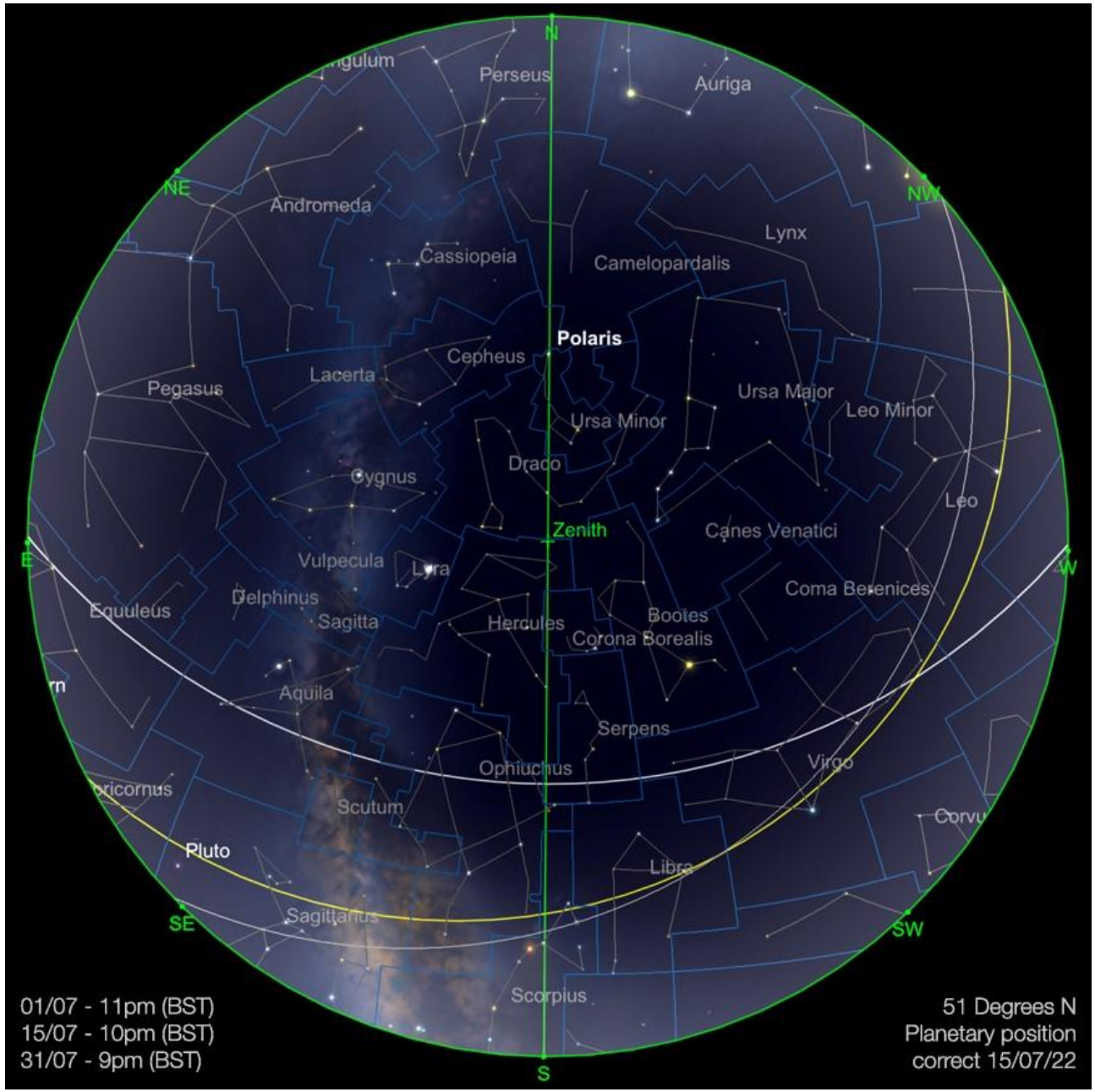

N
Perseus
Auriga
NE
NW
Andromeda
Lynx
Cassiopeia
Camelopardalis
Polaris
Cepheus
Lacerta
Pegasus
Ursa Major
Leo Minor
Ursa Minor
Draco
Cygnus
Leo
Zenith
Canes Venatici
E
W
Vulpecula
Lyra
Coma Berenices
Delphinus
Equuleus
Sagitta
Hercules
Bootes
Corona Borealis
Aquila
Serpens
Ophiuchus
Virgo
Scutum
Pluto
Libra
SE
SW
Scorpius
S
01/07 - 11pm (BST)
15/07 - 10pm (BST)
31/07 - 9pm (BST)
51 Degrees N
Planetary position
correct 15/07/22

Telescope House Sky Guide July 2022

For those of us in the Northern Hemisphere, we are now past Midsummer and the nights are progressively drawing in again. However, for many mid-northern latitude locations, true astronomical darkness won't return until early August. Although true darkness is vital for deep sky astrophotography and observations of very faint targets, there are still many interesting observations to make throughout the month, even in conditions permanent astronomical twilight. Solar system observations (with the exception of those made of fainter outlying members) aren't really affected in the same way by lighter sky conditions. While almost the entirety of the solar system's major members are currently lined up in the morning sky, you'll have to be up early to get the best views, though weather conditions - temperatures especially - are generally more clement at this time of year and will be the source of some comfort. Naturally, those in the southern reaches of our planet are just past Midwinter, so the same cannot be said for all locations. But wherever you are in the world, there's plenty to see this month in the skies about us...

The Solar System

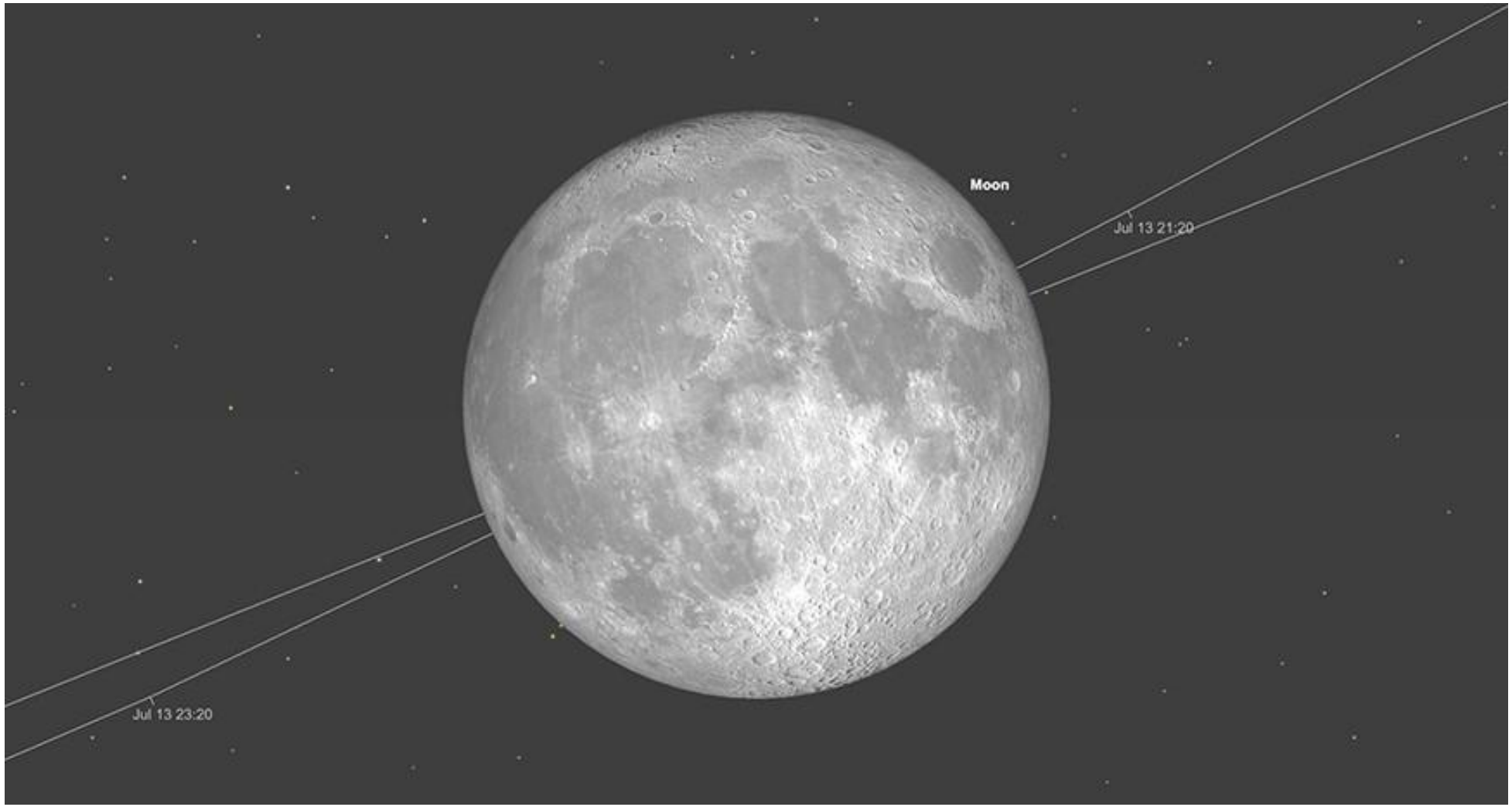
The Moon

We are currently in one of those periods where the Moon and its phases align roughly with the beginning and end of the calendar month. Subsequently, we start July with the Moon in Cancer at just two days old, showing a 6.6% illuminated Crescent. The Moon will stand around 16 1/2° in altitude (from 51° north) in the west on the evening of the 1st, though being so slim a crescent, you will need clear skies and a clear horizon to be able to observe it.

We are currently lacking any solar system activity in the evening skies, with most of the major planets being exclusively morning objects, or in the case of Saturn and Jupiter, certainly much better observed in the morning skies (despite rising in the late evening). Thus, the Moon is very much on its own in the evenings, during July. The first week of July will see the Moon move through Cancer, Leo, and on into Virgo, where it will reach first quarter phase on July 7th.

The second week of July will see the Moon drifting slowly through the southern part of ecliptic, through the constellations of Libra, Scorpius, Ophiuchus and Sagittarius. It is in Sagittarius on the evening of 13th July, that the Moon will become Full. 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 Earth, on its 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. As we've covered before in previous sky guides, Full Moon is actually one of the most disappointing times to 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.



The Full Moon, shortly after rising, 10pm (BST), 13th July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

After reaching Full, the Moon starts to climb up northwards within the ecliptic plane, first navigating through the constellation of Capricornus, where it meets the planet Saturn in reasonably close conjunction on the evening of the 15th and the morning of the 16th of July. On the 19th, after passing through Aquarius, the Moon meets Jupiter in the non-Zodical constellation of Cetus the Whale. A day later, the Moon reaches last quarter phase in Pisces.

On the 21st of July, Mars will be accounted by the Moon. Unfortunately for those of us in Europe, Africa and the Americas, this will only be visible from The North Eastern of Asia and Southern Japan. The following evening, Uranus will be occulted by the Moon, but this will only be visible from eastern South America and north-west Africa.

During the latter part of July, the Moon passes through Aries, Taurus and on into Gemini. Here it will meet the planet Venus, on the morning of July 26th. However, at this point the Moon will only be 5.7% illuminated and will require decent seeing conditions and a clear easterly horizon to observe. The last few days of July see the Moon come to New phase on the 28th, when it joins the Sun in Cancer and then becomes a slim evening crescent in Leo on the evenings of the 30th and 31st. It will be the end and beginning of the month that will favour the deep sky observer (or indeed those astrophotographers out there) - though naturally, this has to be tempered somewhat by the lack of true astronomical darkness for observers in higher northern latitudes at this time of year.

Mercury

The innermost planet starts July in a reasonably favourable position for observation in the mornings. On 1st July, Mercury can be found in Taurus, displaying a -0.7 magnitude, 72% illuminated disc, of around 6 arc seconds in diameter. Standing at just over 8° high as the Sun rises, Mercury should be fairly straightforward to pick out in the dawn sky, for those with binoculars and possibly even naked eye observers, if sky conditions are kind.


Auriga
Taurus
Venus
Mercury
Sun
NE

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

Mercury is heading back towards the Sun, as viewed from our perspective here on Earth. As a result, the next couple of weeks find Mercury becoming progressively more difficult to observe, as it gets closer to the Sun‘s disk and lost in the glare of the morning sky. Mercury reaches superior conjunction - the opposite side of the Sun from Earth - on July 16th. After this point, the planet will re-emerge as an evening target, though it will be the latter part of the month before separation from the Sun has become large enough to make it observable again.

We end of July with Mercury having reached a magnitude of -0.6 and displaying an 86% illuminated, 5.3 arc second diameter disc. The planet stands just below 6° high in the west (from 51° north) on the evening of the 31st.

Venus

Venus is to be found in a similar area of the sky to Mercury at the beginning of July. The planet is also a resident of Taurus, though further west in the sky then its neighbour, will rise earlier and appear higher in the sky at sunrise. Venus displays a -3.9 magnitude, 86% illuminated disc, with an apparent size of just under 12 arc seconds on the morning of the 1st. The planet will be separated from the horizon by about 15° at sunrise (from 51° north) at the beginning of the month.

Although Venus, like Mercury at present, is travelling back towards the Sun from our perspective here on Earth, it takes a lot longer to do this than its neighbour. Subsequently, as July continues, not much changes as far as Venus is concerned. By mid- July, Venus is still -3.9 magnitude and although it has shrunk very slightly to an apparent size of 11.3 arc seconds, has expanded a little in phase from the month’s beginning, which means its brightness stays static. As the planet is now approaching the most northerly part of the ecliptic, Venus’ height at sunrise actually increases a little from the month’s beginning, on the 15th it can be found 16° above the horizon at sunrise in the east (again, from 51° north).

Venus at sunrise, July 15th. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

By the end of the month, Venus is a resident of Gemini and is still -3.9 magnitude, though it is decreased in diameter to 10.8 arc seconds. However this decrease in diameter has also come with an increase in phase to 92.4% elimination, meaning the actual illuminated surface

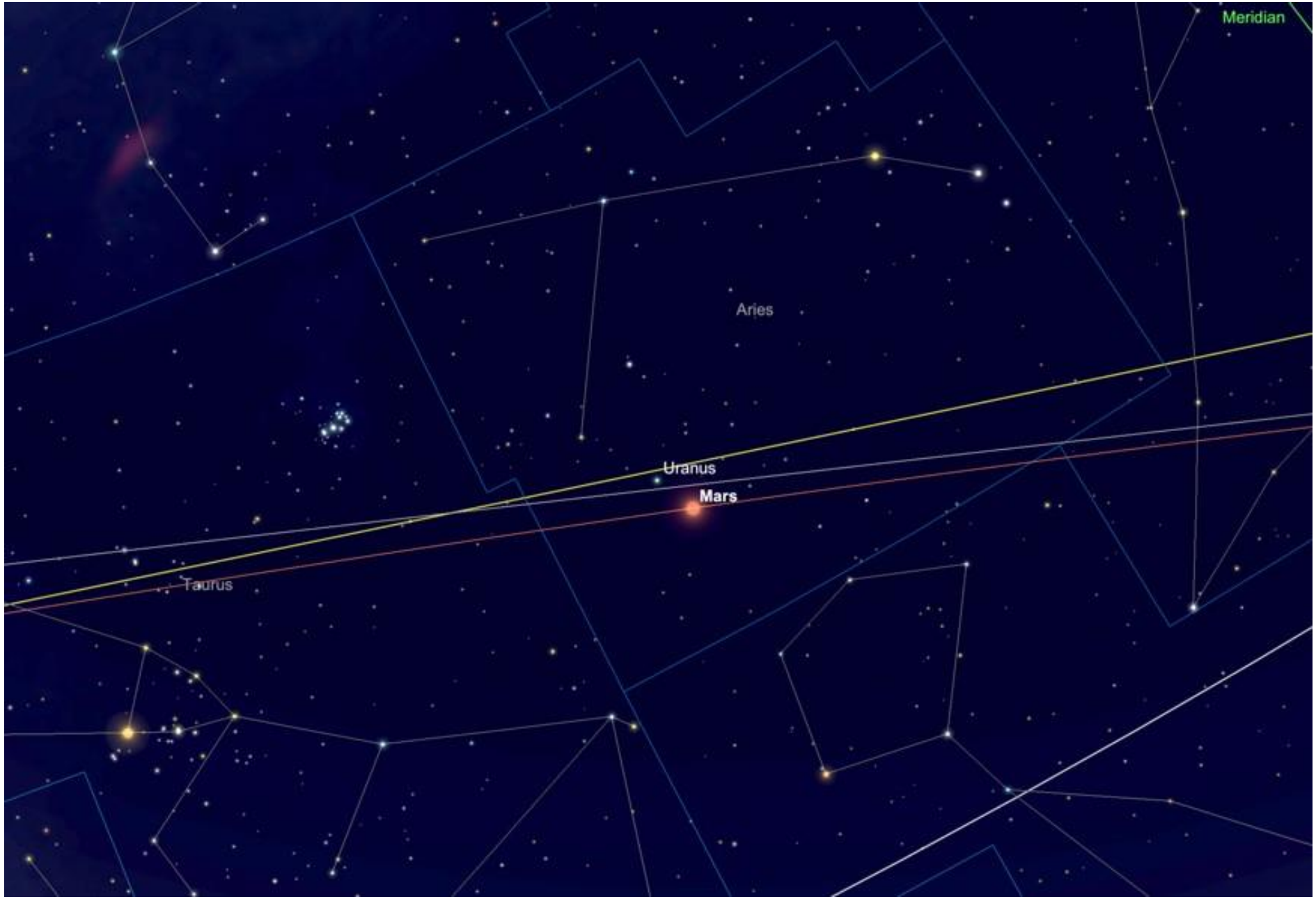
area of the planet has not changed dramatically since the months beginning - hence the static nature of Venus' brightness, during July. It will be found at just under 16° elevation in the east, as the Sun rises (again, as observed from 51° north).

Mars

The Red Planet is still far from its best at the beginning of July, but has improved quite dramatically from even a relatively short period of time ago. On the morning of the 1st, Mars, a resident of Pisces, will rise at just after 1:30 am. It will display 7.2 arc second diameter desk, shining as a steady, if unspectacular, +0.5 magnitude. It will have reached an altitude of just over 32° elevation in the south-east at dawn (from 51° north).

By mid-month, Mars will have moved into the neighbouring constellation of Aries and will now display a +0.3 magnitude, 7.7 arc second diameter disc. At sunrise, it will stand 39° high in the south-east. As previously reported, the Moon occults Mars on the 21st July, though this will be unobservable for most of our planet.

But the end of the month Mars has increased brightness again to +0.2 magnitude and is now displaying an 8.2 arc second diameter disc. It will be very close to the outer planet Uranus on the morning of the 31st, with the much brighter Mars acting as a signpost for the fainter outer world.


Meridian
Aries
Uranus
Mars
Taurus

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

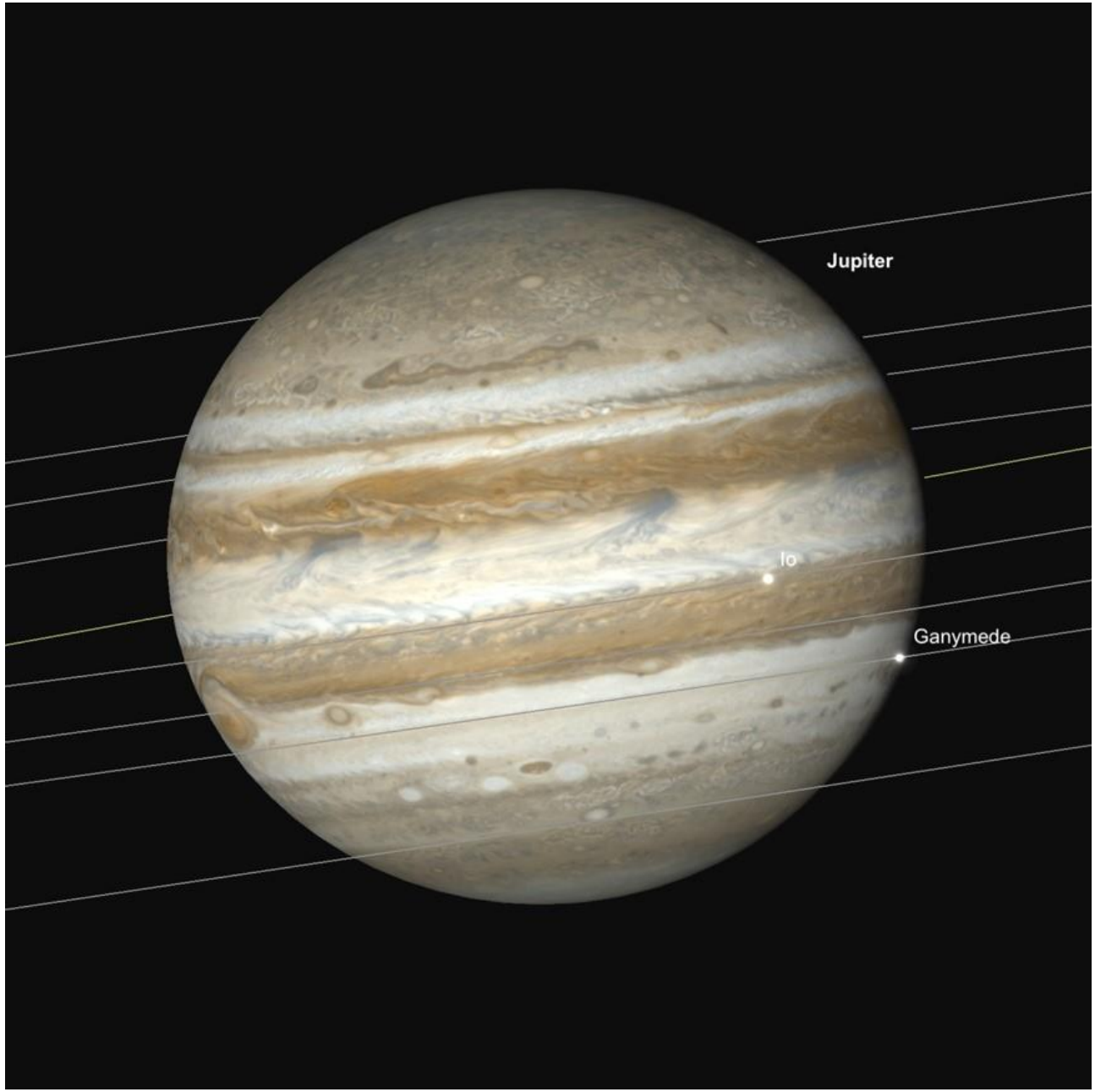
Jupiter

Jupiter is a resident of the non-zodiacal constellation Cetus the Whale, during early July. Shining at a brilliant -2.4 magnitude, Jupiter is really gearing up for September's Opposition and is now just under 41 arc seconds in diameter. Rising at just before 1 am, on the 1st, Jupiter can be found in the south-east at dawn, at an altitude of just under 35° elevation (from 51° north).

Jupiter continues its upward trend and by mid-month has brightened to -2.5 magnitude and is now displaying an apparent size of just under 43 arc seconds. The planet now stands at just above 40° in south, as the Sun rises.

The end of the month finds Jupiter having brightened yet further to a dazzling -2.7 magnitude, now displaying a 45 arc second diameter disc. It will rise at just before 11 pm on the 31st and transit a little after 5 am, sitting at a little before 11:30 am. At dawn, Jupiter can be found in the south, at just over 41 degrees elevation (from 51° north).

There are a couple of interesting Jovian transit events, observable from Europe, during July. Occurring around dawn on the 17th, there's a dual transit of both Io and Callisto. There's also a dual transit of Ganymede and Io at around 12am (BST) on July 26th.


Jupiter
Io
Ganymede

Jupiter displaying simultaneous Great Red Spot, Io and Ganymede Transit, 2am July 26th. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

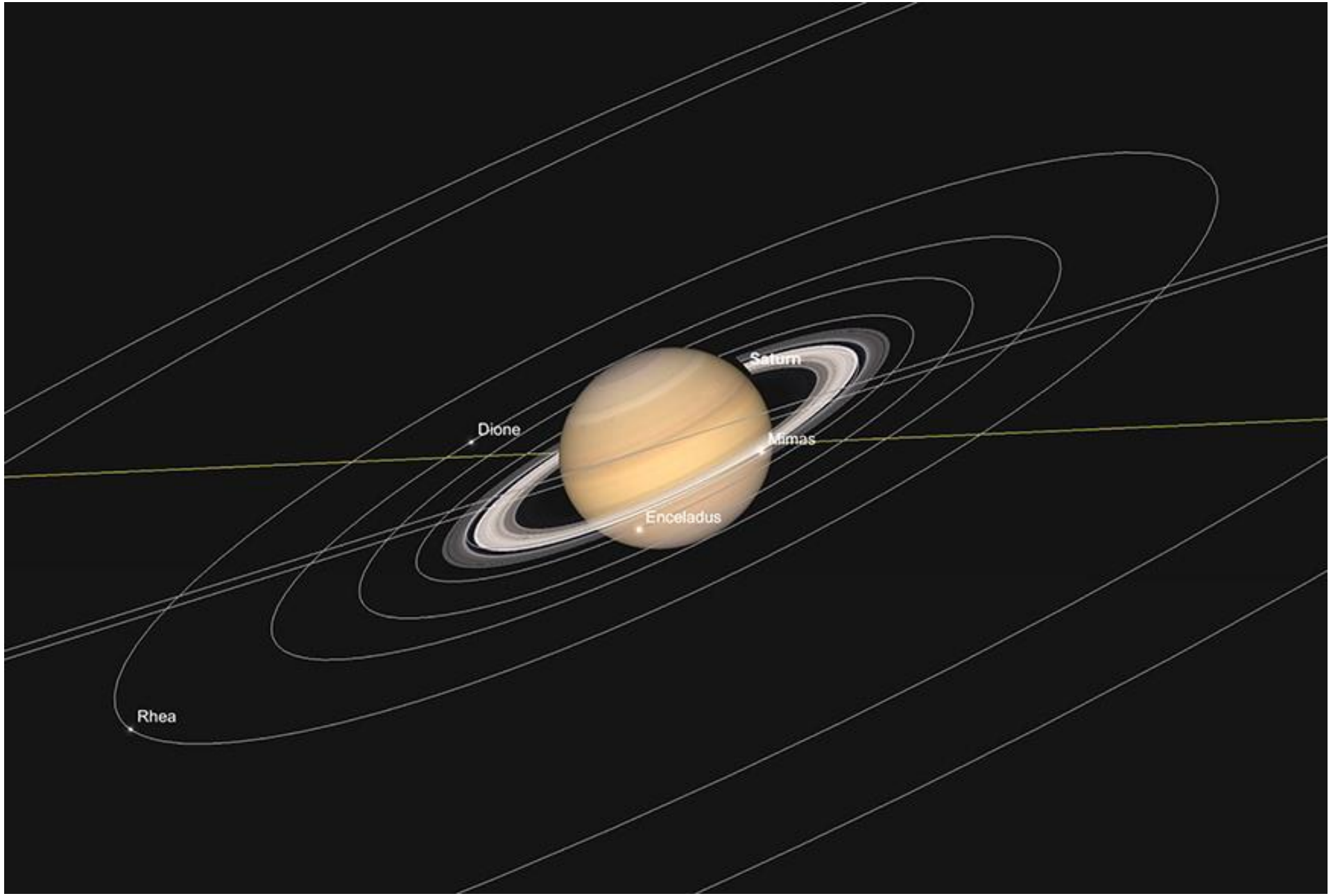
Saturn

We find Saturn, a resident of Capricornus, shining at +0.6 magnitude and displaying an 18.2 arc second diameter disc, on July 1st. Rising at a little after 11:30 pm (BST), The ringed planet transits at a little before 4:30 am, setting at just after 9am the following morning (from 51° north).

Saturn is brightening a little in anticipation of next month's Opposition, but its brightness never varies tremendously, no matter what part of its orbit we find it on. By the 15th July, Saturn has brightened fractionally to +0.5 magnitude, and is now showing and 18.5 arc second diameter disc. It will rise at around 10:30 pm (BST) and transit a little before 3:30 am the following morning.

By the end of the month, Saturn has brightened fractionally to +0.4 magnitude and now displays an 18.7 arc second diameter disc. The planet rises at just after 9:30 (BST) in the evening, transiting at a little before 2:30 am the following morning and sets at just after 7am.

It is certainly possible to observe Saturnian moon transits with larger telescopes, but these are much more of a challenge than Jovian transits are to make out. this is largely due to Saturn's distance and the smaller diameter of the majority of Saturn's moons, when compared to Jupiter's Galilean satellites. With Saturn's rings system closing up from our perspective here on Earth, we are now at a time within the observational cycle, where a few of Saturns moons appear to move in front of the Saturnian disc at certain times of the month. The amount of transit events will increase as we head towards the crossing of Saturn's ring plane in 2025. At present, it is technically possible to observe transits and shadow transits of the moons Mimas, Enceladus and Tethys. This type of observation is not for the faint-hearted or inexperienced observer. However those with the prerequisite observing skill, patience and above all a compliant sky and a decent telescope, of reasonable aperture, may have some success.

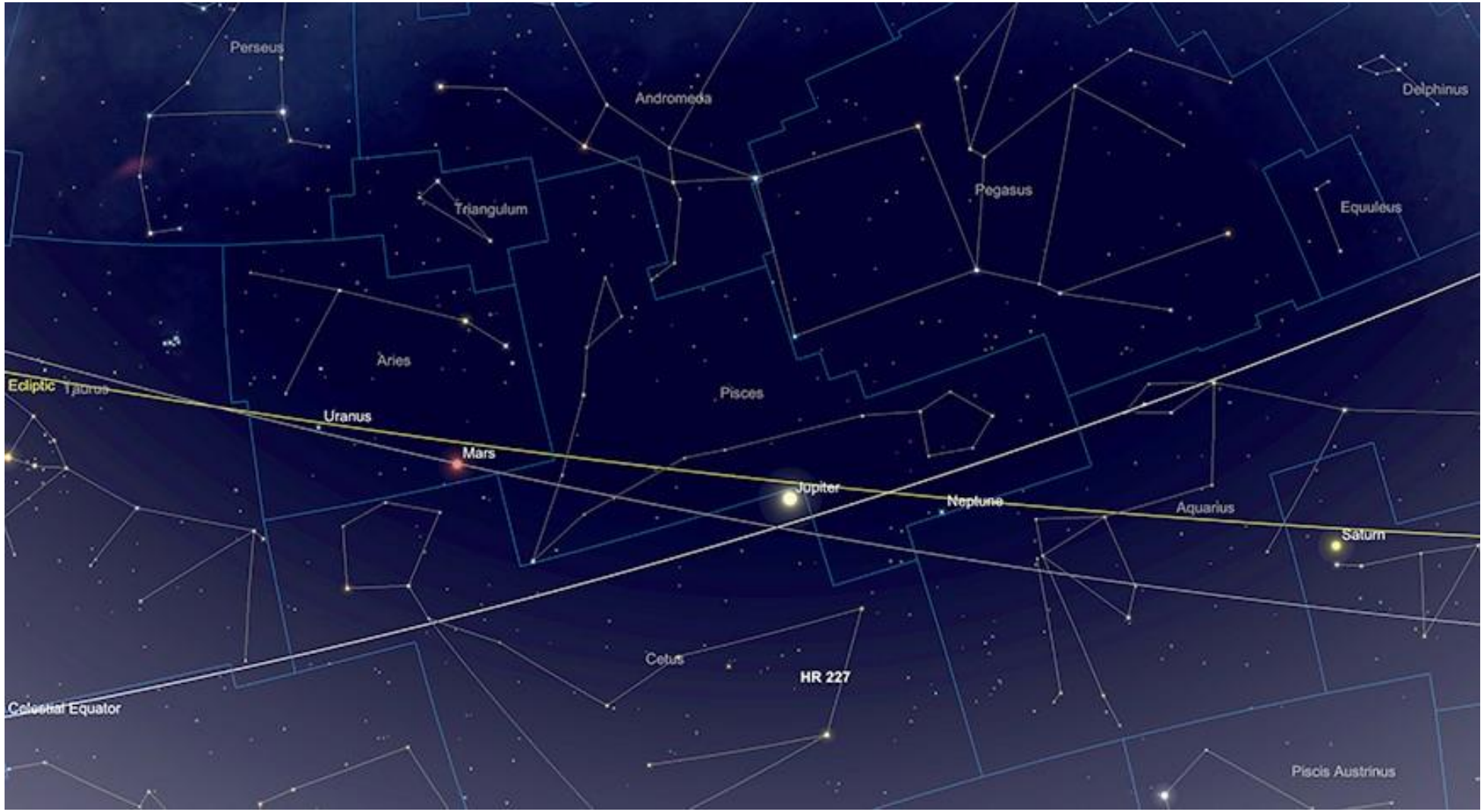

Saturn
Dione
Mimas
Enceladus
Rhea

Saturn, with dual Enceladus and Mimas transits, 1am (BST), 23rd July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Uranus and Neptune

The two outer gas giants are most definitely morning targets during July. Neptune, sitting around the borders between Pisces and Aquarius is the further west in the ecliptic of the two and therefore rises earlier. Mid-month, Neptune will rise at just past 11:30 pm (BST) and transits at just before 5:30 in the morning. At +7.9 magnitude and displaying a 2.3 arc second diameter disc, Neptune will definitely require binoculars or a telescope to identify.

Further east in the ecliptic, in the constellation of Aries, Uranus rises later - at just before 1:15am (BST) on the 15th. Being +5.8 magnitude and displaying a 3.5 arc second diameter disc, Uranus is that much more prominent and easier to find in binoculars. Eagleeyed observers from very dark locations can see the planet with the naked eye, but you will need a very good observing site and extremely good vision to do this. Good binoculars make the task considerably easier. As previously reported, at the end of the month, Mars draws close to Uranus in Aries and provides a convenient way-point for us to find the fainter outer planet.



Uranus and Neptune relative sky positions, 15th July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

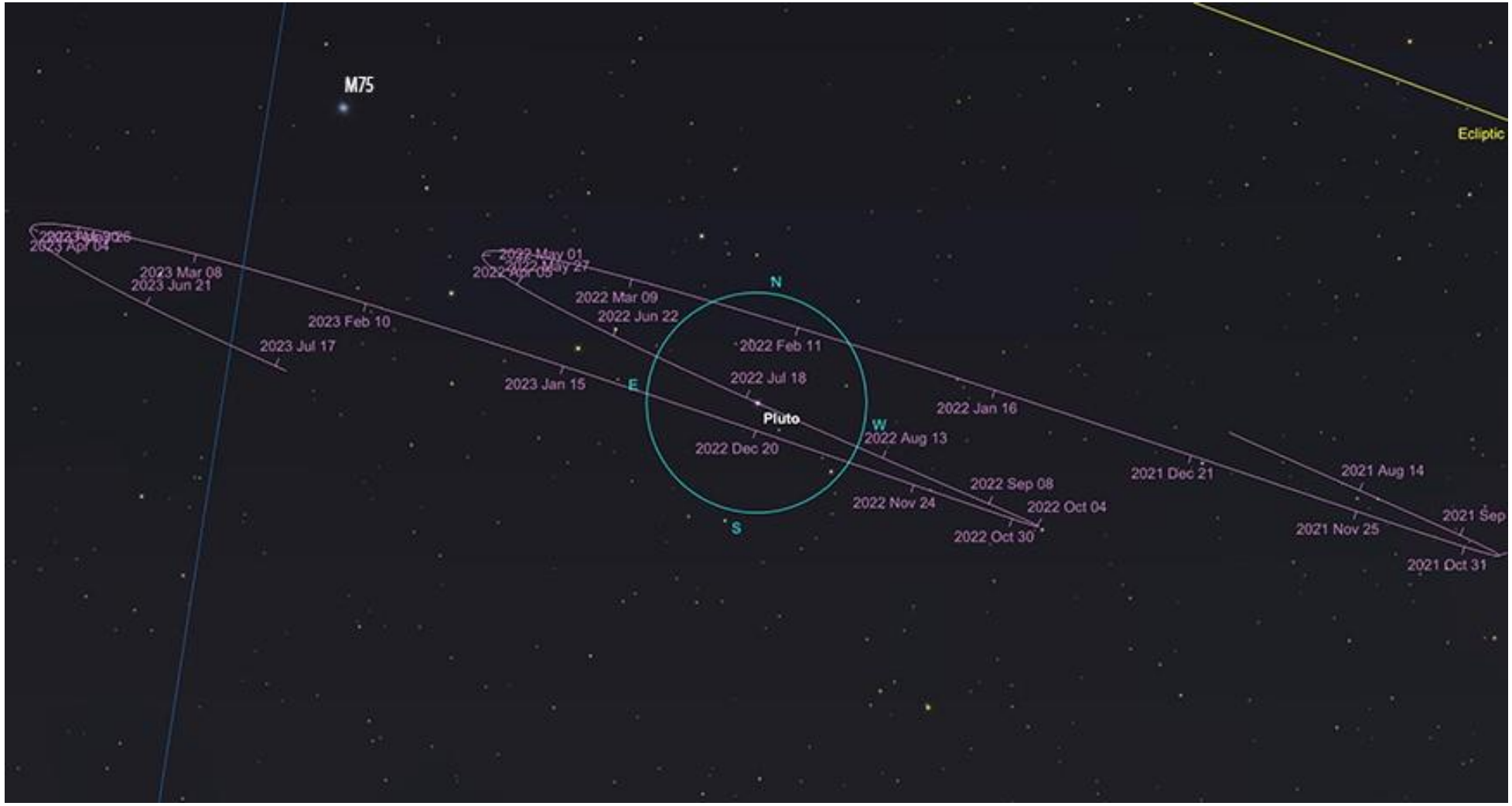
Pluto

Everybody’s favourite dwarf planet, Pluto, comes to Opposition on July 20th. At +14.3 magnitude and just 0.1 arc seconds across, finding and positively identifying Pluto is one of those observing challenges that should be attempted once in a while - but only with the right telescope and under good conditions. There are many factors that can influence observing a target this faint: prevailing sky conditions, sky darkness (or otherwise), the individual observer’s eyesight and dark adaption, but above all, the aperture of your telescope.


Saturn
Capricornus
Pluto
Scutum
Sagittarius
Piscis Austrinus
Microscopium
S

Pluto's position in widefield view, Opposition night. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Technically, it should be just possible to observe Pluto visually at high power in an 8 inch reflector or 5 inch refractor, under ideal conditions. However, technically and practically, are two very different criteria. Practically, at least 12” of aperture is regularly required, along with good skies and decent sky charts. Preferably 14-16” aperture is needed to make observations “easier” - but even with this sort of telescope, seeing Pluto (especially for northern hemisphere observers, considering its low southern altitude) is tricky. Recording the dwarf world photographically in a smaller telescope is a more practical, if less romantic, method of tracking it down. Sadly, at present, there are no really bright stars around Pluto's current position in Sagittarius to act as a signpost. The rather dim globular cluster, M75, can be found 2 degrees to the NE of Pluto's location on Opposition night, as shown below.



Pluto's more detailed position, Opposition night. Blue ring represents a 16" f/4.5 Dobsonian and 32mm Plossl field of view (just under a degree). Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Comets

Continued observations of Comet 2017/K2 (PanSTARRS) suggest it is still brightening (albeit slowly) and recent observations put it around the 9-10th magnitude presently. The comet may however become a little brighter still in August of this year, but is unlikely to get any better than 7th or 8th magnitude, making it very much a target for telescopic or large binocular observations. During July, the comet will continue to track through the generous expanses of Ophiuchus, heading south as it does, but still making it pretty wellplaced for observing throughout much of the night.


Meridian
2021 Dec 28
2022 Feb 22
2022 Feb 08
2022 Jan 25
2022 Jan 11
2022 Jun 01
2022 Jun 15
2022 Jun 29
C/2017 K2 (PANSTARRS)
Ophiuchus
2022 Jul 13
Scutum
2022 Jul 27
2022 Aug 10
2022 Aug 24

Comet 2017/K2 (PanSTARRS) path, during July. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

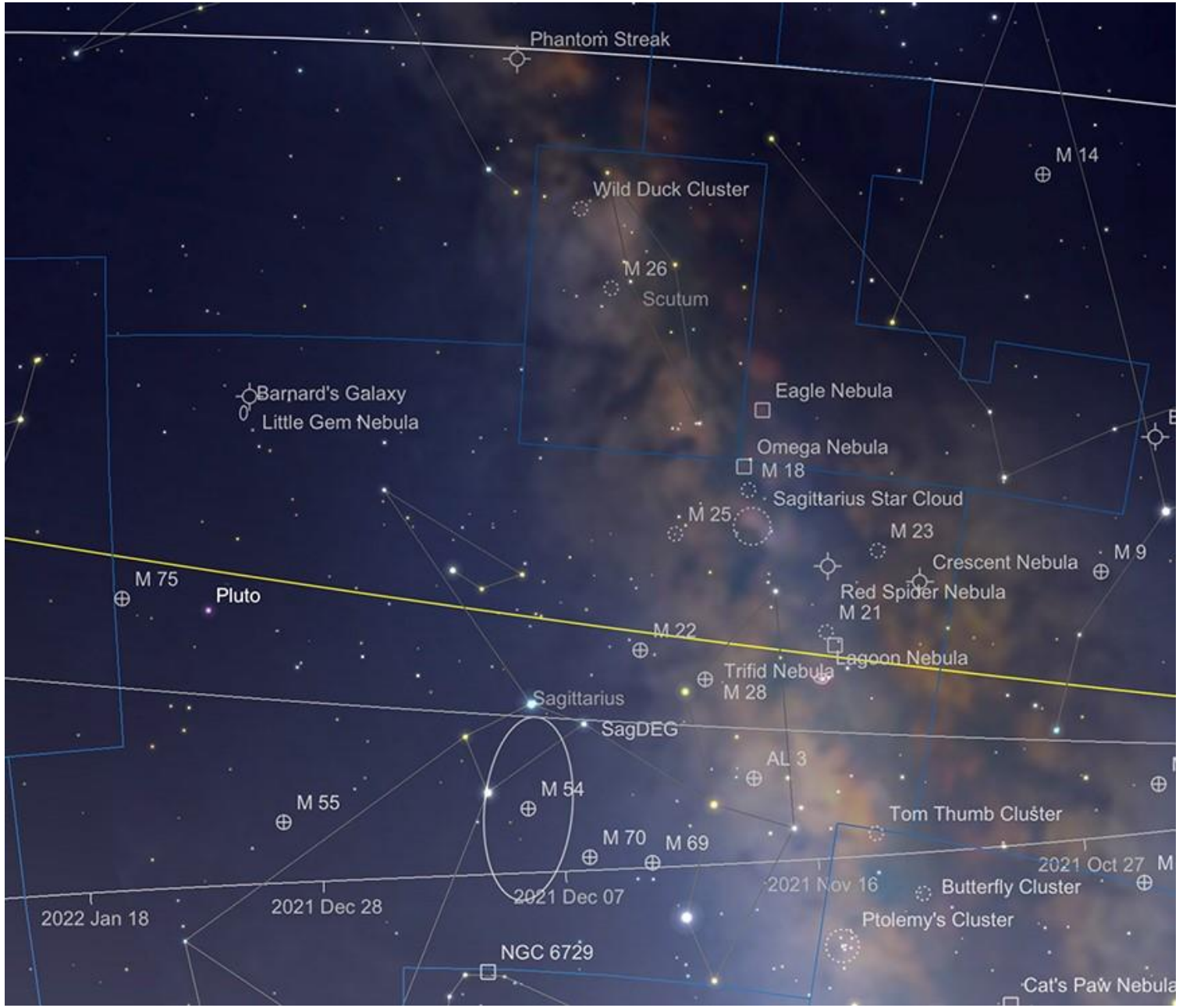
Meteors

August is the best Summer month for meteors, being the peak of the Perseids, but this particularly fine shower does begin in later July, so it's worth keeping an eye open for some early participants in this year's shower later in the month - the influence of the Moon in later July this year will be negligible, making conditions close to ideal. The peak of the Delta Aquariids on the night of the 28th/29th July is the major shower that reaches a maximum during July.

This shower normally favours observers in the southern hemisphere somewhat, but can be seen throughout the world. However, it is worth noting that while the radiant of the shower is in Aquarius, meteors from the shower can be seen at any point in the sky. Best seen after midnight, the Delta Aquariids are relatively slow moving meteors, at a mean of around 41km / 25 miles per second. This means they are not as energetic and bright as some other showers. Despite this, the shower is pretty reliable and is actually the more southern of the two Delta Aquariid showers (the northern equivalent is much less active and peaks in mid August). They are seeded by Comet 96/P Macholtz, a short period comet, which will next come to Perihelion in January 2023. When observed in 2012, a couple of smaller fragments of the comet appeared to have detached themselves from the main body, which may eventually lead to an uplift in Zenithal Hourly Rates of the meteor shower, which currently stands at around 15-20 meteors per hour. Naturally, the best way of recording the shower is by the use of multiple widefield images - a DSLR with a widefield lens, or USB imager with an "All Sky" super-widefield lens are both ideal for this. But in truth, when you are out observing the Delta Aquariids, you are just as likely to see an early Perseid. Tracing a line back through the path of a particular meteor will enable you to positively identify which radiant it came from.

Deep Sky Delights in Sagittarius, Serpens Cauda and Scutum

Last month we looked at the area of sky in the far north taking in the constellations of Draco and Hercules. This month we visit a very different area of the heavens - the rich area of Sagittarius, the eastern part of Serpens (Serpens Cauda - the tail of the serpent) and the compact but notable constellation of Scutum, the Shield.


Phantom Streak
M 14
Wild Duck Cluster
M 26
Scutum
Barnard's Galaxy
Little Gem Nebula
Eagle Nebula
Omega Nebula
M 18
Sagittarius Star Cloud
M 25
M 23
Crescent Nebula
M 9
M 75
Pluto
Red Spider Nebula
M 21
M 22
Lagoon Nebula
Trifid Nebula
M 28
Sagittarius
SagDEG
AL 3
M 54
M 55
Tom Thumb Cluster
M 70
M 69
2021 Oct 27
2021 Nov 16
Butterfly Cluster
2021 Dec 07
2021 Dec 28
2022 Jan 18
Ptolemy's Cluster
NGC 6729
Cat's Paw Nebula

Sagittarius, Serpens Cauda and Scutum. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.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 wellde 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 1⁄2 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.

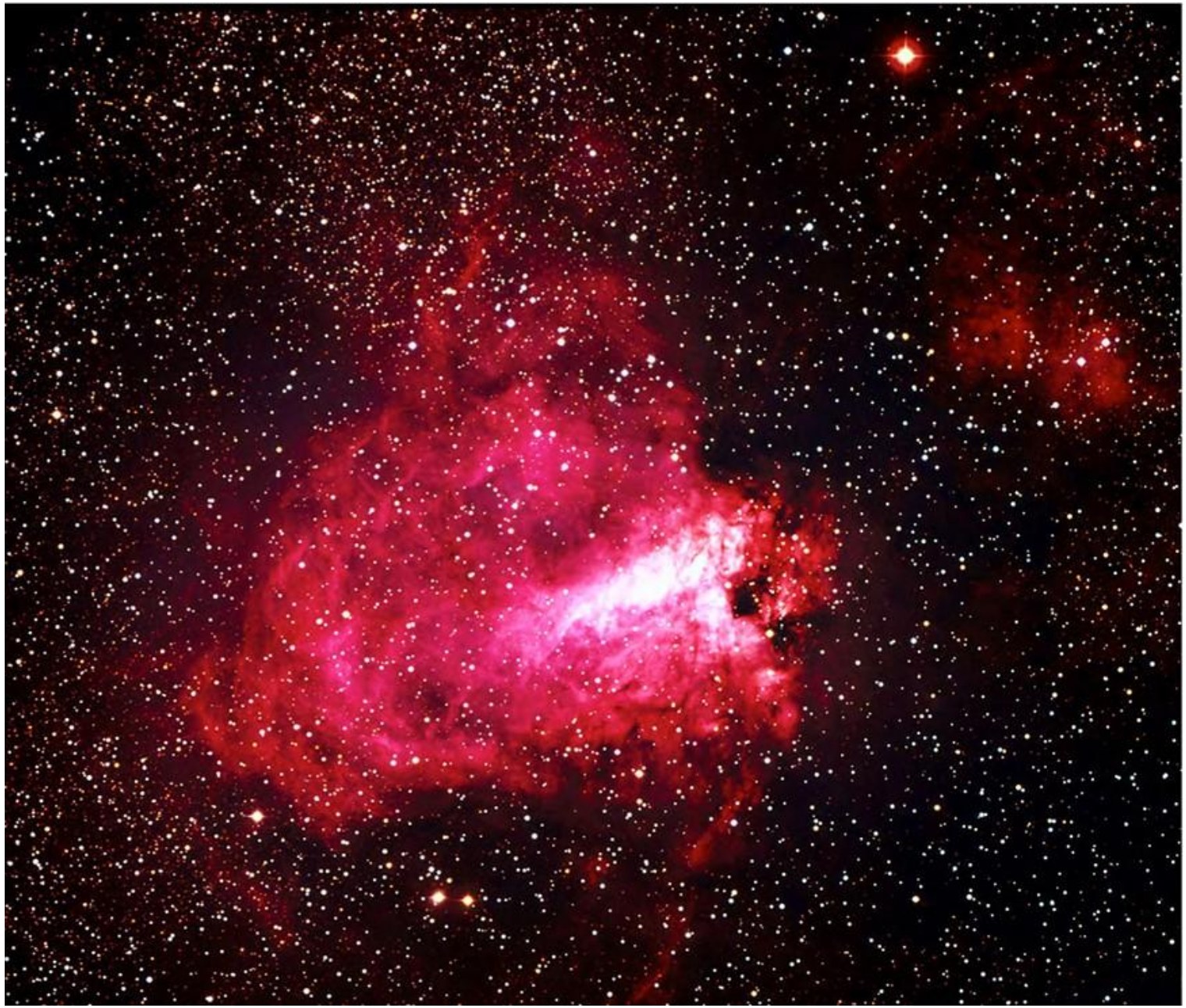
Drifting eastwards, about equidistant from M23 on the other side of the +3.8 mag star Polis, Mu Sagittarii, we come to yet another of Sagittarius' fine clusters, M25. Discovered by de Cheseaux in 1746, M25 was independently rediscovered by Messier in 1764. It is bright at +4.59 mag and an easy target 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.

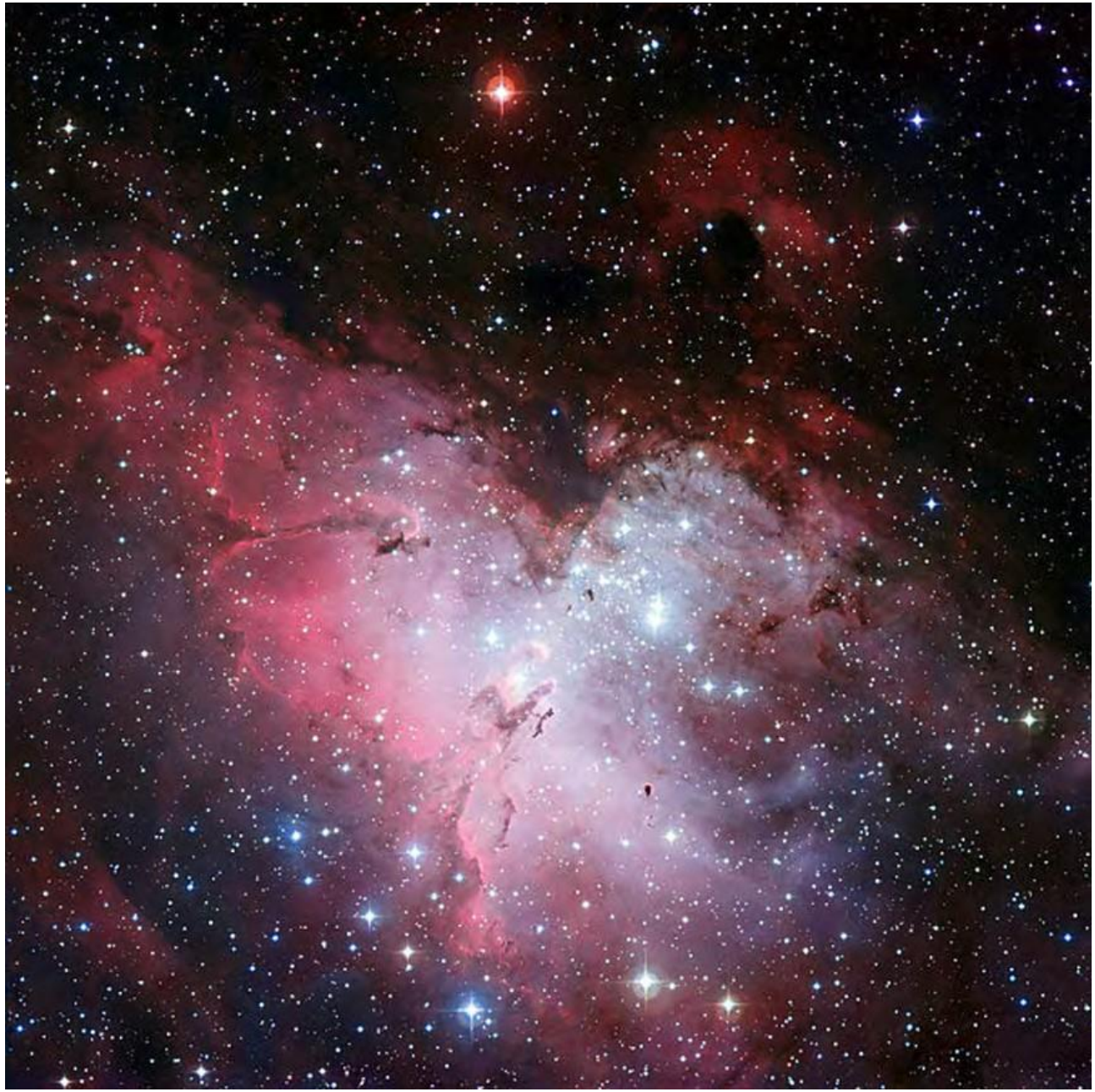
Lying 1 1/4 degrees to the N of M18 is the final object of note we shall be covering in Sagittarius - and what a way to end. The Omega Nebula, otherwise known as the Swan, Lobster or Horseshoe (take your pick)
or more properly, M17, is a bright nebula of +6 magnitude and a healthy 46 x 37 arc minutes 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 SagittariusCarina 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