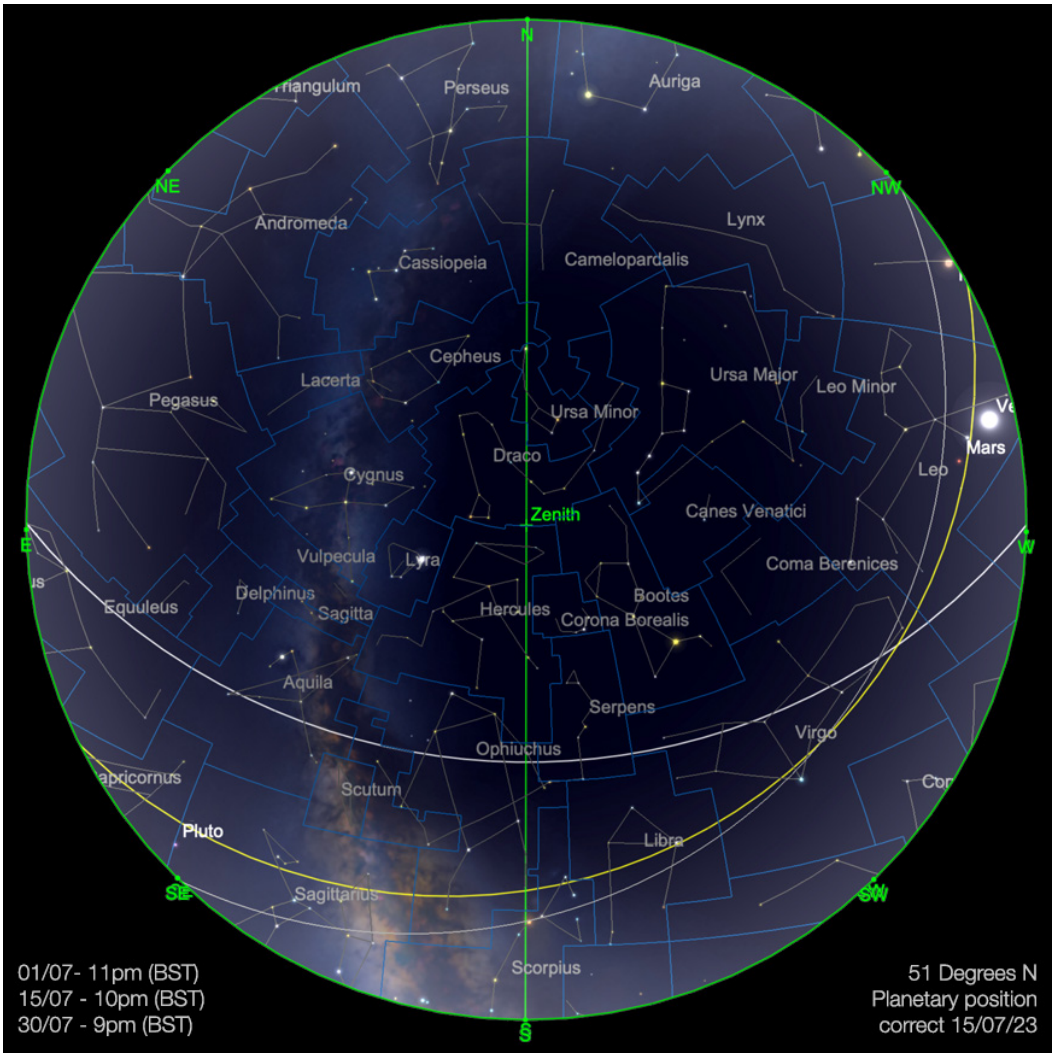
Telescope House July 2023 Sky Guide



For those of us in the Northern Hemisphere, we have now passed the peak of the Sun's elevation in the Northern celestial hemisphere and are now on the inevitable decline towards winter. This of course is a very gradual process, but observers in mod-Northern latitudes will definitely notice the difference from July's beginning to its end. At the beginning of July there is no true astronomical darkness, as the Sun is never more than 12 degrees below the horizon, even in the middle of the hours of darkness. Once we reach July's end, those of us around 50 degrees N will experience a whole three hours of true darkness. However, for those living further north, permanent astronomical darkness will continue way into August. Those observers in Scotland or parts of Scandinavia around 57 degrees N will not experience any astronomical darkness at all until the middle of August. Those living further north still have much longer to wait. Residents of Reykjavik, at 64 degrees N, won't experience astronomical darkness until the early part of September.

Wherever you find yourself in the world, there's still much to see, so let's explore what the skies have in store for us this month...

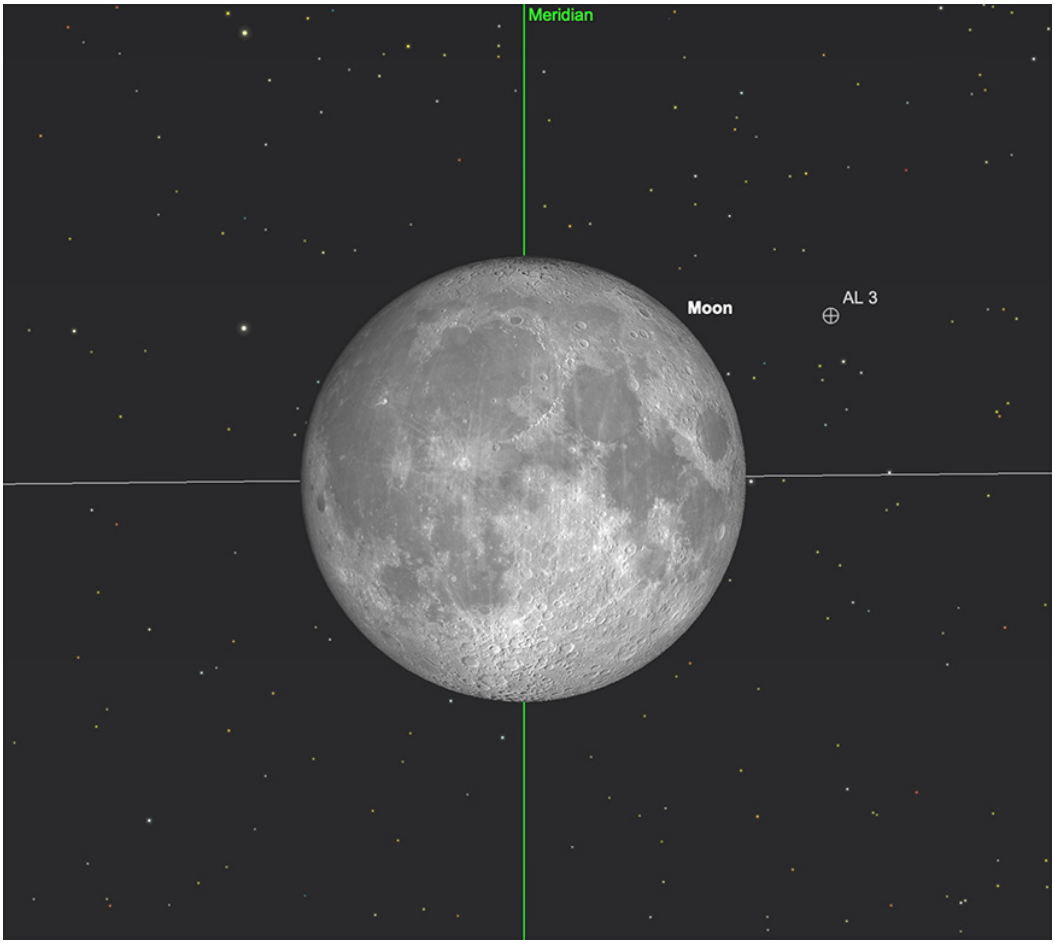
The Solar System

The Moon

We begin July with our natural satellite in Scorpius, with the Moon a couple of days off Full. Rising at little after 8pm, the Moon won't rise very hight in the sky during the very beginning of July, for observers in Northern climes, as it is lurking in the southern ecliptic.

The Moon becomes full on the 3rd July, while in Sagittarius. This Full Moon is another so-called Supermoon. A Supermoon is more properly known as a Perigee-Syzygy Moon And occurs when the Moon becomes Full at its closest point to worse or it's slightly elliptical orbit around our planet. As a result of this, the Moon can look anything up to 13-14% larger in the sky during a Supermoon event. This particular Supermoon *may* appear slightly larger than normal for northern hemisphere observers, as the location of the Moon in the southern skies will maximise the effects of atmospheric lensing, which appears more prominent the lower int he sky an object sits. However, as we've covered before in previous sky guides, Full Moon is actually one of the most disappointing times to actually observe the Moon, as a lot of surface detail is completely washed out by its very harsh illumination - though a decent Moon Filter or Neutral Density Filter can work well in a telescope to dial this down somewhat and make observations more comfortable. These considerations, along with the negative influence of atmospheric movement, the closer a target is to the horizon, will limit the amount of magnification observers can use in their telescopes to observe the Supermoon. Still, it should be an enthralling sight to the naked eye and the Supermoon - however astronomically insignificant it ultimately may be - does inspire those for whom astronomy is only of a very passing interest, to look skyward.

With Full Moon sitting so close to the beginning of the month, we just miss out on a "Blue Moon" - the second Full Moon of a whole calendar month. For this, we will have to wait until August, when we will also have two further Supermoon events.



The Full Moon transiting, 12.35am, 3rd July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Beyond Full phase, the Moon's illuminated face starts to diminish. As the Moon climbs the ecliptic (as seen from the northern hemisphere), passing through Sagittarius, Capricornus Aquarius (where it will meet Saturn on the 7th), on into pisces and Cetus, it will grow thinner and thinner. We get to Last Quarter Phase in Pisces on the 10th, with the Moon rising at a little before 1am, setting at a little past 2pm the following day.

On the mornings of the 11th and 12th July, the thinning Crescent Moon will sit respectively to the west and east of the prominent Jupiter in the morning sky. If you are up early enough, it should be quite a stirring wide field sight.

As we approach mid month, the moon will thin down to a tiny sliver, before reaching New Phase on the 17th, when it slides to the north of the Sun in Gemini.

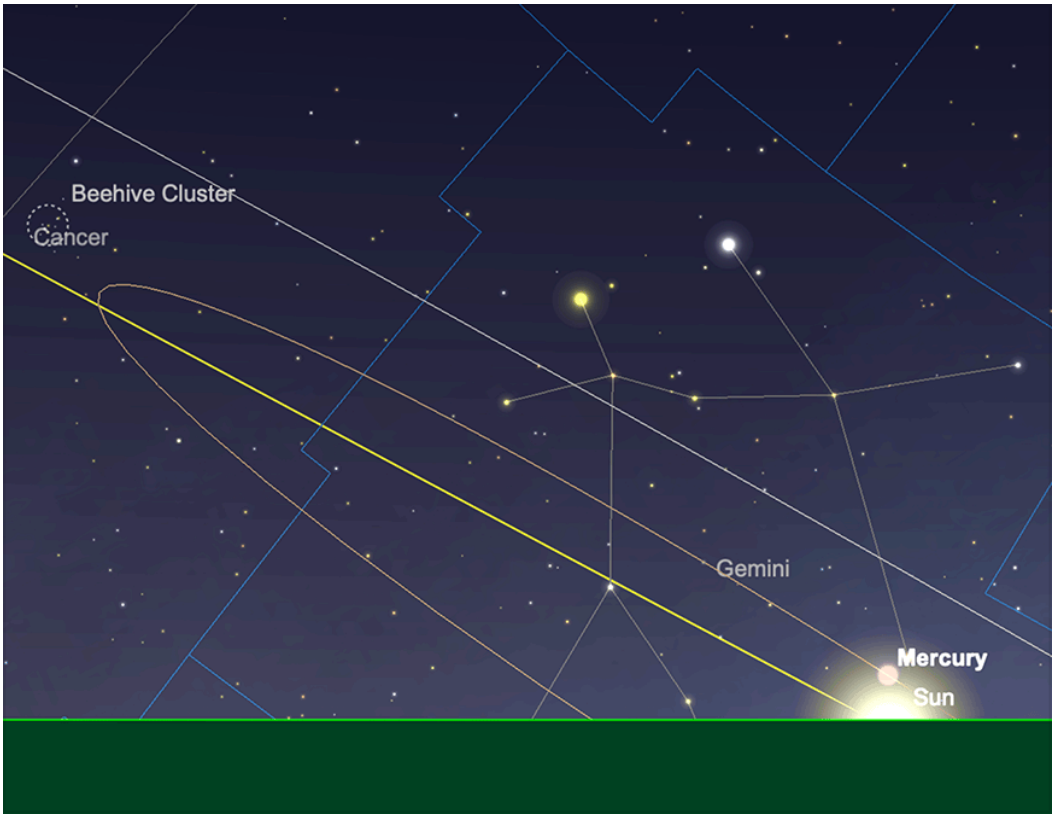
After tis encounter with the Sun, the Moon will re-emerge as an evening object. It may just be visible on the evening of the 19th, when it shares the Leo-Cancer borders with Mercury and the much brighter Venus. The tiny 8.3% illuminated Moon will stand almost vertically in line with Venus and regular, Alpha Leonis, as the Sun sets on the following evening of the 20th. The much fainter Mars

stands a little to the east of this line, but will be more difficult to see in the evening twilight.

The moon then treks across the vast expanse of sky which makes up eastern Leo and the enormous Virgo, ending up in the latter on the 25th at First Quarter phase. The last few days of July finds the Moon sinking further into the southern reaches of the ecliptic again, through. Libra, Scorpius and Sagittarius, until we end the month with the Moon sitting on the Sagittarius-Capricornus borders, just one day off Full.

Mercury

We begin July with Mercury at Superior Conjunction - the opposite side of the Sun from our perspective here on Earth and thus unobservable. However, it will only be the beginning of the second week of the month and Mercury will start to be visible in the evening sky as the Sun sets.



Mercury at superior conjunction, sunset, 1st July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

By mid-month, Mercury will sit 15 degrees to the east of the Sun and will attain a height above the horizon (as seen from 51 degrees N), of 7 degrees as the sun goes down. It will display a -0.7 magnitude, 5.4 arc second diameter, 83% illuminated disk.

As the month progresses, mercury will drift further from the Sun, diminishing its phase and fading slightly as it does. During the last few days of the month, Mercury draws closer to Venus in the evening sky, with its much brighter neighbour providing a helpful (if rather low lying) pointer to its position. The end of July finds Mercury at +0.1 mag, displaying a 6.6 arc second disk, illuminated by 62%. It will stand just under 8 degree high (as seen from 51 degrees N) as the Sun sets and will be, by this point in time, over 25 1/2 degrees from our parent star.

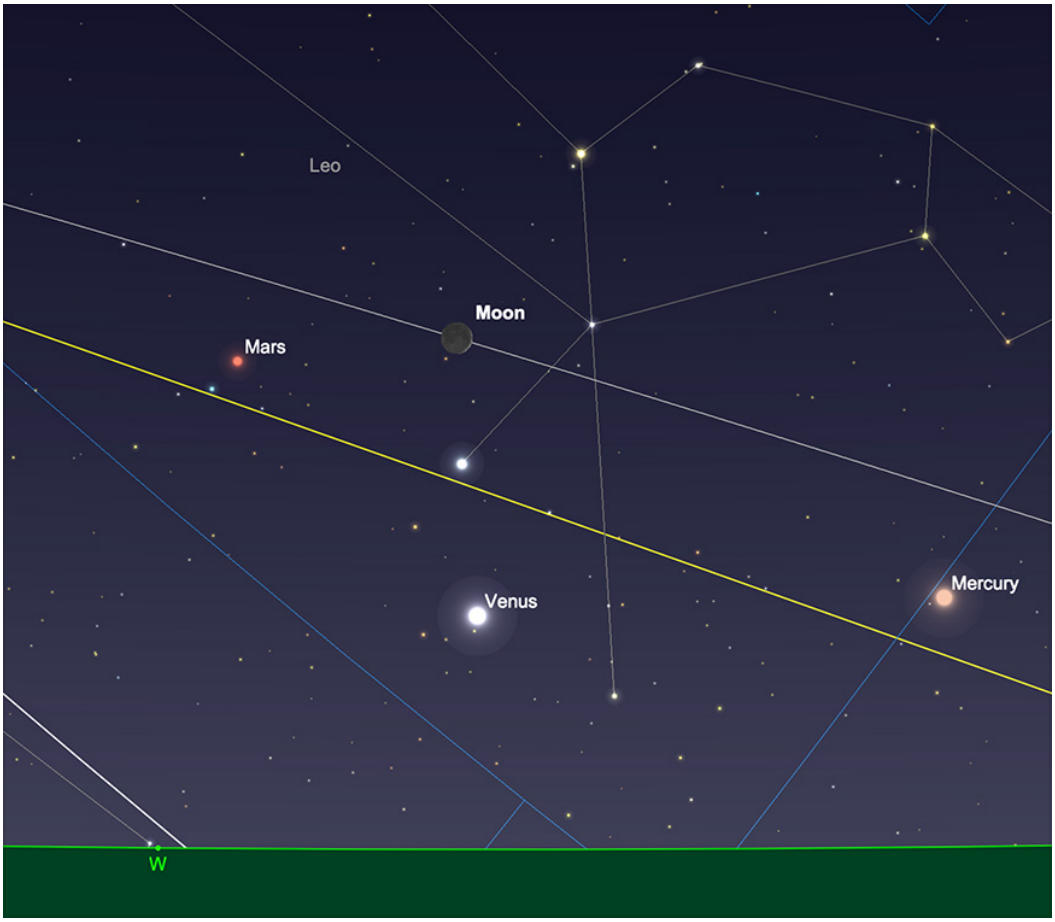
Venus

Having reached maximum eastern elongation from the Sun in early June, Venus is now swinging round on its faster interior orbit, rapidly catching up the Earth and this will have notable and fairly rapid consequences for its observation from our planet. At the beginning of July, Venus sits at a dazzling -4.5 magnitude, displaying a 33.9 arc second diameter, 33.9% illuminated disk. It will stand just under 17 degrees high in the west as the Sun sets (as seen from 51 degrees N) on the evening of the 1st. By the beginning of the second week of July, Venus will remain static in terms of brightness, but will have increased its angular size to 37.8 arc seconds and decreased its phase to 25.85 illumination. It will now stand 14 1/2 degrees high at Sunset (as seen from 51 degrees N).

Most celestial bodies decrease in brightness as their phase decreases - as seen from our planet. But Venus is something of an exception to this rule, as it phase decreases as it draws nearer to us, so while diminishing in overall percentage of illumination, this is made up for by increase in angular size - thus resulting in static brightness, despite a decrease in phase. This month is a particularly good time to observe this unusual effect in action.

By the middle of July, Venus will remain at -4.5 mag and now shows a 43 arc second, 18.7% illuminated disk. It will stand 10 degrees above the horizon (as seen from 51 degrees N), so will begin to be difficult for some observers and will now be significantly negatively influence by atmospherics, so observations through a telescope will probably be best at lower powers, which will still reveal Venus' crescent phase very well.

As previously mentioned, the evening of the 20th will find Venus strung out in a vertical line with the Crescent Moon and Regulus, in Leo, with Mars and Mercury a little to the east and west of this, respectively. This will make for an interesting wide field view in the very early evening sky.



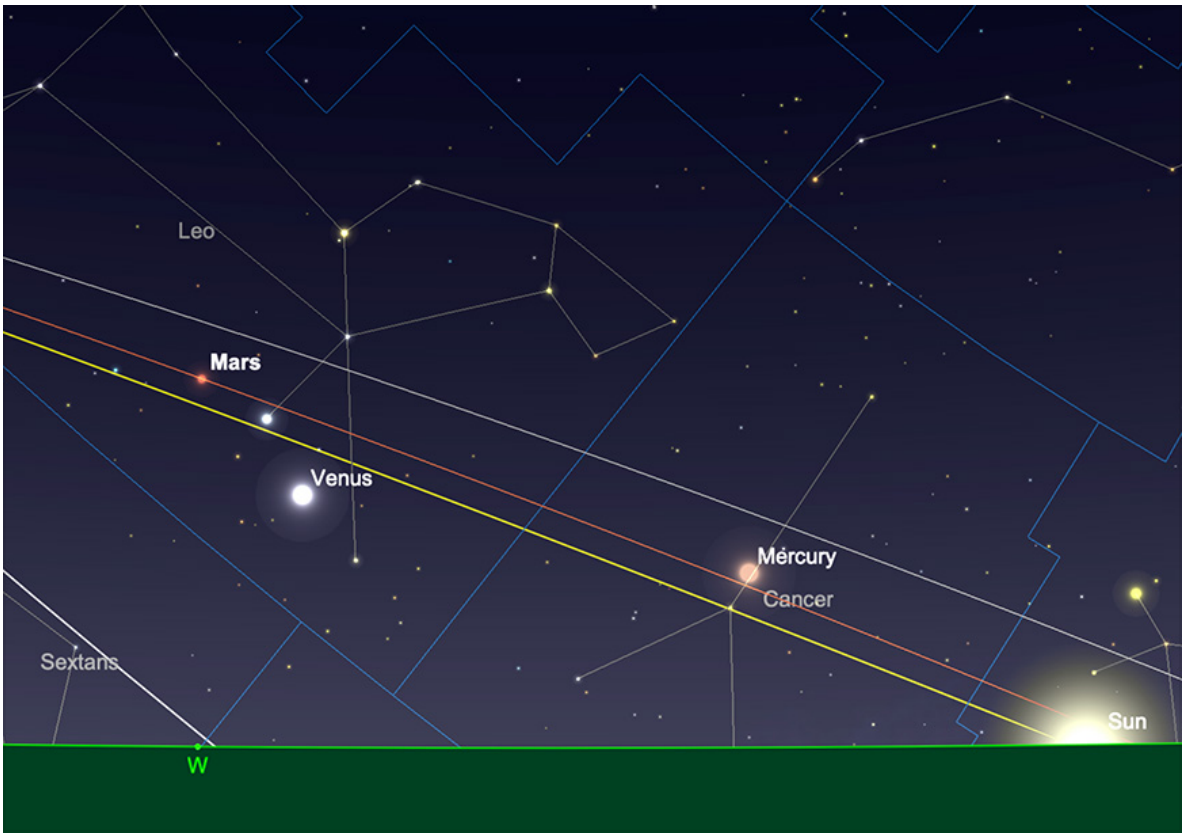
Venus, the Moon and Regulus, sunset, 20th July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

The last week inJuly will see Venus diminishing very slightly in brightness to -4.4 magnitude, though this will be indistinguishable to the naked eye. At 48 arc seconds diameter and 12.3% illuminated phase, it will stand just under 6 degrees high at sunset, making it quite a challenging target to observe in built up areas.

By the time we get to the 31st, Venus will be a comparatively enormous 53.4 arc seconds diameter and a tiny 5.7% illuminated crescent. By this point it will be -4.2 magnitude, it will be setting practically in line with the Sun from mid-northern latitudes, so whilst visible in daylight, will be a trickier target to observe at all. Those closer to the equatorial regions of the Earth will fare much better for longer with Venus, but for observers further north, this really signifies the end of this evening apparition's observing window. Inferior Conjunction of Venus occurs in mid-August. We have had a really fantastic observing window of our neighbour of late, but all good things much eventually come to an end.

Mars

As previously mentioned, Mars is a disappointing target at present. lurking in Leo, at just +1.7 magnitude at the month's beginning, the planet is just 4.2 arc seconds diameter and while handily signposted by the very bright Venus, will be an extremely dispiriting observing experience, in comparison.



Mars position in Leo, sunset, 15th July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com

As the month progresses, the trend is even further downwards - ending on the 31st with Mars just +1.8 mag and 3.9 arc seconds diameter. Amazingly, we are still over 3 1/2 months from superior conjunction at the end of July. Mars' increasing proximity to the Sun will make it more and more difficult to find in the sky and as we have previously advised, there are far better targets to observe at present.

Jupiter

The sky takes with one hand and gives with the other. As we are losing Venus and Mars, Jupiter is really coming to the fore in the morning sky. On July 1st, it is a steady -2.2 magnitude and 36.6 arc seconds in diameter. Standing just over 29 degrees high (as seen from 51 degrees N), in Aries, it will be a fantastic

sight in a telescope or binoculars just before the Sun comes up.

Jupiter comes together with the old Crescent Moon, early morning 12th July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com

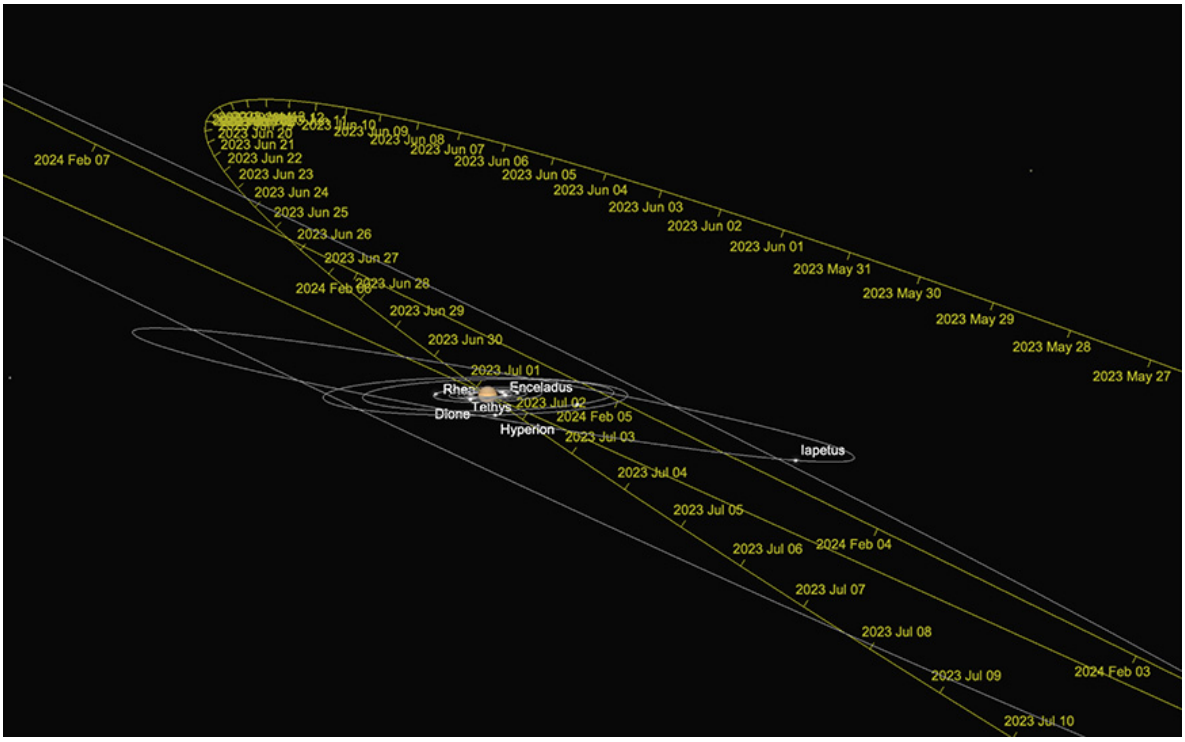
By mid month, Jupiter will have increased brightness imperceivably to -2.3 magnitude and will now display a 37.9 arc second diameter disk. The planet will now stand 38 degrees high (as seen from 51 degrees N) at sunrise - well over the point where seeing conditions tend to dramatically improve.

By the end of the month, Jupiter remains a static -2.4 magnitude in terms of brightness, but has increased in angular size to 39.7 arc seconds. It will now stand over 48 degrees high above the horizon as the Sun comes up. Given Jupiter's relatively recent switch to the northern celestial hemisphere, there are going to be increasing opportunities for these of us in the northern hemisphere to enjoy better views of the King of the Planets. Better times are rapidly coming for northern hemisphere Jovian observers.

Saturn

Saturn is further west in the ecliptic than Jupiter and has already transited by the time the Sun rises the 1st July. Standing just under 29 degrees in elevation

(as seen from 51 degrees N), the planet is currently in Aquarius, at +0.8 magnitude and 18 arc seconds diameter. Saturn is always a joy to look at in any telescope and like its neighbour Jupiter is slowly improving from a northern hemisphere observer's perspective. However, as the Ringed Planet orbits the Sun over three times slower than Jupiter, its improvements (or otherwise) tend to be a rather sedate affair. Saturn began its retrograde path (contrary to its normal "proper" motion in the sky) in late June, which means it is actually moving further south in the sky at present. This retrograde motion is caused by the effect of our planet catching Saturn up and the perspective of motion changing, rather than any real change of orbital direction. An outer planet going retrograde is always the precursor to opposition, which in Saturn's case will occur in late August. This ebb and flow of outer planet's direction of movement from our perspective on Earth is a fascinating by-product of our solar system's orbital dynamics and proof that we are truly inside an ever-changing, but predicable system.

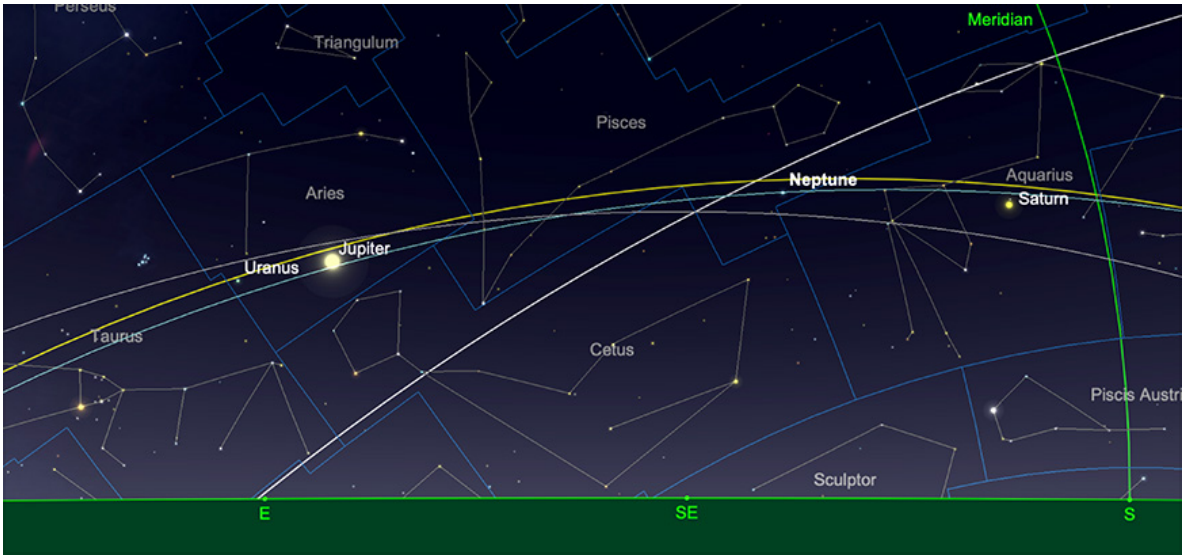


Saturn's retrograde motion during July 2023. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com

By the time we get to the end of July, Saturn has increased brightness to +0.6 magnitude and will display an 18.7 arc second diameter disc. It will now stand a little under 21 degrees high as the Sun rises.

Uranus and Neptune

Of the two outer gas giants, Neptune, at +7.9 magnitude and just 2.3 arc seconds diameter, sitting reasonably close to Saturn, in Pisces, is by far the better-placed for observing. However, the lighter nights at this time of year in the northern hemisphere do little for observations of Neptune - certainly in the first half of the month. By the time we get to the end of July, for those around 51 degrees N, the planet will have reached a respectable 30 degrees of elevation from the horizon, just before astronomical dawn, so the window for meaningful observations of Neptune is opening.



Uranus and Neptune position, 31st July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com

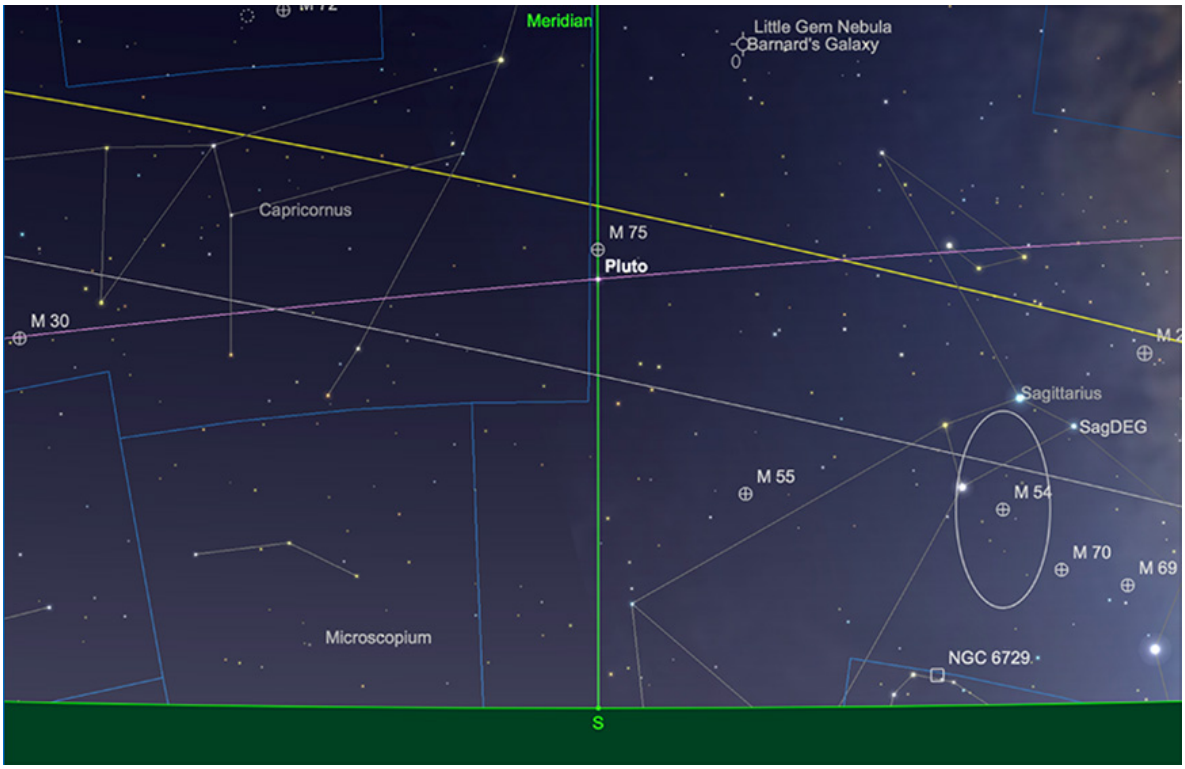
Uranus, is a resident of Aries is slowly re-emerging from May's recent Superior Conjunction and is still not well-placed for early morning observations at the beginning of the month. By the time we make it to the end of July, Uranus, at +5.8 mag and 3.5 arc seconds diameter, will have attained an altitude of around 20 degrees, just as astronomical dawn occurs (as seen from 51 degrees N). Although always brighter than Neptune, Uranus' current position in the sky is still not ideal - another month and the situation will change dramatically, which we'll cover in August's Sky Guide. The much brighter Jupiter, also an Aries resident, provides a handy guide for the area of sky Uranus can be found in.

Pluto

Pluto, now the best known of the family of dwarf planets which occupy our outer solar system, will reach Opposition on July 22nd. However, observing and positively identifying Pluto can be quite challenging and requires the use of appropriate equipment and favourable conditions. The task of locating Pluto is a pursuit that should be attempted occasionally, but not without the right

telescope and under suitable circumstances. Various factors can influence the observation of such a faint target, including sky conditions, darkness levels, the observer's eyesight, and their ability to adapt to darkness. However, the most critical factor is the aperture of the telescope.

From a technical standpoint, it is theoretically possible to visually observe Pluto at high magnification using an 8-inch reflector or a 5-inch refractor, provided the conditions are ideal. However, theory and practice often differ significantly. In practice, a telescope with at least 12 inches of aperture is typically necessary, in addition to clear skies and reliable sky charts. Ideally, a telescope with 14 to 16 inches of aperture makes the observation "easier." Nevertheless, even with such a telescope, spotting Pluto can still be challenging, particularly for observers in the northern hemisphere due to its low southern altitude. A more practical approach to track down and capture images of the dwarf planet involves using a smaller telescope for photographic recording, which may lack the romantic charm of direct visual observation but yields better results.



Pluto’s position, opposition night, 22nd July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com

Comets

There are no comets brighter than the 10th magnitude visible at present. C/2021 S3 (PANSTARRS) *may* reach 5th/6th magnitude early next year and could

become a reasonable binocular target and there is also C/2023 A3 to come, but as previously reported, this is still a large distance from the inner solar system and will require further observations to determine if it will develop into something notable. We must bide our time, for now.

Meteor Showers

The month of August holds the crown for the most spectacular meteor displays of the summer, with the peak of the ever-reliable Perseids. However, the Perseid shower actually begins in late July, so it's worthwhile to keep an eye out for some early participants in this year's event towards the end of the month. Unfortunately, the influence of the Moon, nearing Full in late July, will have quite an impact - creating conditions that are not ideal for meteor watching. Another notable shower, the Delta Aquariids, reaches its maximum on the night of July 28th/29th and is considered the major meteor shower for July. While the Moon will be lurking in Scorpius during the night of the 28th/29th, it will have set by just before 1am and this will leave the sky free of moonlight, during the early hours of the morning when the radiant is at its highest in the sky from the northern hemisphere.

Traditionally, the Delta Aquariids shower favours observers in the southern hemisphere to some extent, but it can still be seen from various parts of the world. It's important to note that while the radiant of the shower is located in Aquarius, meteors from the Delta Aquariids can be spotted anywhere in the sky. The best time to view them is after midnight. These meteors have a relatively slower speed, averaging around 41 km/25 miles per second. Consequently, they are not as energetic and bright as some other meteor showers. Nevertheless, the Delta Aquariids are generally reliable and actually represent the more active of the two Delta Aquariid showers (the northern equivalent is less active and peaks in mid-August). The Delta Aquariids originate from Comet 96/P Macholtz, a short-period comet that will next reach perihelion in January 2023. In 2012, observations indicated that a couple of smaller fragments of the comet had detached from the main body, potentially leading to an increase in the Zenithal Hourly Rates of the meteor shower. Currently, the Zenithal Hourly Rates stand at around 15-20 meteors per hour. To capture the shower effectively, the recommended method is to use multiple widefield images. Utilizing a DSLR with a widefield lens or a USB imager with an "All Sky" super-widefield lens would be ideal for this purpose. However, it's worth mentioning that while observing the Delta Aquariids, you are just as likely to witness an early Perseid meteor. By tracing the path of a specific meteor, you can accurately identify the radiant it originated from.

Deep Sky Delights in Sagittarius, Serpens Cauda and Scutum

This month we visit a very rich area of the heavens: Sagittarius, the eastern part of Serpens (Serpens Cauda - the tail of the serpent) and the compact but notable constellation of Scutum, the Shield.

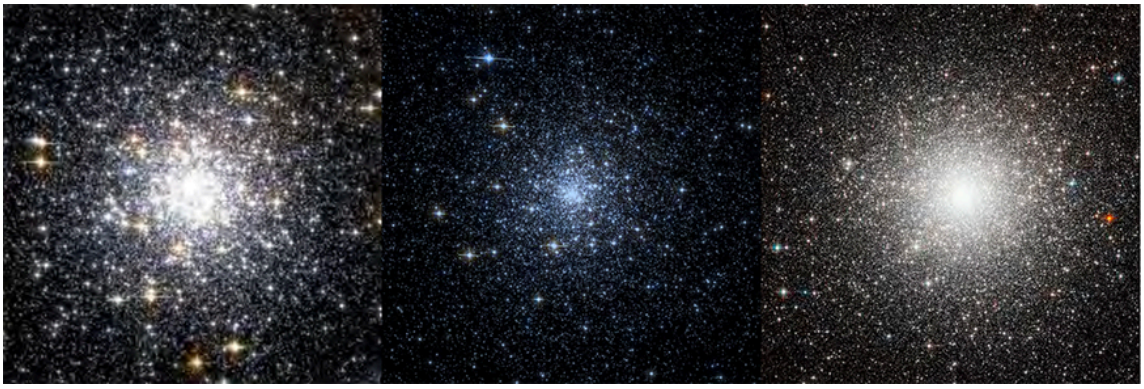
Sagittarius, Serpens Cauda and Scutum. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., .com.

We start in Sagittarius with a chain of globular clusters, which are practically as low as one can observe from UK latitudes - though the further south you find yourself, naturally the better you can see them. Northern temperate observers have to contend with atmospherics in order to make any meaningful observations of these objects - naturally, it almost goes without saying that having a clear southerly horizon is a must! These are difficult objects from the UK, but rewarding to identify.

Messiers 69, 70 and 54 are strung out in a line running between Kaus Australis , Epsilon Sagittarii and Ascella, Zeta Sagittarii, Sagittarius' first and third

brightest stars respectively - the line representing the base of Sagittarius'"Teapot" asterism M69 is the most westerly and is +7.69 mag and 1.7 arc minutes diameter.

It was discovered, along with its neighbour M70 on the same night, August 31st 1780, by Messier. This is within reach of decent binoculars, though begin compact and not especially bright will require a larger telescope to resolve individual stars. The same can be said of M70, to be found 2 1/2 degrees to the east, though it is a little fainter at +7.86 mag and somewhat more compact at 1.4 arc minutes diameter. M54 is found just over three degrees to the NW of M70 and was discovered a little earlier by Messier in 1778. It can be more easily located by working back from Ascella by 1 3/4 degrees to the west. M54 is the brightest of this globular chain at +7.59 and is 1.6 arc minutes in diameter. M54's appearance is very smooth and uniform and it is very difficult to resolve into individual stars, even in larger instruments. M54 is a bit of a mist in regards to its neighbours, which are both around 29,000 light years away from Earth. In comparison, M54 is around 86,000 light years away and rapidly receding from us. It was discovered in 1994 that M54 is not a member of the Milky Way's globular family. Instead it is associated with the Sagittarius Dwarf Galaxy, a satellite attendant galaxy of the Milky Way. M54 lies right in the middle of the Sagittarius Dwarf from our perspective - though the galaxy itself is very difficult to detect. Although +4.50 mag, this galaxy is spread out over a huge area of sky - a colossal 447 x 214 arc minutes! This is the reason it remained undetected for so long. M54 is huge and extremely luminous - running a close second to Omega Centauri in terms of size and brightness. It is practically the only globular one can easily observe and say with certainty that it does not belong to our galaxy - so worthwhile looking out for.



Left to Right: M69, M70, M54. Image credit: Hubble - NASA/ESA. Public domain/creative commons

9 2/3 degrees to the west of M54 lies another globular, M55. M55 is much brighter than the members of the "chain" at +6.32 mag and considerably larger at 5.7 arc minutes across. Reported by Nicholas Louis de Lacaille to Messier, after the former observed it on his 1752 trip to South Africa, Messier recovered

it in 1778. At roughly 2/3rds the diameter of the Full Moon, M54 is big. Subsequently, even in binoculars, M54 appears granular and it is very easy to resolve its individual stars in a telescope. At 17-18,000 light years distance it is one of our nearest globular neighbours and a rewarding sight - if you can find it from your particular location. From 51 degrees N, this globular stands a maximum of 7 3/4 degrees high of the horizon at point of transit, so, like all the aforementioned globulars is a challenge to observe.

Left to Right: M55, M75, M22. Image credit: ESO, Hubble - NASA/ESA. Public domain/creative commons

11 degrees to the E of M55, lies another Messier globular, M75. Much more compact and fainter then its neighbour, M75 is +8.52 mag and 0.9 arc minutes across and is to be found around 68,000 light years away - on the opposing side of the Milky Way's core to our part of the galaxy. Although fainter than many globulars, M75's core is condensed and while you won't be able to resolve individual stars in binoculars, telescopically at high power, it does reveal granulation. M75 was discovered in August 1780 by Messier's collaborator, Pierre Mechain and confirmed by Messier a little while afterwards in the same year. Sir William Herschel found it in 1784 and was moved to describe it as a "miniature of M3 [the prominent globular in Canes Venatici] ". Although nowhere near as spectacular as the lovely M3, who are we to disagree with Herschel?

Moving back westwards from M75, past Nunki, Simga Sagittarii, the second brightest star in the constellation (marking the top of the handle of the "Teapot"), we come the jewel of the Sagittarian globulars, the lovely M22. At +5.09 mag, this cluster outshines all the others in its class, bar Omega Centauri and 47 Tucanae. Lying on the plane of the Milky Way means this cluster is probably not as well-de ned and noticeable in its particular location as it would be were it in another, darker part of the sky. However, an observer can still make out M22 from a dark location with the naked eye. Through a telescope or binoculars it is stunning - an elliptical blizzard of stars, easily resolved in all types of optics, though it is true that its core is not particularly well-condensed. At 6.7 arc minutes across, M22 is larger than most globulars, including 47

Tucanae. Only the massive Omega Centauri, at 10 arc minutes across is appreciably bigger.

M22 may have been recorded by Hevelius, but its discovery is normally credited to the 17th century German Astronomer Abraham Ihle, who first reported it in 1665. Halley included it as part of his 6 nebulous objects of 1715. Messier found and cataloged M22 on June 5th 1764.

The reason for M22's comparative brightness has nothing to do with its physical dimensions - at 97 light years diameter and 210,000 solar masses, it is quite average. M22 is so bright and large because it is close to us as globulars go - around 10,000 light years from Earth.

2 1/2 degrees from M22 to the SW is the star Kaus Borealis, Lambda Sagittarii. This star marks the tip of the "Teapot's" lid and also provides a useful star hopping point for the next globular Sagittarius has on offer - M28. This globular can be found a little under a degree to the west of Kaus Borealis. M28 is a little less bright and large than its neighbour, but is a lovely object in its own right. At +6.78 and just under 4 arc minutes diameter, M28 lurks on the very limit of human naked eye resolution. By all means attempt to find it without binoculars or telescope, but you will need a very, very dark location and good night adaption in order to make the attempt. However, in binoculars and telescopes, M28 really delivers. More compact and condensed than M22, M28 has a distinct core, surrounded by a halo of looser granular stars. Binoculars will pick up this granularity, but won't resolve individual stars - a larger telescope (probably 8-inches +) will.

M28 was discovered by messier at some point in July 1764, a month after its neighbour M22. It is now known to lie some 18,000 light years away from us and be around 60 light years in diameter. Again, like M22, M28 is a cluster well worth seeking out.

M28. Image credit: Hubble - NASA/ESA. Public domain.

We now take a break from the delights of globular clusters for a little while to explore one of the best parts of the sky for nebulae - the heart of the Sagittarius Milky Way.

Moving westwards from M28, by 4 3/4 degrees, we arrive at the fabulous Lagoon Nebula, M8. At 4300 Light Years distance, the Lagoon appears as a titanic object n our skies. It is a degree and a half in length and over half a degree wide – roughly three full Moon's width by a Moon's width – comparable in area to the Orion Nebula M42/M43 complex, though not quite as bright. Still at +6 mag it is an easy object in large binoculars and small telescopes, though at a maximum of 14 ½ degrees above the horizon at its highest for the UK, it can be a tricky object for those without a clear southern horizon. The Lagoon is so prominent, it was first cataloged by the telescopic observer Giovanni Battista Hodierna in or slightly before 1654. It was also noted by English Astronomer Royal John Flamstead around 1680 and French Astronomers de Cheseaux and Le Gentil in 1747 and 1748 respectively. Messier cataloged the Lagoon in 1764, noting both the cluster that lies within the nebula and the nebulosity.

The Lagoon is home to numerous young stars and the Hourglass section of its interior is actively observed to be in the process of stellar formation. It is these stars that cause the nebula to glow its distinctive pink colour, which make the Lagoon another very attractive target for astrophotographers.

The Trifid Nebula and The Lagoon Nebula. Image Credit: Ljubinko Jovanovic. Creative Commons.

1 1⁄2 degrees north of the Lagoon lies the magnificent Trifid Nebula, or M20. This is one of the best deep sky objects in the sky to observe and can be easily found in binoculars and telescopes. At +6.30 mag and half a degree across, the Trifid is an impressive sight. Progressively larger instruments will show the dark lanes that trisect this object and a UHC filter will also help isolate the lanes and enhance the brighter HII regions. It was the trisecting pattern of dark material that gave rise to the Trifid's popular name. John Herschel was the first to describe it as such and the name stuck, though it was first discovered by the French observer Le Gentil in 1750 and later cataloged by Charles Messier, if he rediscovered it on June 5th 1764. Located around 5000 Light Years from us, the Trifid is the stellar nursery for a number of stars which also illuminate the bright blue reflection nebula to the North of the object's edge. The beautiful range of colours in this target and the starkness of the dark lanes gives M20 an amazing three-dimensionality and makes it a perennial subject for astrophotography. As M20 and M8 lie so close together in the sky, they make for a fantastic pairing in wider eld images. It is thought that the Trifid and the

Lagoon are both constituent parts of a much larger molecular cloud (much as the separate components of the Orion Nebula are), though the Trifid lies a little further from us and is potentially somewhat younger - current estimates put it at around 300,000 years old, which would make it around 10 light years across.

2/3 of a degree to the NE of the Triffid, sits the open cluster M21. At +5.90 mag and 14 arc minutes across, M21 is fairly prominent and can normally be found in the same binocular eld as its neighbour. Containing upwards of 50 stars, this cluster is thought to lie around 4000 light years away - somewhat closer than its neighbour and due to the spectral signature of its stars is assumed to be around 4-5 million years old.

Just under 4 degrees to the NW of M21 sits yet another Messier object - the lovely open cluster M23. A little brighter than M21, M23 is +5.5 mag and is twice the diameter at 29 arc minutes wide and a glorious sight in telescopes and binoculars. This cluster is practically the same width in the sky as the Full Moon and its brightest members form a fan shape in its central region. M23 lies around 2000 light years from our solar system and is thought to be around 20 light years in diameter. It is a little older than its neighbour as spectral data reveals the oldest of its stars to be around 300 million years of age.

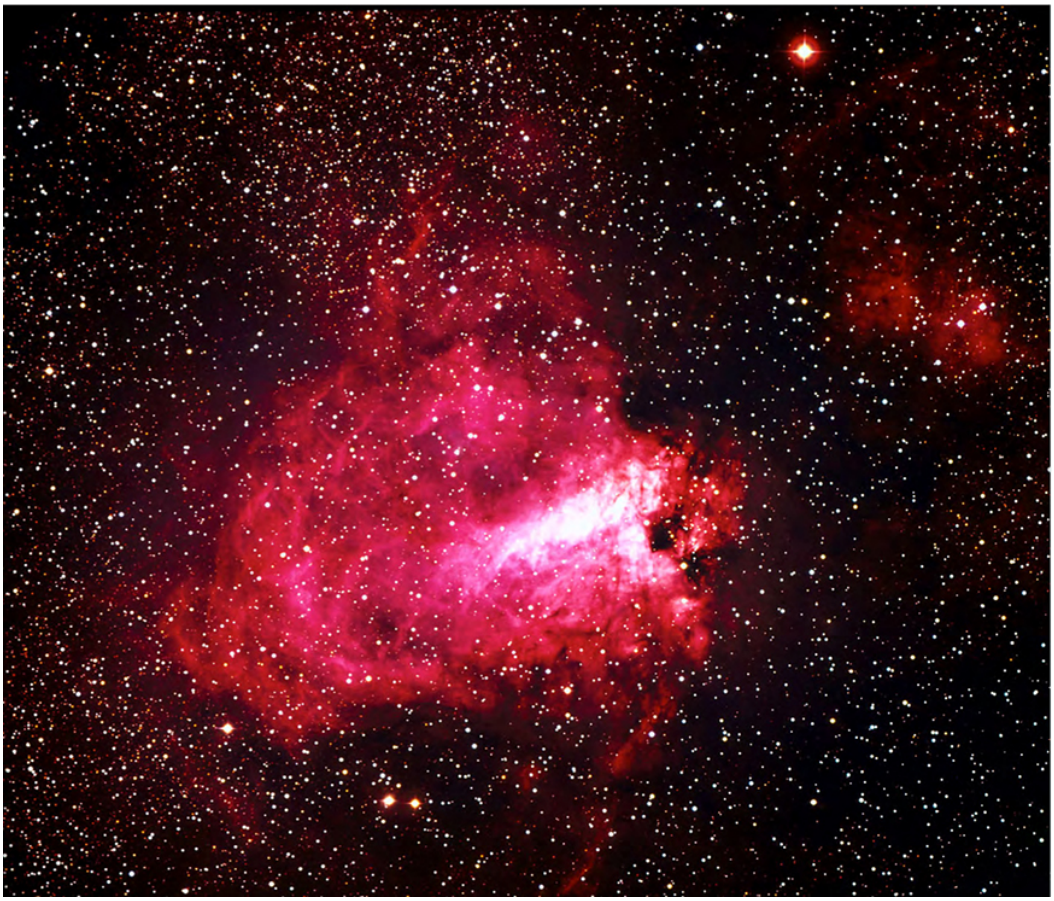
Drifting eastwards, about equidistant from M23 on the other side of the +3.8 mag star Polis, Mu Sagittarii, we come to yet another of Sagittarius' fine clusters, M25. Discovered by de Cheseaux in 1746, M25 was independently rediscovered by Messier in 1764. It is bright at +4.59 mag and an easy target for those with binoculars and small telescopes. At 29 arc minutes diameter, it is the same dimensions in the sky as M23, though a little more concentrated in brightness. There are under 40 easily observable stars in M25, though there are many more - up to 600 - in the cluster as a whole. Some of the brighter members of the cluster form a star chain that appears to be akin to the letter W on its side - or maybe more pertinently, the Sigma sign. This can be seen easily through telescopes at moderate power. As M25 contains G class giant stars, this suggests that the cluster is around the 90 million year old mark and the cluster is thought to lie similar distance from us as M23 - around 2000 light years.

Crossing back westwards from M25, back in the direction of Polis, we come to another Messier target - M24. This object is often known as the Sagittarius Star Cloud, as it represents one of the brightest parts of the Milky Way in this any of the sky. Describing M24 as "a large nebula, containing many stars" Messier listed M24 with dimensions of 1.5 degrees across. Although a fainter cluster, NGC6603 is contained within these boundaries, it is clear from Messier's description that this is not what he was cataloging. Easily seen in binoculars and wide eld telescopes, M24 represents the truncated end of the Sagittarius-Carina Arm of our galaxy - the arm adjacent to the Orion-Cygnus Spur which our solar system sits in. A gap in the surrounding dust clouds frame this area and this void allows M24 to appear particularly bright from our location -

though this is simply a line of sight effect. Binoculars reveal a huge number of stars within this area - over 1000 visible in such a small area. Although strictly speaking not a nebula or a star cluster, M24 is a very interesting area of sky to examine and is well worth tracking down.

Found 1 1/3 degrees north of the Sagittarius Star Cloud is M18 - though at +7 mag and loose conformation, it is one of the less exciting of the Messier list in this part of the sky. This open cluster contains around 30 visible members spread over a 5 arc minute field and is thought to be around 4-5000 light years away. A comparatively young cluster at around 30 million years of age, M18 is about 17 light years in diameter. Long duration astrophotography reveals faint nebulosity surrounding this cluster - whether this is the remnants of the nebula the cluster formed from or material it is encountering in its way around the galaxy is still the matter for debate.

Lying 1 1/4 degrees to the N of M18 is the final object of note we shall be covering in Sagittarius - and what a way to end. The Omega Nebula, otherwise known as the Swan, Lobster or Horseshoe (take your pick)
or more properly, M17, is a bright nebula of +6 magnitude and a healthy 46 x 37 arc minutes in size. This object is capable of being resolved by the naked eye under ideal conditions (rarely from the UK due to atmospherics), but is easily picked up in binoculars and marvellous in telescopes of all sizes. Discovered by de Cheseaux in early 1746, Messier discovered it independently in 1764.

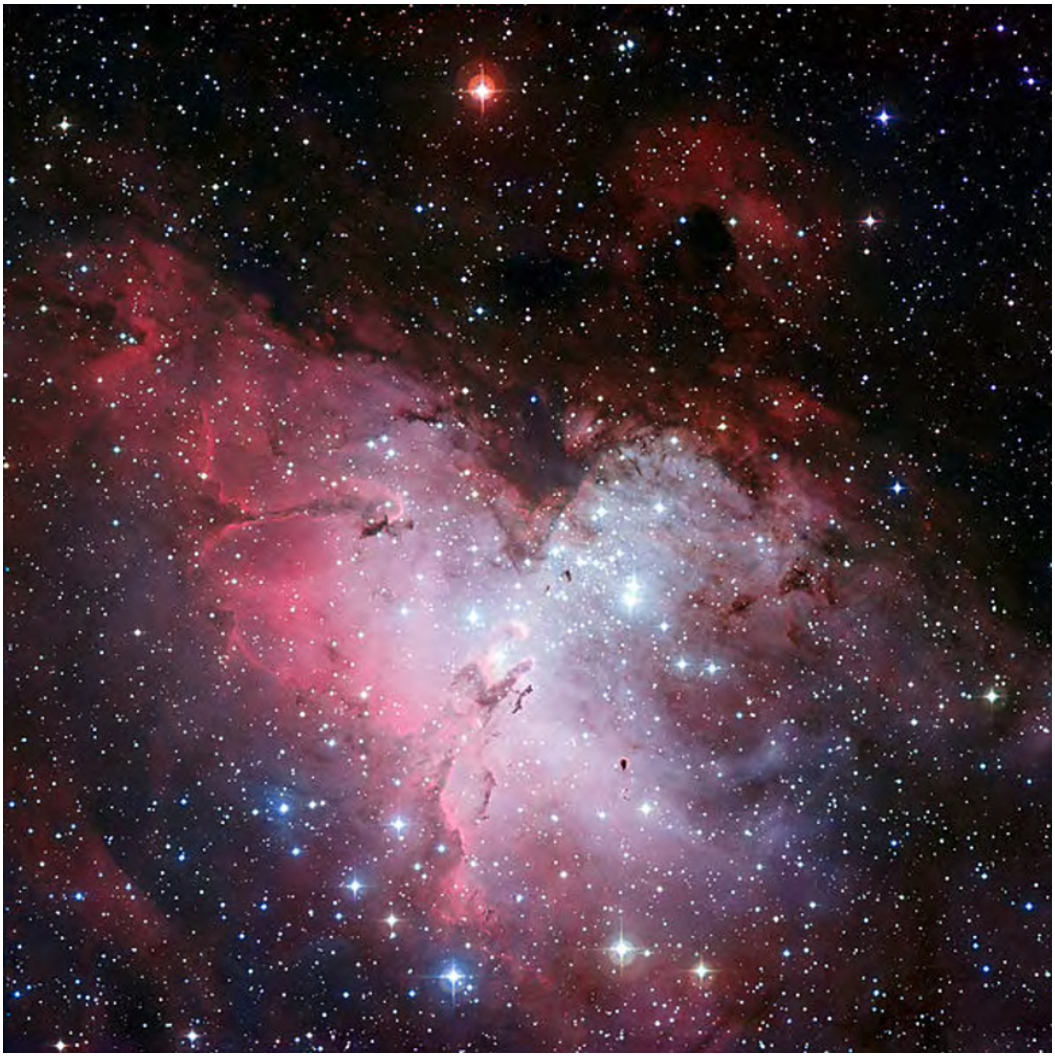


The Omega Nebula. Image Credit: ESO. Creative Commons.

While not as extensive as the Orion Nebula, M42, M17 has a brightly condensed core and as such is arguably the second most prominent emission nebula in the sky. A telescope will reveal the looped structure of the gas clouds against which are silhouetted dark clouds of material, which causes the distinctly swan like shape. The looped area of the “neck” of the Swan is what gave rise to the Omega and Horseshoe nicknames - as this section does resemble the Greek letter, or indeed the shoe of a horse. The Lobster nickname comes from the tail-like section of the nebula - the opposing end to the swan’s neck - and the red-pink colour of the nebula revealed in long duration astrophotography. The glowing gas clouds of this nebula are powered by newly-formed stars hiding in its interior. These massive stars can’t be seen optically, but studies of the nebula at other wavelengths have revealed their presence. These stars are big and extremely luminous - it is estimated they are anything up to 30 times the mass of the Sun and 6 times hotter. It is estimated there is enough material left in the Omega Nebula to form up to 800 stars the mass of the Sun - a much higher number than that the Orion Nebula is capable of producing.
M17 is thought to lie around 5-6000 light years from us.

Leaving Sagittarius, we briefly cross over its northern border into the constellation of Serpens Cauda - the tail of Serpens. Just under 2 1/2 degrees to the north of M17 sits a magnificent 35 x 28 arc minute target: this object is

the +6.40 mag star cluster and nebula, M16 – otherwise known as the Eagle Nebula. Made famous by the famous “Pillars of Creation” Hubble Space Telescope picture, this object is well seen in all kinds of telescope, but the larger the instrument, naturally, the more you can see of it! The star cluster formed from the surrounding nebulosity, which can be glimpsed in a sub-6-inch telescope. An instrument of the class of a 12-inch+ Dobsonian will be needed to see the “Pillars” and OIII or UHC-type filter will help considerably with this. Photographically, the Eagle Nebula is a fantastic subject. Amateur CCD images of the nebula may lack the resolution of the Hubble image, but can reveal a surprising amount of equivalent detail.



The Eagle Nebula. Image Credit: ESO. Creative Commons.

The Eagle was discovered by de Cheseaux in 1745 or 46 - though he simply listed the star cluster as the point of focus. Messier, independently recovering it nearly 20 years later in 1764, not only mentions the star cluster, but also the impression that the stars within it we “enmeshed in a faint glow” - a clear sign that nebulosity was evident to him in his observations. Certainly the nebulous regions of M16 start to be visible in a telescope of around 8-inches of aperture, but as previously mentioned, 12-inches of aperture will be needed to start

making out structure within the nebula itself.
Modern astrometry puts the Eagle at about 7000 light years from our neck of the cosmic woods - similar in distance to the aforementioned Omega Nebula. Some theorists postulate that the two objects may be linked by the same molecular cloud and form two parts of a constituent whole. Certainly, there can be little doubt that they both lie in the same part of our galaxy - the Sagittarius-Carina spiral arm, but re they more closely related?

The age of the stars in the cluster seem to suggest that the M16's stellar population itself is around 5.5 million years old. Some astronomers have pointed out that while the "Pillars of Creation" area of the Eagle Nebula is prominent from our perspective today, that stellar compression by cosmic wind and the sheer luminance of the newly formed stars has probably already eroded these completely - in 7000 years-or-so, we'll find out if this is actually true!

Moving NE of the Omega Nebula complex, we come to the diminutive constellation of Scutum, The Shield. Scutum contains two objects of note, both open star clusters, the fainter M26 and the magnificent M11, or Wild Duck Cluster. M26 is 9 degrees NE of the Omega Nebula and at +8.00 mag and 7 arc minutes in diameter is not the brightest, nor largest cluster in the area. This is largely thought to be the result of interstellar matter obscuring part of the cluster - a reasonable common occurrence for objects located on or near the plane of our galaxy. If this material was not present it is likely M26 would appear much bigger and brighter than it does to us. Binoculars will pick it out and small telescopes will show its 30-or-so members well. Messier found M26 on the night of 20th June 1764 and reportedly was rather underwhelmed by its appearance - "not distinguished in a 3 1.2 foot [focal length] telescope and needed a better instrument", he wrote in his description.

M26 is thought to lie around 5000 light years away.

M26's neighbour, M11 is to be found just under 3.5 degrees to the NE. Whereas M26 is rather diminutive, the Wild Duck Cluster, as it is commonly known, is a lovely, rich object of +5.80 mag and 32 arc minutes across. The major part of the cluster takes up an area roughly a third of the diameter of the Moon, making it a prominent feature in this area of sky. M11 was discovered in 1681 by German Astronomer Gottfried Kirsch and included as an original Messier object in 1764. It was the noted observer Admiral Smyth who first suggested the "Wild Duck" moniker - describing the fan shaped structure as resembling "a flight of wild ducks". If examined in a telescope or larger binoculars, the "V" shape of the cluster seems to point in an Easterly direction, though it is not particularly well defined. M11 is supposed to be about 250 million years old and thought to be around 6000 light years distance. Its total of stars is thought to number just shy of 3000, though only 500 of which will be visible to amateur telescopes. It is not an object that should be missed in any type of instrument.

The Wild Duck Cluster. Image Credit: ESO. Creative Commons.

Original text: Kerin Smith