venus (which it is not, it is far too hot) the view would be very odd because the refraction of light would cause large distortions compared to our atmosphere.

Venus has an orbital period (year) equivalent to 226.5 Earth days but its axial rotation (day) is equivalent to 243 Earth days. This means a day on Venus is longer than its year. Not that this makes any difference on the surface because the Sun is never visible due to the very thick Carbon Dioxide (CO_2) clouds.

The upper layer of the atmosphere exhibits a phenomenon known as Super-Rotation. This means the atmosphere circles the planet in just four Earth days, much faster than the planet's day (243 Earth days). The winds supporting Super-Rotation can blow at a speed of 100m/s (360km/h) or even faster.

With its thick white reflective atmosphere Venus is the brightest planet but looks featureless and rather uninteresting to the amateur astronomer. It appears as a very bright but plain white disc or crescent. However it can be quite interesting to follow the phase changes as Venus orbits the Sun inside the orbit of Earth.

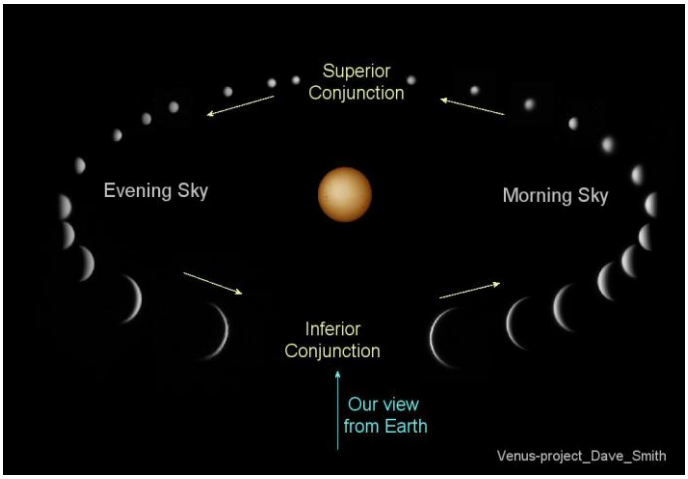


Venus seen in the west after sunset in Mid February

Venus is currently on view in the west after sunset in the early evening. The chart above shows the location of Venus and its orbital path. Venus was in Superior Conjunction (between Earth and the Sun) on 22nd October 2022 when it was not visible. As it moved out from Superior Conjunction and away from the Sun, it followed the orbital path shown on the chart above. The darkened part of the orbit shows the path out from conjunction.

The furthest point from the Sun (Greatest Eastern Elongation) will be reached on 4th June 2023 when Venus will be at its apparent furthest point from the Sun. See the chart on the next page. After this point Venus will appear to move back towards the Sun.

As Venus moves back from Greatest Eastern Elongation it will appear as a 'Half Moon' crescent in the west in the evening. It will still appear small in diameter because it will be at the same distance from Earth as the Sun and will be half illuminated by the Sun. It will be at the mid position on its orbit on the left side of the diagram below.



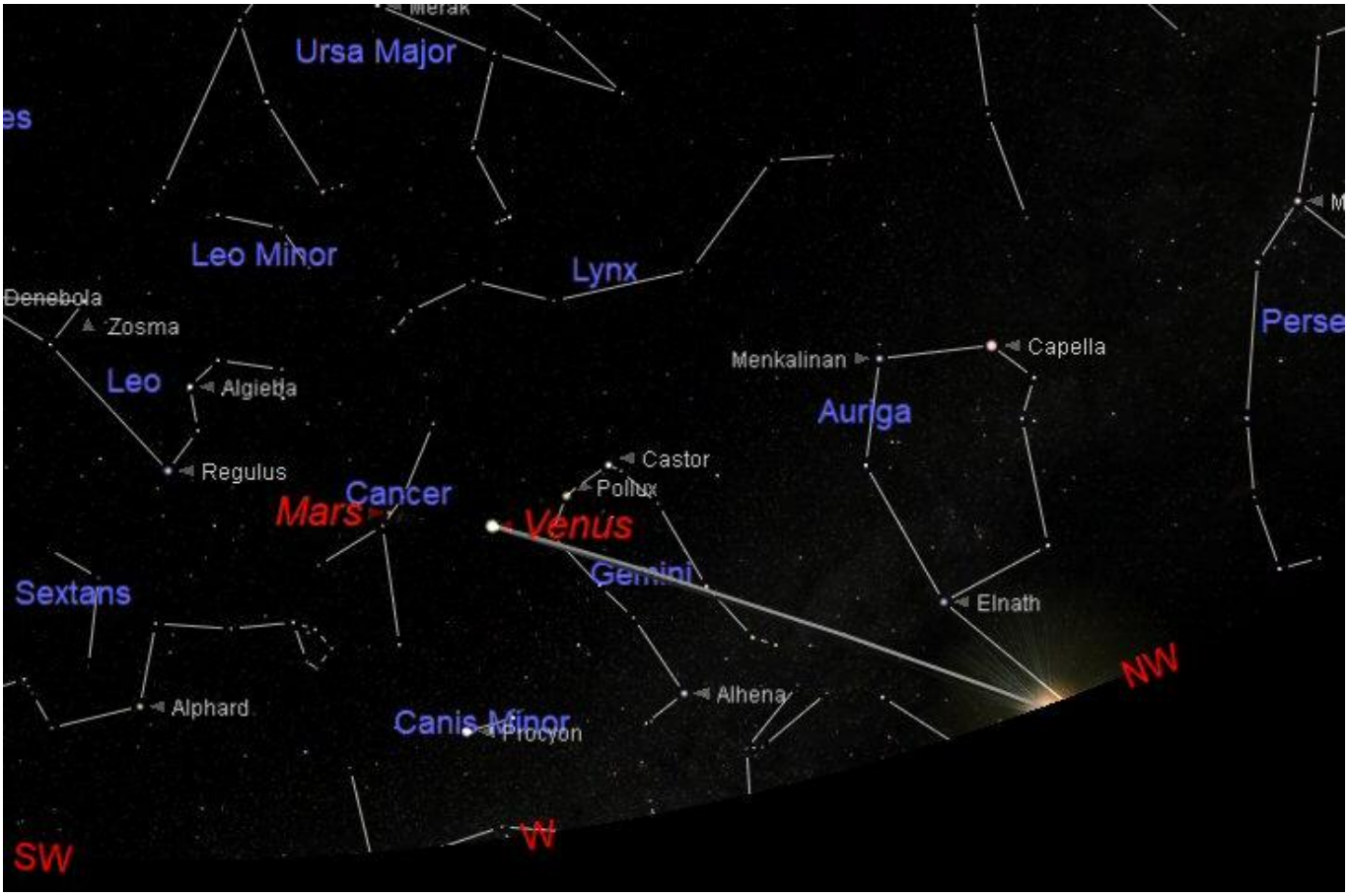
The Orbit, Phases and Conjunctions of Venus

At the time of writing this article Venus was still fairly low in the west after sunset and moving out from the Sun and its Superior Conjunction (on the other side of the Sun). This is the darker part of the orbit shown on the diagram above. As Venus moves towards Greatest Eastern Elongation and on to Inferior conjunction (passing between Earth and the Sun) the orbit above is shown to becoming brighter. After Inferior conjunction Venus will emerge and be located in the east before sunrise.

Venus appears bright in the west as the Sun is setting and is often called the 'Evening Star'. It will also appear to be moving towards us as it moves further around its orbit and away from the Sun. Therefore it will appear to become larger but will also develop into a thinner crescent so it will remain at about the same brightness.

Venus imaged as a wide crescent by the author

Venus will spend a couple of months in Inferior Conjunction when it will be difficult to see in the bright sky close to the Sun. It will also be close to the horizon and low in the sky.



Venus at Greatest Eastern Elongation 4th June 2023

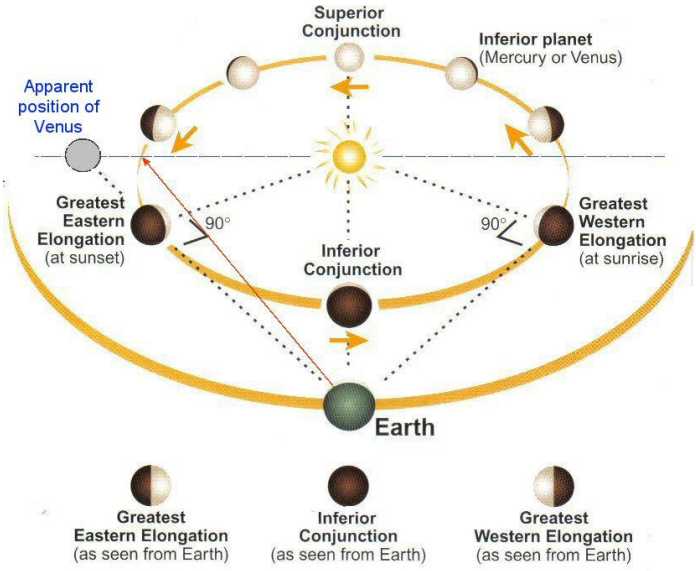
When Venus passes Greatest Elongation (its apparent furthest easterly point from the Sun) it will appear to start moving back towards the Sun in the Evening sky at sunset. It will begin to appear larger and as a thinning crescent. It is sometimes called the Evening Star. As Venus appears to move back towards to the Sun it will still be moving towards us on Earth so it will appear larger in diameter but the crescent will become thinner.

The change in diameter and phases of Venus

When Venus moves out from Superior Conjunction it appears as a full disc because it is on the opposite side of the Sun to us. From our point of view we see the whole surface of Venus illuminated. Venus then moves on its orbit around the Sun and appears to us to move away from the Sun to the east (left) in the evening sky. As it moves further away from the Sun its orbit brings it towards us so some of the illuminated surface begins to disappear from our view. See the images above.

After about 70 (Earth) days Venus will have moved a quarter of its way around the Sun and will be at its apparent furthest point from the Sun. We call this Greatest Easterly Elongation. At this point Venus will be the same distance as us from the Sun so we will see the half of Venus facing the Sun appearing 'Half Moon' shaped. As shown on the left of the diagram opposite.

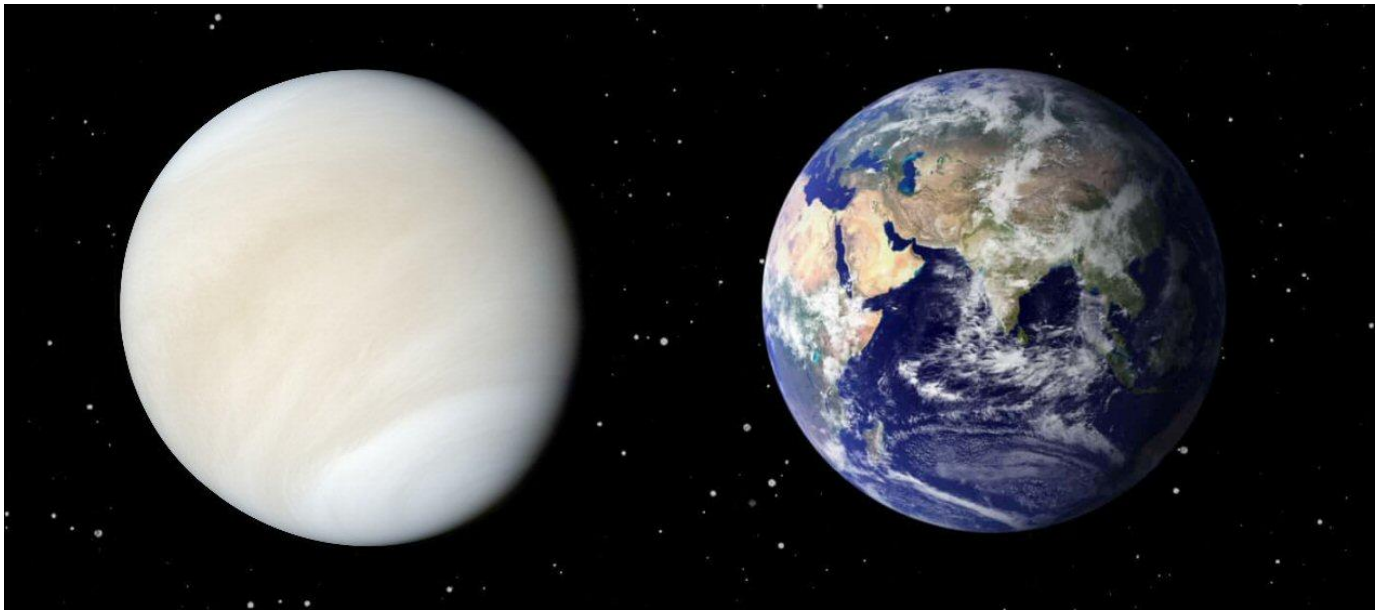
Up to this point more than half of Venus would have been illuminated and the apparent shape would have been more than half, a shape we call 'Gibbous'. Actually the Greatest Easterly Elongation occurs after the point when Venus is half way around its orbit. It occurs when Venus is at 90º from the Sun as we see it from Earth as shown on the diagram below (dotted lines).



The orbit of Venus around the Sun

After Greatest Easterly Elongation, Venus will appear to start moving back towards the Sun in a westerly direction. As it is still moving closer to Earth it will appear to significantly increase in diameter. As less and less of the illuminated surface of Venus will be visible to us it develops into a narrowing crescent. However the overall perceived brightness will remain about the same.

OBSERVING VENUS



A comparison of the size of Venus and Earth

Venus has a very thick and clouded atmosphere that covers the whole surface. Consequently there are no surface features to see. All that is visible on Venus is the top of the thick white clouds. Some faint features can be seen in the clouds but special filters (such as ultraviolet filters) are required to see them.

The main interest for amateur astronomers when observing Venus is to follow the progress of the phases. The two inner planets Mercury and Venus (known as Inferior Planets) are the only planets to show phases. Phases occur when these planets (and our Moon) are partially illuminated by the Sun. The phases change as the planets move around the Sun on their orbits.

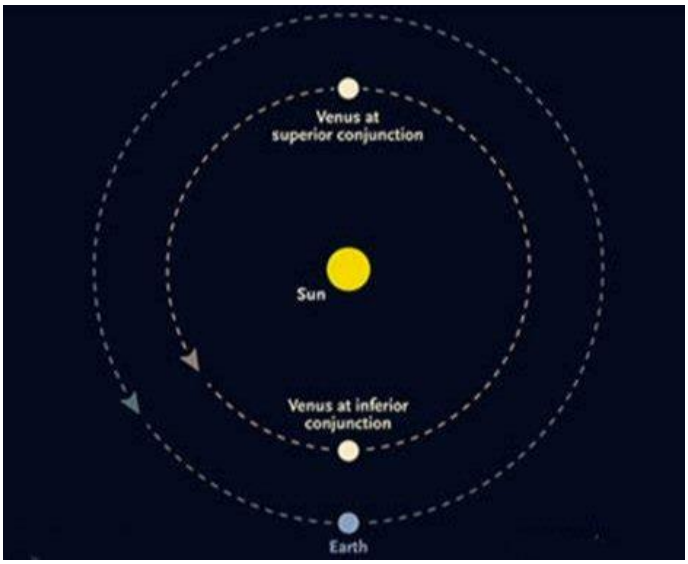
We have already seen that Venus has an orbital period (year) equivalent to 226.5 Earth days but its axial rotation (day) is equivalent to 243 Earth days. This means a day on Venus is, very oddly, longer than its year. However this makes no difference on the surface because the Sun is never visible due to the very thick Carbon Dioxide (CO_2) clouds.

The period taken for Earth to catch up with another planet is called the Synodic Period and the time taken for a planet to complete one orbit around the Sun is called its Sidereal Period. The table below shows the Synodic and Sidereal Periods for Earth and the other planets.

Planet	Synodic Period (days)	Sidereal Period
Mercury	116 (~3x y)	88 days
Venus	584 (~1.5x y)	225 days
Earth	-	1.0 year
Mars	780 (2.137y)	1.9 years
Jupiter	399 (y + ~34d)	11.9 years
Saturn	378 (y + ~13d)	29.5 years
Uranus	370 (y + ~5d)	84.0 years
Neptune	368 (y + ~3d)	164.8 years

Table showing the Synodic Periods of the planets

From a point where Earth and Venus are in the same point on their orbits as on the diagram opposite, at Inferior conjunction, Earth will take 365.25 days to return to the same spot. As the orbit of Venus is inside the orbit of Earth it completes its orbit of the Sun in just 225 Earth days. When Venus catches up with Earth it will have completed 2.6 of its own orbits. Earth will have needed to move around its orbit for 584 days for Venus to catch up. This is called the Synodic Period of Venus.

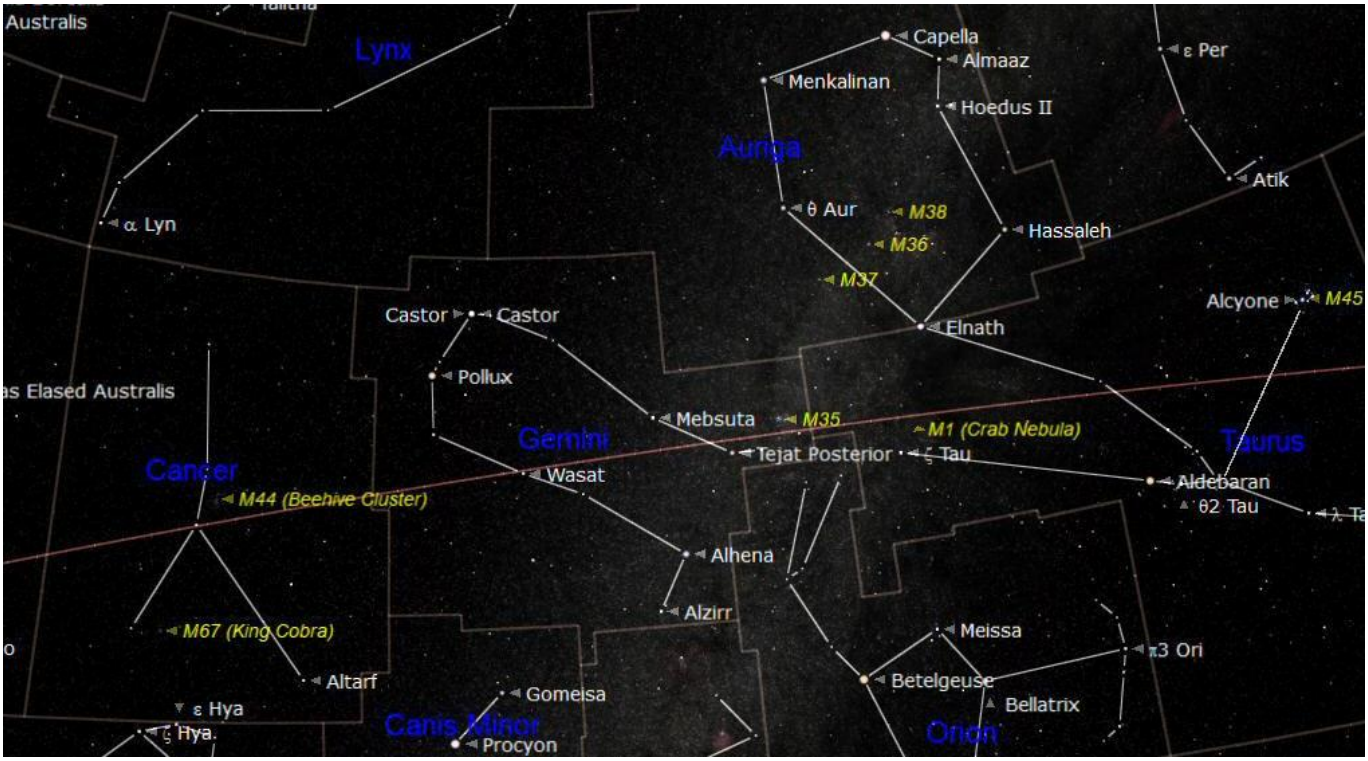


The orbits of Venus and Earth

A telescope is needed to see Venus as a disc and the larger the telescope the bigger Venus will appear. Venus often appears low in sky and in the murky and turbulent air close to horizon. It is best to start with a low power eyepiece (25mm) when observing Venus then use a higher power (magnification) eyepiece (10mm) to have a closer look. If the image is too bright then a Moon filter can be used (an adjustable Polaroid type is best). Alternatively the Dust cap can be fitted to the telescope and the small 'Moon' cap removed to reduce the glare.

If the image looks good then a Barlow Lens can be used to effectively double the magnification of the 10mm eyepiece. When Venus is low in the sky and we are looking through more of our atmosphere some colour distortion will be seen as red and blue fringes.

CONSTELLATIONS OF THE MONTH – AURIGA, GEMINI AND CANCER



The constellations of Auriga, Gemini and Cancer

The chart above shows the winter constellations of Auriga (the Charioteer), Gemini (the Twins) and Cancer (the Crab). These are interesting constellations to search out and have some very interesting objects to see even when using just a pair of binoculars. Gemini and Cancer are located on the Ecliptic and therefore are occasional hosts to the Sun, Moon and Planets as they appear to move along this imaginary line.

Capella is the brightest star in the constellation of Auriga, it is the sixth-brightest star in the night sky and the forth-brightest in the northern celestial hemisphere after Sirius, Arcturus and Vega. A prominent object in the northern winter sky, it is circumpolar to observers north of 44°N. Its name means "little goat" in Latin. Capella is depicted as the goat Amalthea that suckled Zeus in classical mythology. The Capella system is relatively close, at only 42.9 light-years from the Sun.

Although it appears to be a single star to the naked eye, Capella is actually a quadruple star system with two binary pairs made up of the stars Capella Aa, Capella Ab along with Capella H and Capella L.

The first pair, Capella Aa and Capella Ab is composed of two bright yellow giant stars, both of which are around 2.5 times as massive as the Sun. The second pair, Capella H and Capella L are positioned around 10,000 astronomical units (AU) from the first pair and are two faint, small and relatively cool red dwarfs.

Auriga has three Messier Open Clusters that can be seen using binoculars. These are M36, M37 and M38. See the chart above. Open Clusters are groups of stars that have formed from the gas and dust in a Nebula (large cloud of gas and dust). These clusters look like small smudges of light using binoculars. They are best seen using a telescope which will show many of the individual stars in the clusters.

During the midwinter months Capella is almost directly overhead which makes it very easy to find. During the summer months it can be seen close to the northern horizon. The Milky Way (our galaxy) passes through Auriga and can be seen on the chart above. The three open clusters in Auriga are seen against the dense star fields of the Milky Way.

The constellation of Auriga is joined to the constellation of Taurus at the most southerly star of Auriga called Elnath. Oddly Elnath is actually included in the lists of the stars belonging to both constellations.

There is a fourth Open Cluster that appears to be in the same line as M36, M37 and M38 over the border in the constellation of Gemini, this is Messier 35 (M35). Gemini is named after the mythical twins Pollux and Castor from Greek mythology.

The recognised shape of Gemini is in the form of a rough rectangle with Pollux and Castor at the eastern short side. A line of stars runs south west from Castor to the star Tejat Posterior. The line from Pollux takes a diversion south through kappa (κ) then south west through Wasat to Alhena and Alzirr.

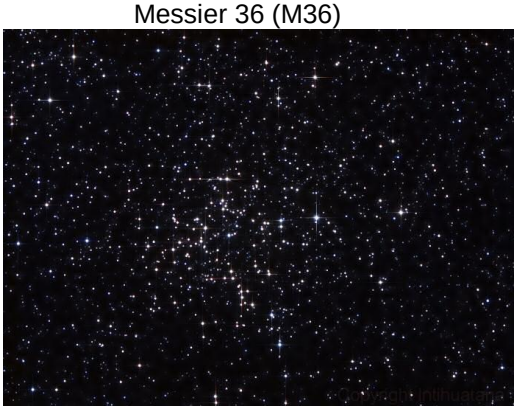
The two brightest stars in Gemini are Castor and Pollux which look quite similar and represent the twins. Castor and Pollux were the children of Leda. However Pollux was actually the son of Zeus who seduced Leda but Castor was the son of Tyndareus, King of Sparta and Leda's husband.

Gemini is easy to find because its two brightest stars are quite close together and similar in appearance. The two brightest stars are called Pollux (β) and Castor (α) and are known as the Gemini Twins. Although Castor has been given the Greek letter designation α (alpha), which is normally given, to the brightest star in a constellation, Castor is not actually the brightest Pollux is in fact the brighter of the two.

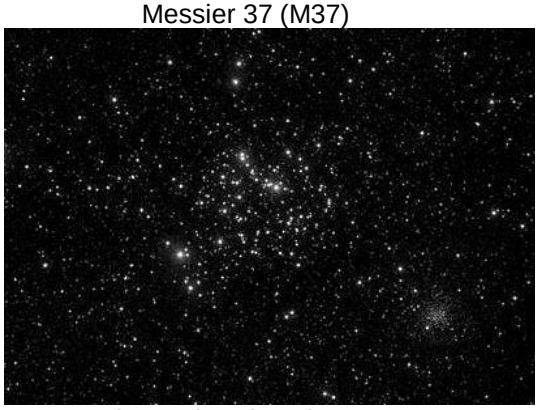
The open Clusters in Auriga and Gemini

Messier 36 (M36)

Messier 37 (M37)



Messier 38 (M38)



Messier 35 (M35) and NGC2158

Pollux is brighter at magnitude +1.59 compared to the +1.9 of Castor. However Castor is a double star with a fainter companion that has a magnitude of +2.9 and separated by 6 arc-seconds. The two stars, known as Castor A and Castor B, orbit their common centre of gravity every 467 years. The pair can be separated in a 75mm aperture telescope on a good clear night.

Messier 35 (M35) is located at the end of the upper of the two lines of stars that emanate from Pollux and Castor. It is the most spectacular of the four Open Clusters and is shown above.

Cancer is a faint and rather indistinct constellation but it does have a rather nice Open Cluster called Messier 44 (M44) Praesepe or 'the Beehive Cluster'. The stick figure shape of Cancer is an up-side-down letter 'Y'. Although M44 is large, the stars are dispersed and fairly faint. It is quite difficult to find in a light polluted area so will require binoculars to see it. See the chart on page 7.

Messier 44 (M44) Praesepe the Beehive Cluster

Open Star Clusters are listed in Charles Messier's Catalogue along with other objects of interest to amateur astronomers. Messier listed these objects along with Globular Clusters, Nebulae and Galaxies so they would not be mistaken for the comets he was searching for. Many of the brighter open clusters do look quite comet-like when viewed through binoculars. They are as the name suggests clusters of related stars and many are very beautiful to look at.

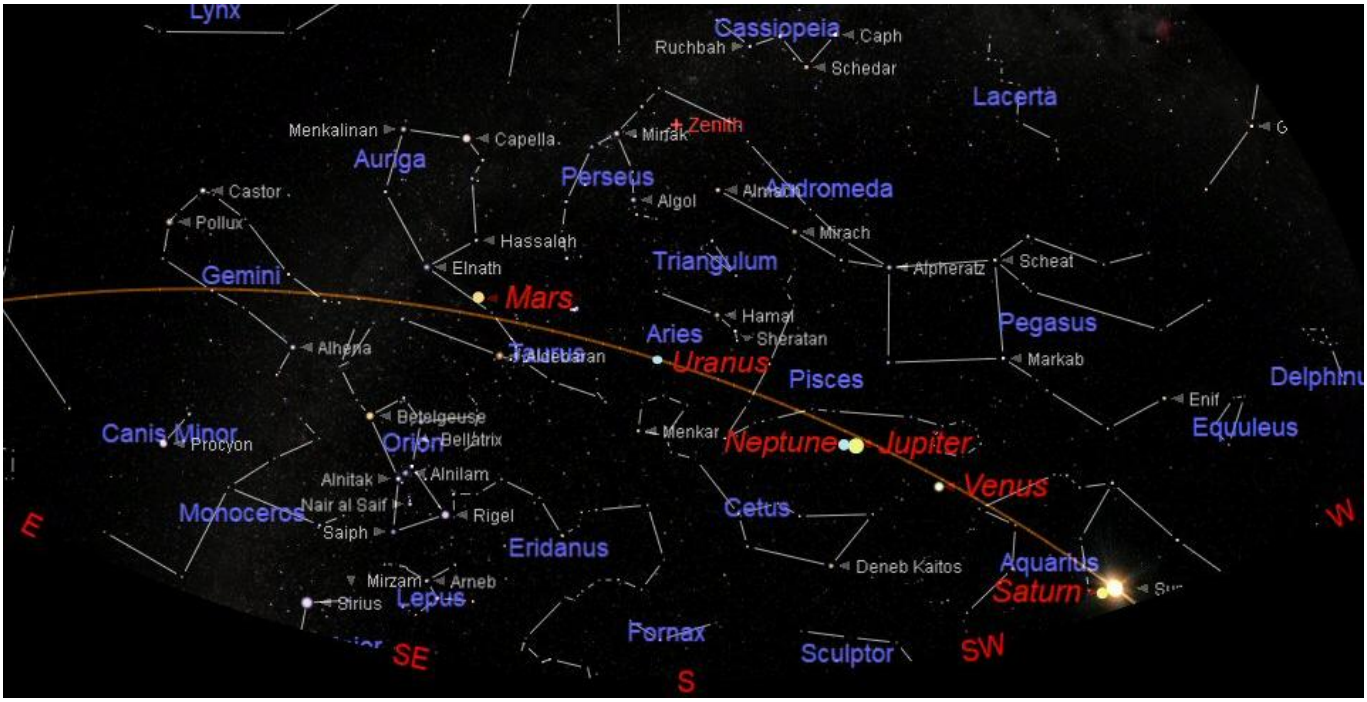
It is thought all stars form in vast clouds of gas and dust known as Nebulae (singular Nebula). Gravity pulls the atoms together into denser clumps until the gas and dust is compressed into very dense spheres. The temperature and pressure in the centre of the spheres rises until Nuclear Fusion begins. The Nuclear Fusion in the core produces an enormous amount of energy and the spheres begin to shine as stars and an Open Star Cluster is formed.

The brightest and most easily seen Open Cluster is Messier 45 (M45). See the chart on page 7. This is a cluster of about 300 stars in the constellation of Taurus. The cluster is known as the Pleiades but even more widely known as the Seven Sisters.

Six or possibly seven of the brightest stars in M45 are easily visible to the naked eye in a clear dark sky. They occupy an area of sky about the same size as the full Moon. Using a pair of 10 x 50 binoculars another thirty or so fainter stars can be seen embedded within the Seven Sisters. See the December 2022 magazine.

The clusters M35, M36, M37 and M38 are further away so appear smaller and fainter. They can just about be seen using binoculars but a telescope is required to see them well. M35 is particularly lovely as it has a spectacular string of stars that appear to cascade through its centre and cluster NGC2158 is close by.

THE SOLAR SYSTEM – FEBRUARY 2023



The planets at 18:00 on 15th January

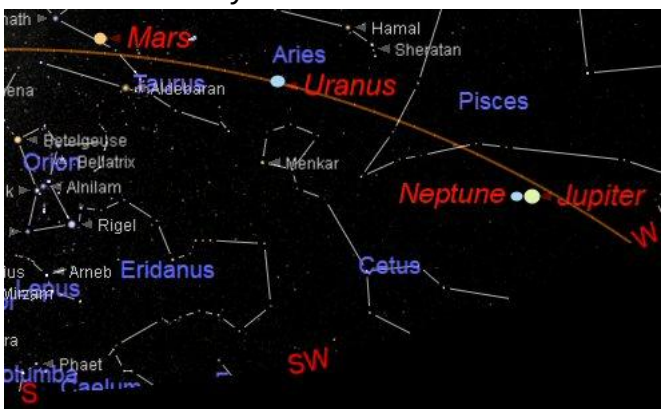
The chart above shows the location of the planets along the Ecliptic. All of the planets except Saturn and Mercury will be visible during evening before sunset. Saturn is too close to the Sun and Mercury is in the early morning sky before sunrise.

MERCURY will appear very close the Sun just before sunrise in the east. Experts may be able to find it in the brightening morning sky but it will require a clear view to the eastern horizon. Mercury is to the west of the Sun just before Sunrise in the east.

Mercury in the South East at 07:00 on 15th February

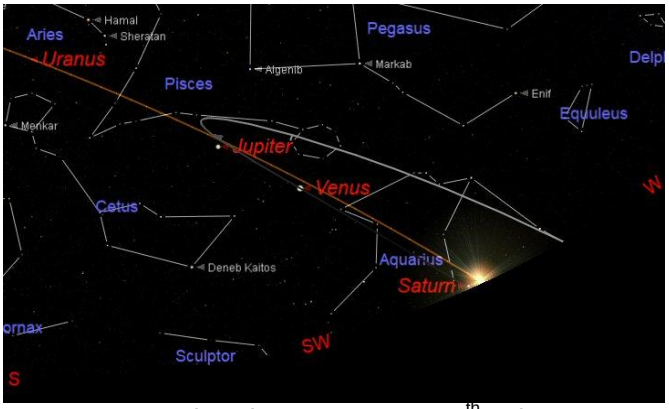
VENUS will be visible in the early evening sky as soon as possible after sunset. It will be easy to find but it will require a clear view to the western horizon. Venus was in Superior Conjunction on 22nd October and is now emerging from its excursion behind the Sun. It will appear at its smallest diameter and will be fully illuminated because it is still beyond the Sun from our point of view. See the Jupiter chart and pages 3 to 6.

MARS can be seen high in the evening sky as soon as the Sun has set and the sky darkens. It is looking small at about 10" (arc-seconds). Earth overtook Mars on the inside on 8th December. So Mars is past its best and is now starting to fall behind Earth and will appear to be getting smaller as it moves away from us.



Mars, Uranus, Neptune and Jupiter at 20:00

JUPITER is past its best for this year but is still good for observing in the early evening. Jupiter was at its very best when it was at opposition on 26th September. At this time it was due south at midnight 01:00 BST and appearing at its highest above the southern horizon.



Venus and Jupiter at 15:00 on 15th February

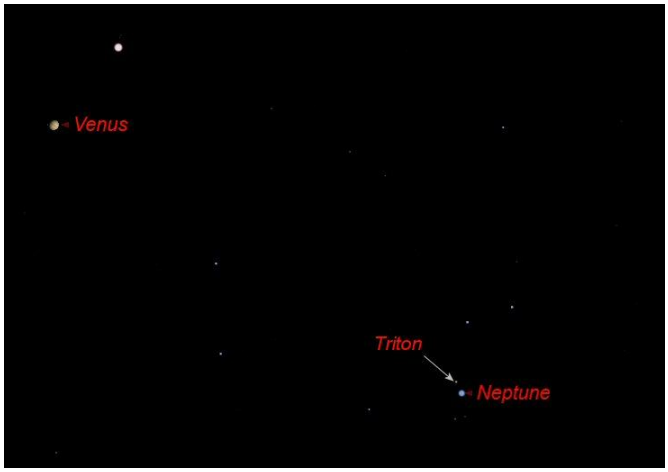
Jupiter is now moving towards the western horizon during the evening. It will set over the horizon at 21:40 GMT at the beginning of this month and set by 20:40 GMT at the end of the month. In reality it will start to appear unsteady up to an hour before these times due to the turbulent and muggy air closer to the horizon.

However it is still very worthwhile to observe the King of the Planets in the early evening for another month or so. The moons are still easy to follow and can be very interesting to see as they move around the planet. A planetarium application will show the positions of the moons and the times of a transit or occultation.

The movement of Jupiter's moons can be predicted by using a Planetarium Application on a computer. The free to download application called Stellarium is very good for doing this. We are able to predict when a moon will pass in front (transit) or behind the planet (occultation). There is an interesting close approach between Jupiter and Neptune on 14th and 15th February. This will provide a good time for finding Neptune using a telescope. See Neptune below.

SATURN is in conjunction with the Sun this month and is not observable see the chart on the previous page.

URANUS was at Opposition on 9th November so was at its best position for observing this year. As Earth overtook Uranus on the inside Earth, Uranus and the Sun were aligned with Earth between the Sun and Uranus on the outside. This meant Uranus was in the south at midnight 00:00 GMT and at its highest point above the southern horizon. As it is so far away from us it appears very small in fact just 3.6" (arc-seconds).



Neptune close to Venus 15th February

NEPTUNE is always difficult to find but will be a little easier to find on the 14th and 15th of this month using a telescope (see chart above). Neptune will be still be difficult to find in the sky close to Venus as it is very small at just 54' (arc-minutes) only magnitude +7.9.

Once Neptune has been found in a telescope there is another difficult but interesting task that can be attempted. This to try to see Neptune's largest moon called Triton but it will be a very difficult task. Triton is 2,720 kilometres in diameter but will appear very small.

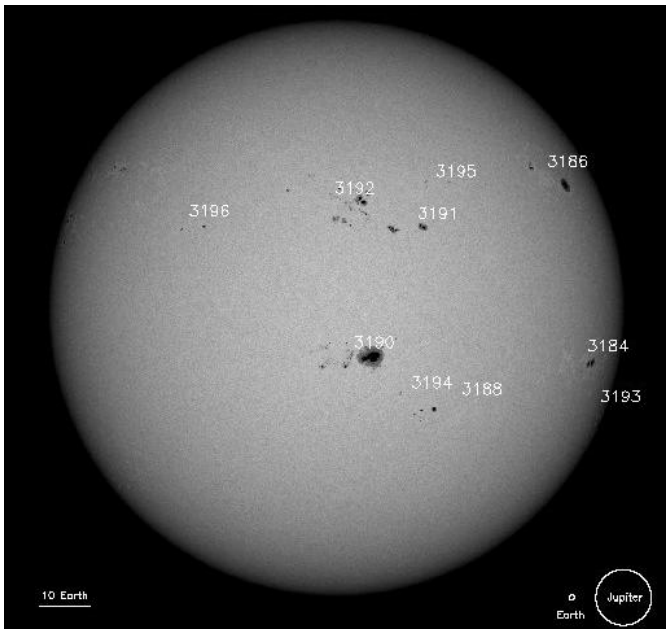
THE SUN

The Sun rises at about 08:00 at the beginning of the month and 07:50 by the end. It sets at 16:00 at the beginning of the month and 16:30 at the end of the month.

The Sun is over half way through its Active Phase when there is more activity on the surface. There is an 11 year cycle when the Sun increases and decreases activity on the surface. The most obvious change on the Sun is the appearance of Sunspots as shown on the image below. These and other activity is caused by the interaction of powerful magnetic fields in the Sun.

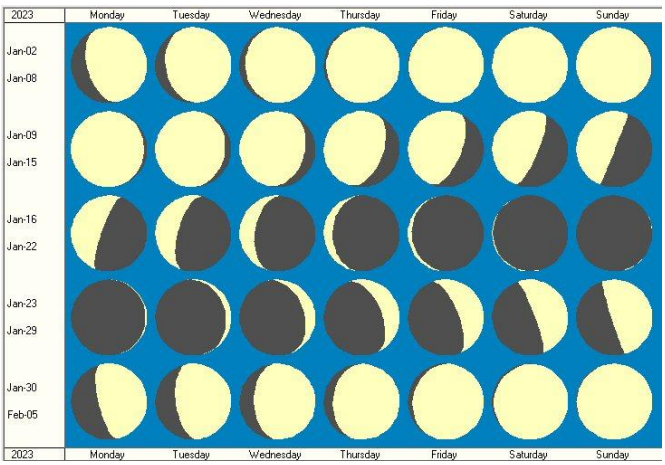
More sunspots appear and there are often huge ejections of energetic particles thrown into space. When these particles encounter the Magnetic fields surrounding Earth they are captured and drawn into the north and south poles. The energetic particles cause the upper atmosphere to glow and produce the Aurora Borealis (northern lights) and the Aurora Australis (southern lights).

Nearly all telescopes can be modified to allow the safe observation of the surface features on the Sun by fitting a special Solar Filter to the telescope. These filters reject most of the sunlight and only allow a small fraction of the light to pass through. These must be the correct approved type or permanent eye damage can occur. If a telescope is not available the Sun can still be observed by downloading daily images from NASA's orbiting Solar and Heliospheric Observatory (SOHO) at: http://sohowww.nascom.nasa.gov/.



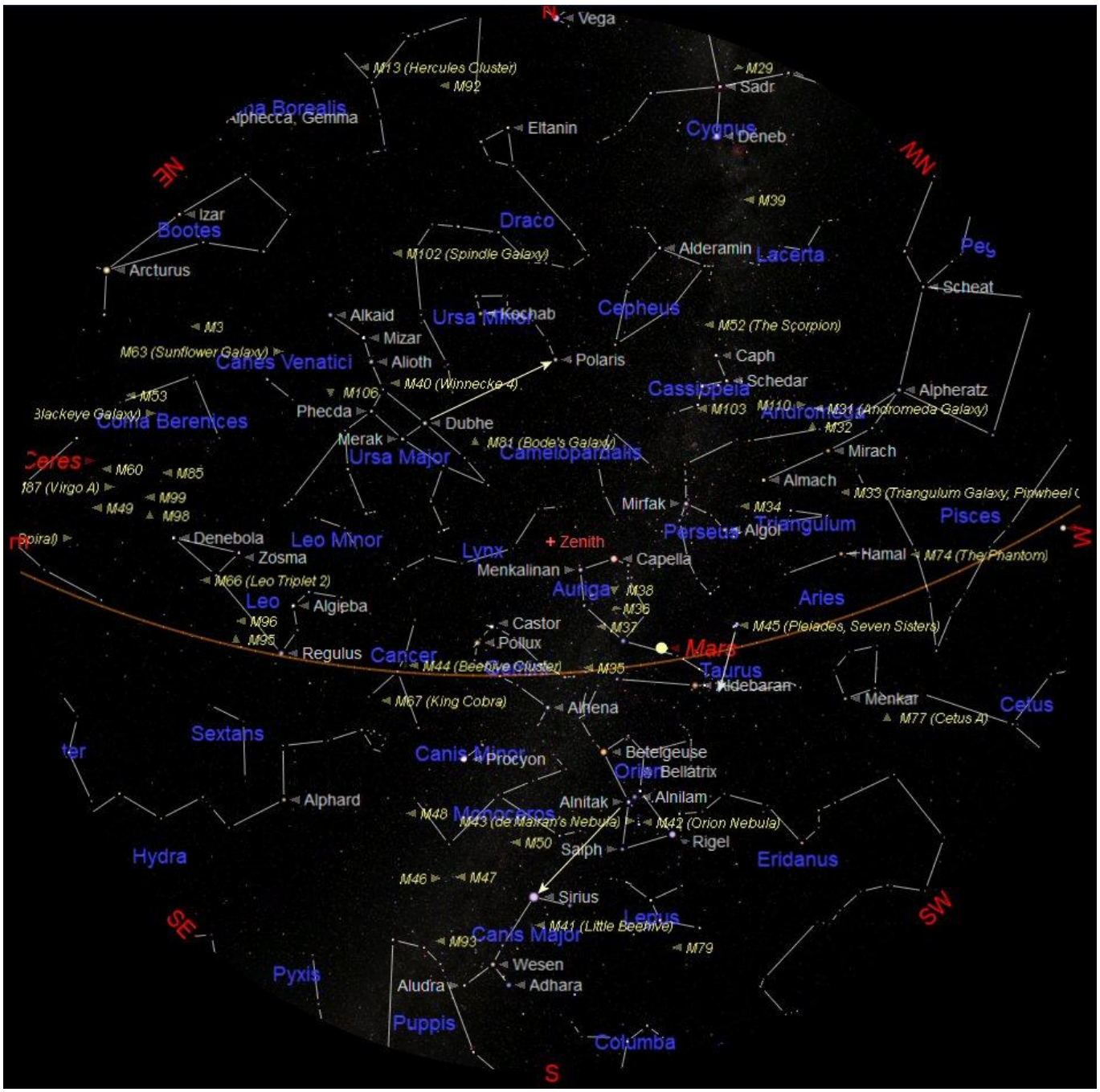
Sunspots imaged by SOHO on 19th January

THE MOON PHASES DURING FEBUARY



Full Moon will be on 5th February
Last Quarter will be on 13th February
New Moon will be on 20th February
First Quarter will be on 27th February

THE NIGHT SKY – FEBRUARY 2023



The chart above shows the whole night sky as it appears on 15th February at 21:00 (9 o'clock) Greenwich Mean Time (GMT). As the Earth orbits the Sun and we look out into space each night the stars will appear to have moved across the sky by a small amount. Every month Earth moves one twelfth of its circuit around the Sun, this amounts to 30 degrees each month. There are about 30 days in each month so each night the stars appear to move about 1 degree. The sky will therefore appear the same as shown on the chart above at 8 o'clock GMT at the beginning of the month and at 10 o'clock GMT at the end of the month. The stars also appear to move 15º (360º divided by 24) each hour from east to west, due to the Earth rotating once every 24 hours.

The centre of the chart will be the position in the sky directly overhead, called the Zenith. First we need to find some familiar objects so we can get our bearings. The Pole Star **Polaris** can be easily found by first finding the familiar shape of the Great Bear 'Ursa Major' that is also sometimes called the Plough or even the Big Dipper by the Americans. Ursa Major is visible throughout the year from Britain and is always quite easy to find. This month it is in the North East. Look for the distinctive 'saucepan' shape, four stars forming the bowl and three stars forming the handle. Follow an imaginary line, up from the two stars in the bowl furthest from the handle. These will point the way to Polaris which will be to the north of overhead at about 50º above the northern horizon. Polaris is the only moderately bright star in a fairly empty patch of sky. When you have found Polaris turn completely around and you will be facing south. To use this chart, position yourself looking south and hold the chart above your eyes.

Planets observable in the evening sky: Venus, Jupiter, Neptune, Uranus and Mars.