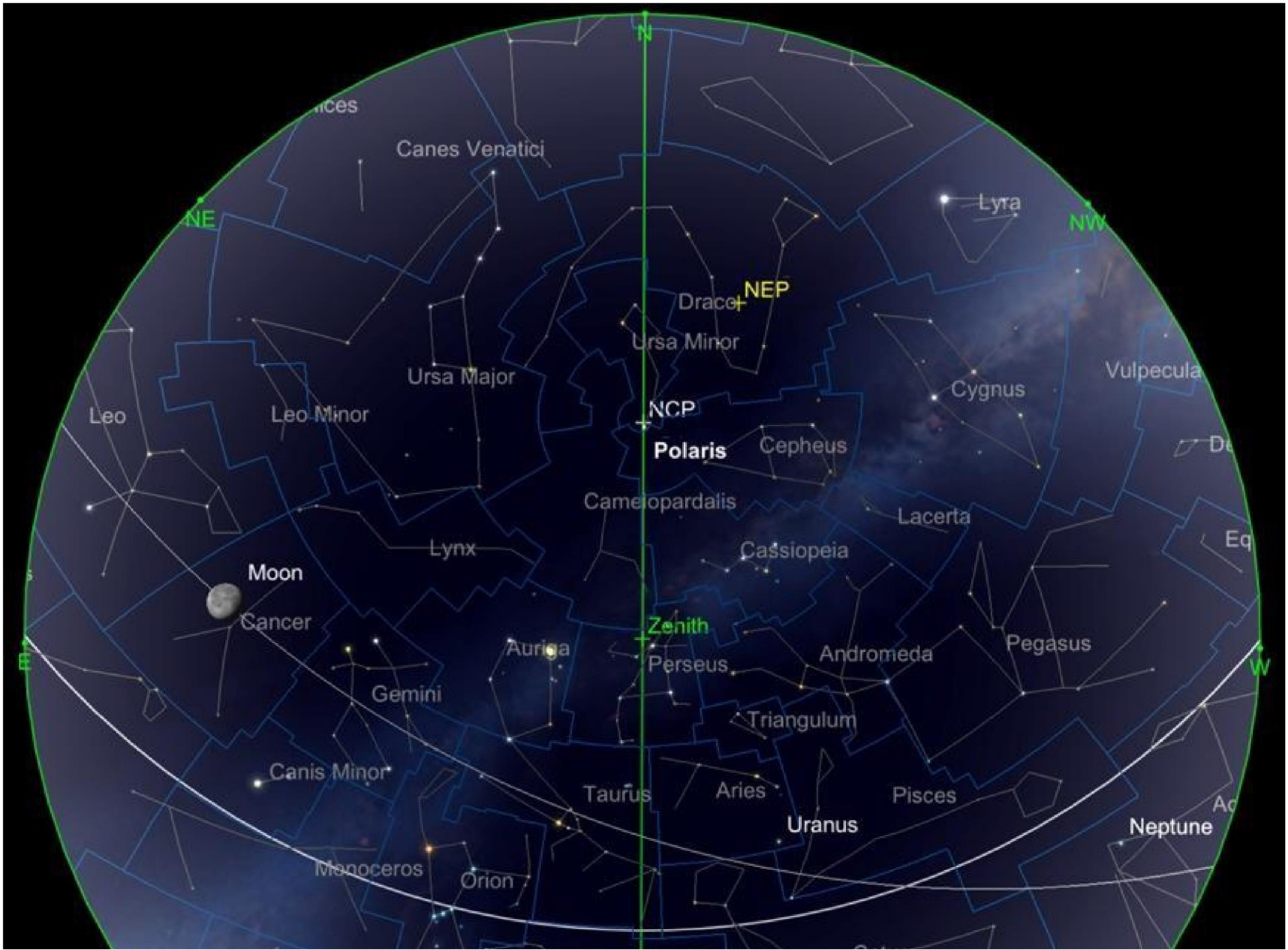
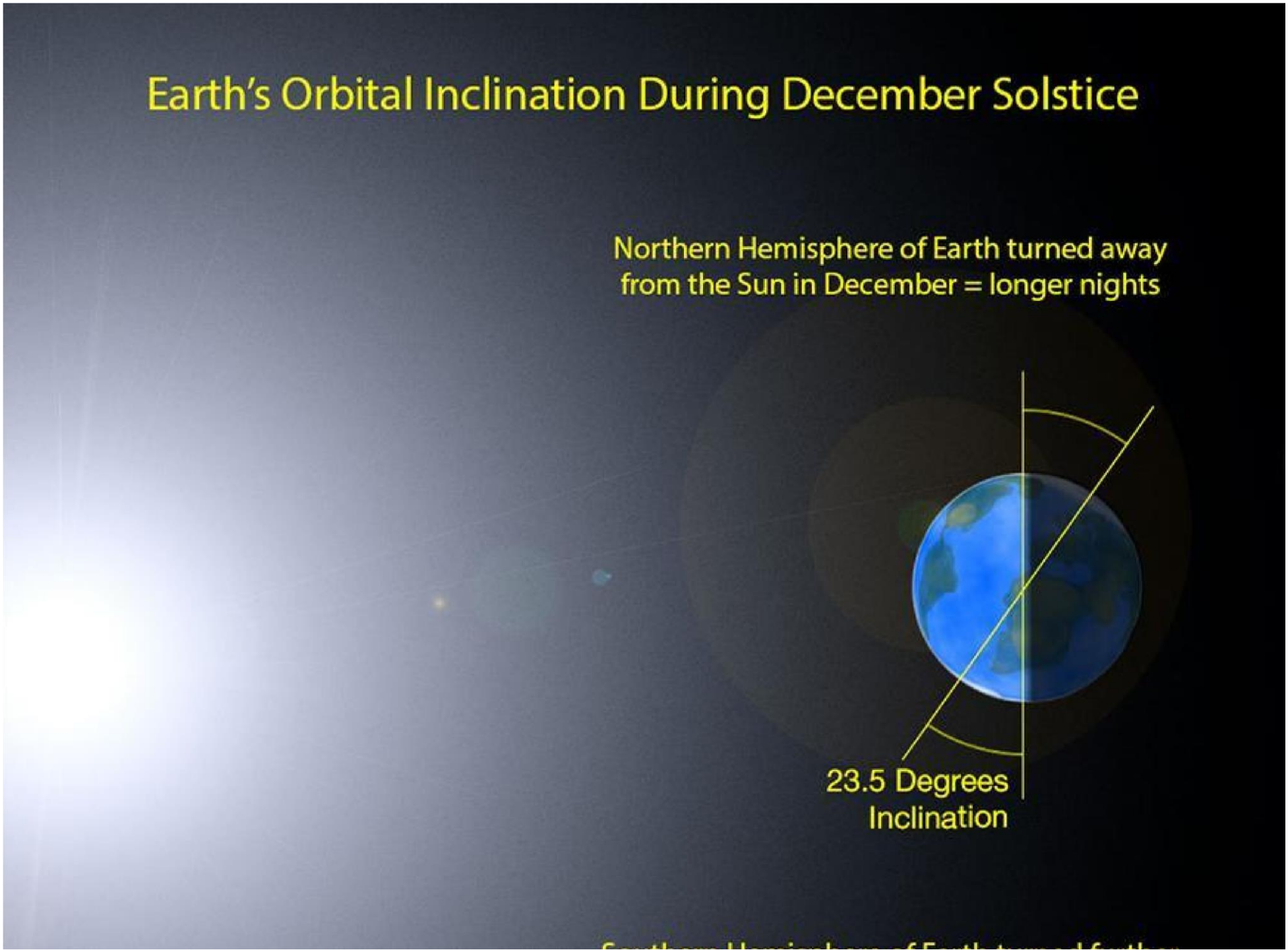

N
NE
NW
W
Canes Venatici
Lyra
NEP
Draco
Ursa Minor
Ursa Major
Vulpecula
Cygnus
Leo
Leo Minor
NCP
Polaris
Cepheus
Camelopardalis
Lacerta
Lynx
Cassiopeia
Moon
Cancer
Zenith
Auriga
Perseus
Andromeda
Pegasus
Gemini
Triangulum
Canis Minor
Taurus
Aries
Pisces
Uranus
Neptune
Monoceros
Orion

Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

This month ushers in Midwinter for those in the northern hemisphere - and Midsummer for those readers in the Earth's southern climes. The Sun reaches the most southerly part of the ecliptic in the sky on 22nd December 2018 at 04.19am GMT. At this point of the year for readers around the 51 degree N latitude, the Sun will be just 15 degrees above the horizon at the highest point of transit in the south. The more northerly you are, the smaller the Sun's altitude at transit point will be. For those at the Arctic Circle, the Sun won't rise at all. Those above the Arctic Circle will be already experiencing total darkness for days or even weeks surrounding the Winter Solstice. No matter where you are in the northern hemisphere, this day will be the shortest of the year and the night the longest. This is caused by the Earth's 23.5 degree polar inclination from its orbital plane - the major cause of the seasonal nature of our planet's weather.

Earth's Orbital Inclination During December Solstice



The Earth at the Winter Solstice. Image Credit: Kerin Smith
Conversely, those in the southern hemisphere will experience the longest day of the year, the shortest night and the very height of Summer on the 22nd December. Wherever you find yourself at this time of the year, we wish all you the very best, whatever season you're experiencing. As usual, if you turn your eyes, binoculars and telescopes skyward, there's lots to see…

The Solar System

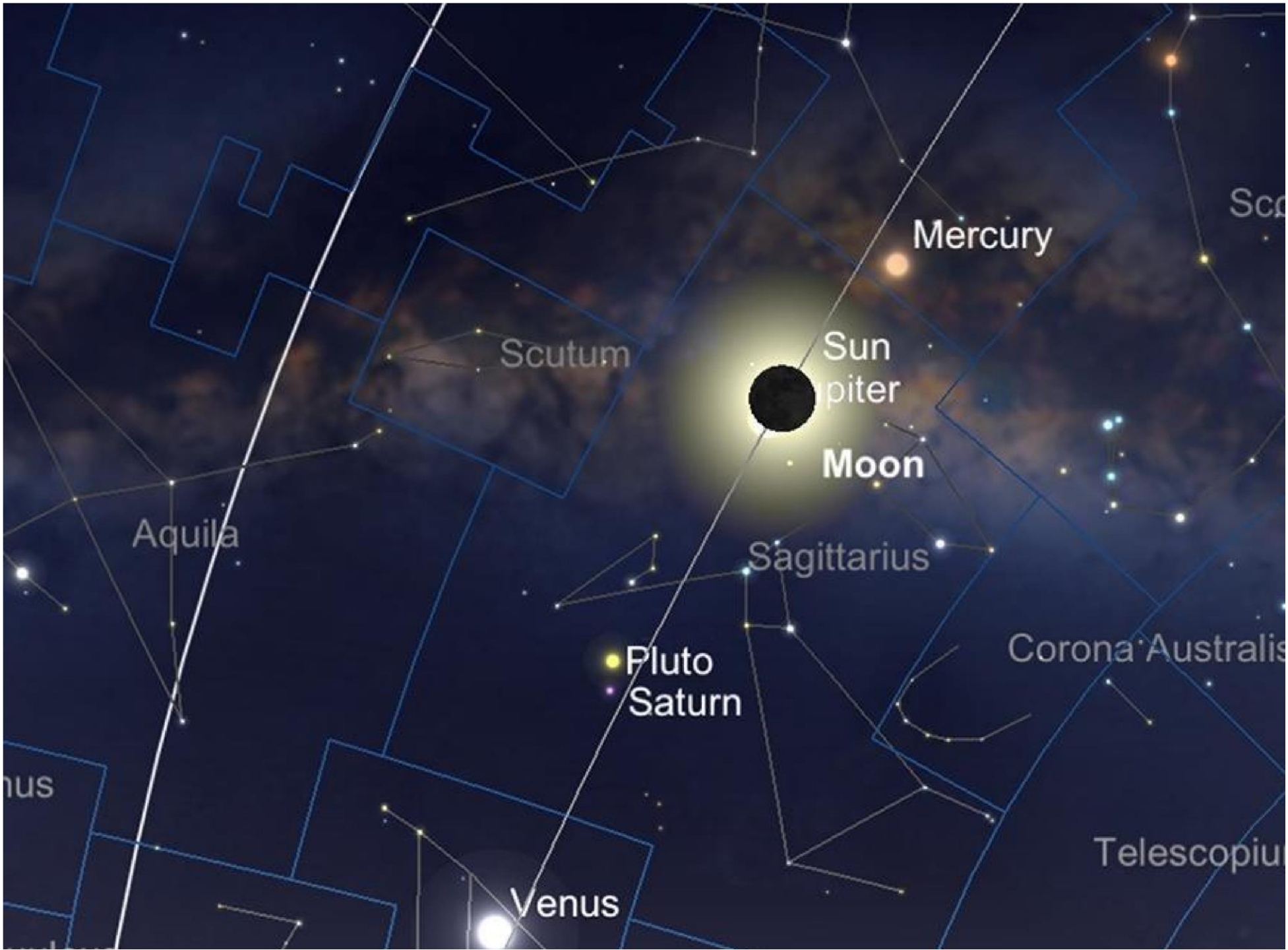
The Moon

Our natural satellite begins December in Capricornus, as a five day old waxing crescent, strung out in a line after sunset alongside Saturn, Venus and Jupiter, which are all found to the west of the Moon in the evening sky. On the evening of the 1st, the Moon will sit around 18 degrees above the horizon (from 51 degrees N) and will set around 4 1/2 hours after the Sun, at just before 9pm (GMT).

The Moon, alongside Jupiter, Venus and Saturn, sunset, 1st December. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

The Moon will reach First Quarter phase on the 4th, when it will be found in Aquarius, sitting around 4 1/2 degrees to the south of the planet Neptune. It will then continue its journey up the Ecliptic until it reaches Full on the morning of the 12th, while in Taurus. This is one of the furthest north Full Moons of the year, when it will stand just over 59 1/2 degrees high in the sky as it transits (from 51 degrees N). This figure will be bested by January 2020's Full Moon, which will occur when the Moon is practically at the furthest north in the Ecliptic it can be - sitting on the Taurus Gemini borders.

After this point the Moon will gently slide down the descending side of the Ecliptic (from a northern hemisphere perspective), until it reaches Last Quarter in Virgo on the 19th, having risen a few minutes before midnight. Beyond this, it will reach New on 26th December, which will also coincide with an Annular Solar Eclipse, which won't be visible in any part from Europe, save some very extreme eastern parts. This Eclipse will be seen, at least in part, through much of the Middle East, the Indian Subcontinent, China and SE Asia, Mongolia, Central and Eastern Russia, much of Japan, the Indonesian archipelago, and much of the northern and western parts of Australia. The maximum centreline runs through Saudi Arabia, across the Indian Ocean to the Southern part of India and Sri Lanka, across the Bay of Bengal to make landfall again in Indonesia, Malaysia, the Philippines and Guam and out into the Pacific, where it will end. An Annular Eclipse occurs when the Moon is closer to Apogee - its furthest point from Earth - and thus appears smaller in the sky and covers less of the Sun's disk. While not as spectacular as a Total Solar Eclipse, an Annular Eclipse, displaying its "Ring of Fire" is almost as memorable. Good luck to anyone who finds themselves in the right part of the world to witness this one.


Mercury
Scutum
Sun
piter
Moon
Aquila
Sagittarius
Pluto
Saturn
Corona Australis
Venus

Annular Solar Eclipse from Colombo, Sri Lanka, 26th January. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

As the Moon is at New at this part of the month, this is going to be the most useful period for deep sky observations in December - so the latter part of the year is one to look out for if you fancy imaging or looking for the sky's fainter members.

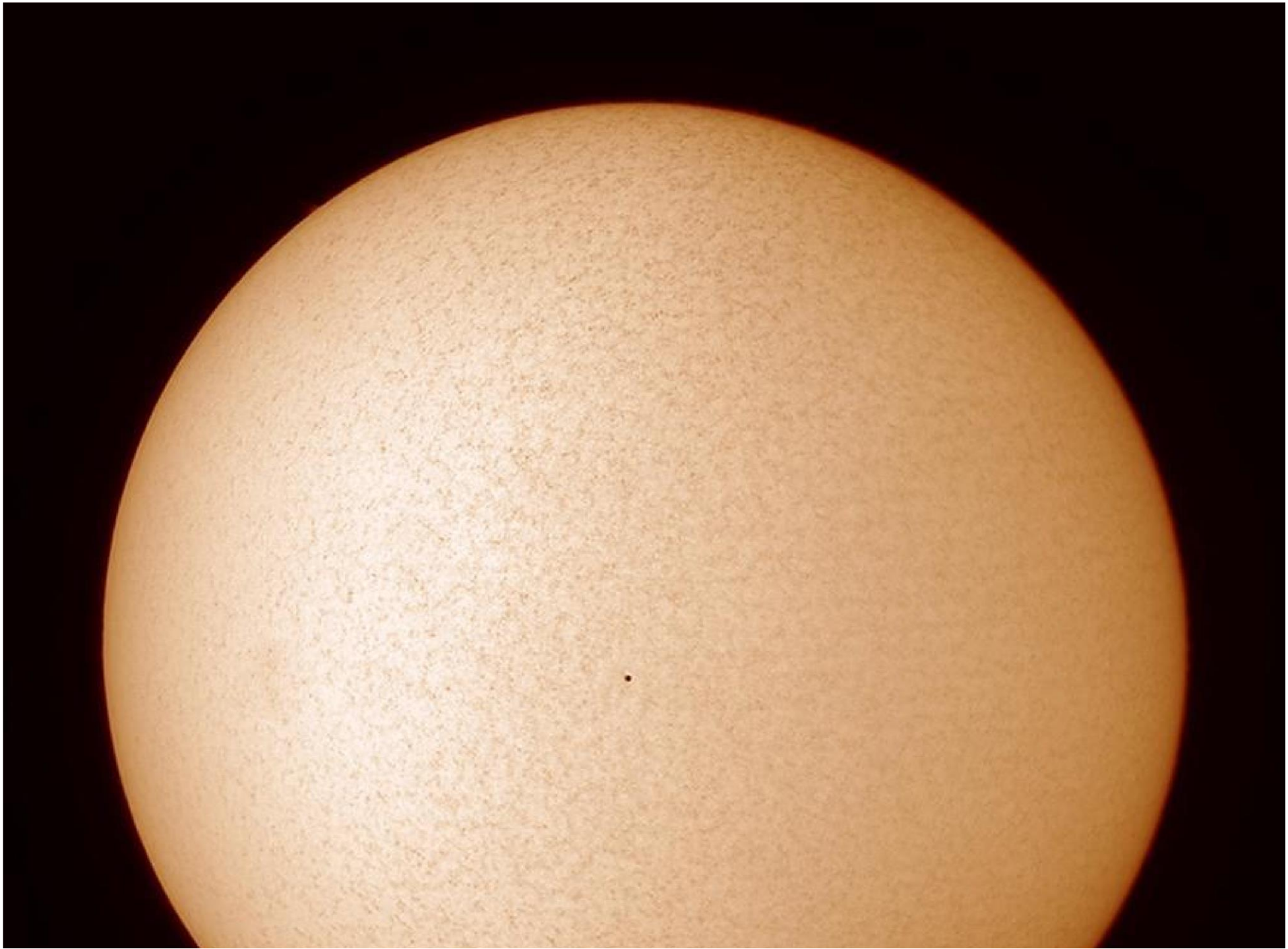
On the evening of the 29th, a slim 11% illuminated Waxing Crescent Moon is to be found in the same part of the sky as Venus - sitting around 6 1/2 degrees to the east of the planet in the sky. Both bodies will sit around 18 degrees high in the SSW (from 51 degrees N) at sunset and will make for a pretty pairing in the early evening sky.

The year ends with the 27% illuminated Moon back in Aquarius, nicely poised just before transit, as the Sun goes down. It will set a little before 10pm (GMT) on the 31st.

Mercury

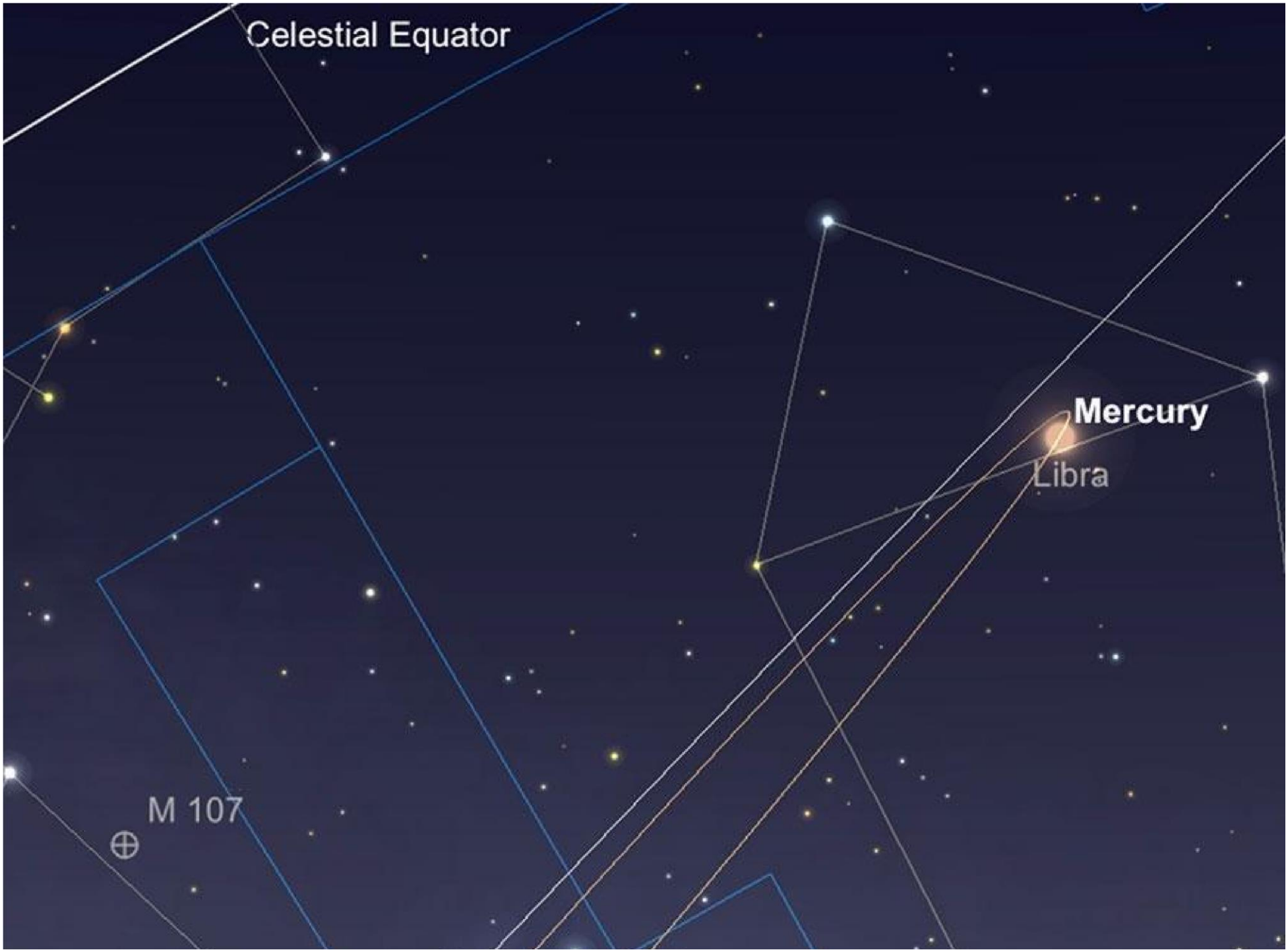
After the excitement of last month's Transit, things are a little more sedate this month in regards to Mercury. November's Transit was well observed throughout its sphere of visibility and while weather was variable throughout Europe, many did manage to catch part of the

event. The next transit occurs on 13th November 2032 from Europe, when unlike the last transit, which was still ongoing at sunset in Europe, 2032's will be visible as the Sun rises over the continent.



November's Mercury Transit at around halfway point. Taken with Lunt LS60T/B1200 and ZWO ASI1600M Pro. Image Credit: Kerin Smith

However, the 1st December finds the planet very well-placed for morning observations, being just a few days past maximum western elongation. Mercury will stand around 14 degrees above the horizon Mercury (from 51 degrees N) at sunrise, shining at -0.6 magnitude and presenting a 70% illuminated, 6.3 arc second diameter disk.


Celestial Equator
Mercury
Libra
M 107

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

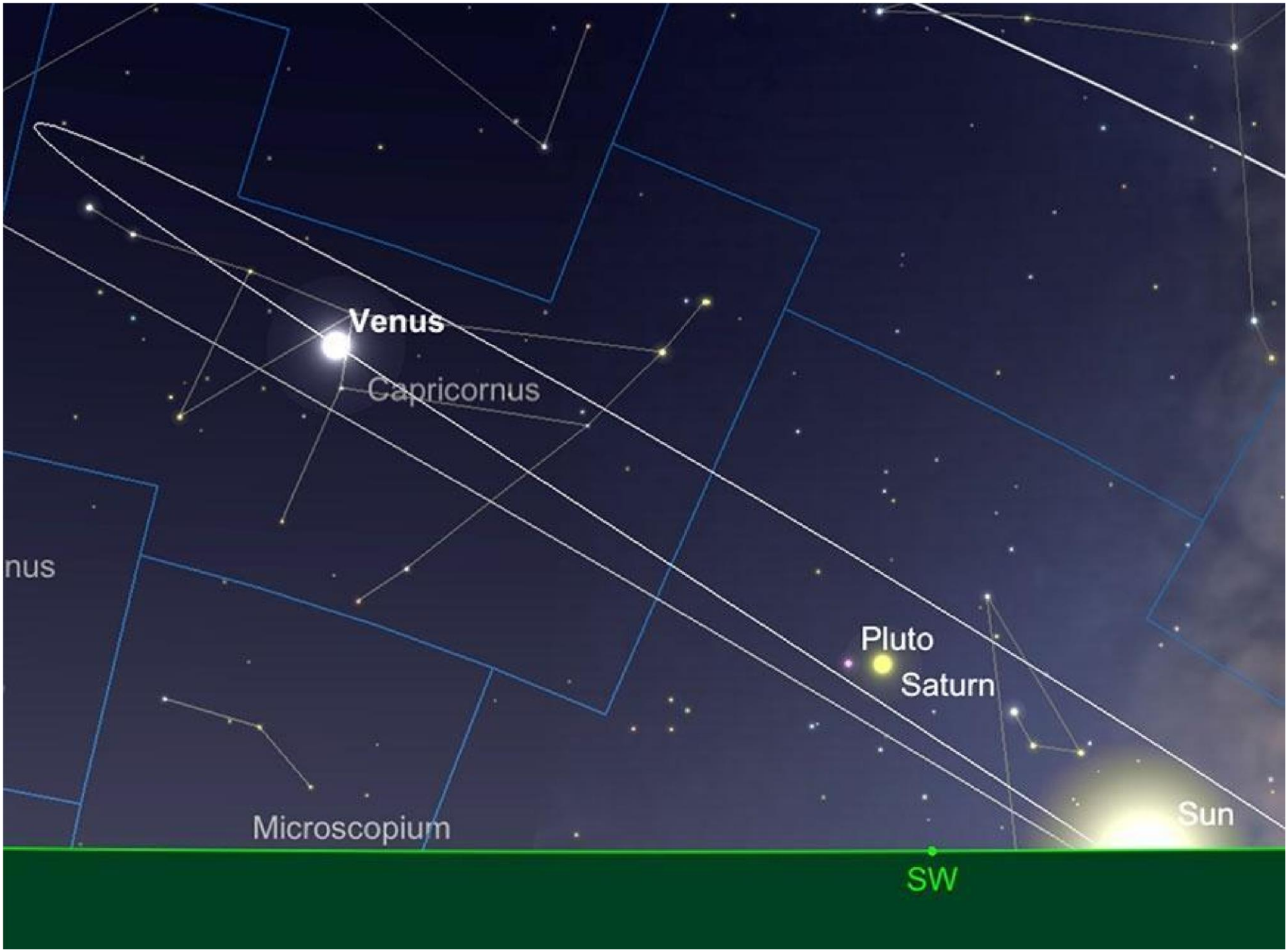
As is inevitable with Mercury, the situation doesn't stay as positive for long, as the planet sweeps sunward. By mid-month, Mercury has increased its illumination to 91.5% and although it has shrunk to 5.1 arc seconds diameter, remain s just as bright as it did at the month's beginning. However, at Sunset, the planet will be just 8 degrees high from the horizon, making it a much more difficult find. Mercury is now swinging around on a path that will take it behind the Sun and while it won't reach Superior Conjunction until January 10th, the latter half of the month will prove increasingly difficult for observations. They key with Mercury this month, is to make the most of the early part of the month's good morning apparition and catch it while you can.

Venus

Venus is to be found in Sagittarius at the month's beginning, alongside Jupiter and Saturn, as the Sun sets. Attaining a height of just under 9 1/2 degrees as the Sun sets, Venus is not ideally-placed for observation, but is steadily improving as it continues to track eastward, increasing its separation with our parent star. it can be found at a separation of just under 28 degrees from the Sun on the 1st. At -3.9 and 11 arc seconds across, it will be easy enough to spot now for those with a reasonable westerly horizon - though telescopically will remain disappointing as it is mired in the murk of the foreshortened atmosphere, being so far south in the sky from temperate northern hemispherical locations. Those observers around the equatorial part of the Earth will see the planet much higher in the sky and subsequently much better.

By mid-December, Venus' situation hasn't changed dramatically: it has brightened imperceivably to -4.0 mag and is now 12 arc seconds diameter. Solar separation has increased to just under 31 degrees and the planet now sits 12 3/4 degrees high in the SSW at sunset.

At the year's end Venus is a no brighter at -4.0 mag, though has increased diameter to 13 seconds of arc. However, due to a combination the fact the Sun has now passed its most southerly point in the Ecliptic and is now tracking northward and Venus' continuing separation from the Sun, the planet ends 2019 sitting at just over 17 3/4 degrees high from the horizon at sunset (from 51 degrees N). As previously mentioned in former Sky Guides, those of us in the northern hemisphere are headed towards a very favourable evening apparition of Venus, which will peak in late March 2020. From now until then, Venus will keep getting better and better to observe and image.


Venus
Capricornus
nus
Pluto
Saturn
Sun
Microscopium
SW

Venus at sunset, 3st December. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Mars

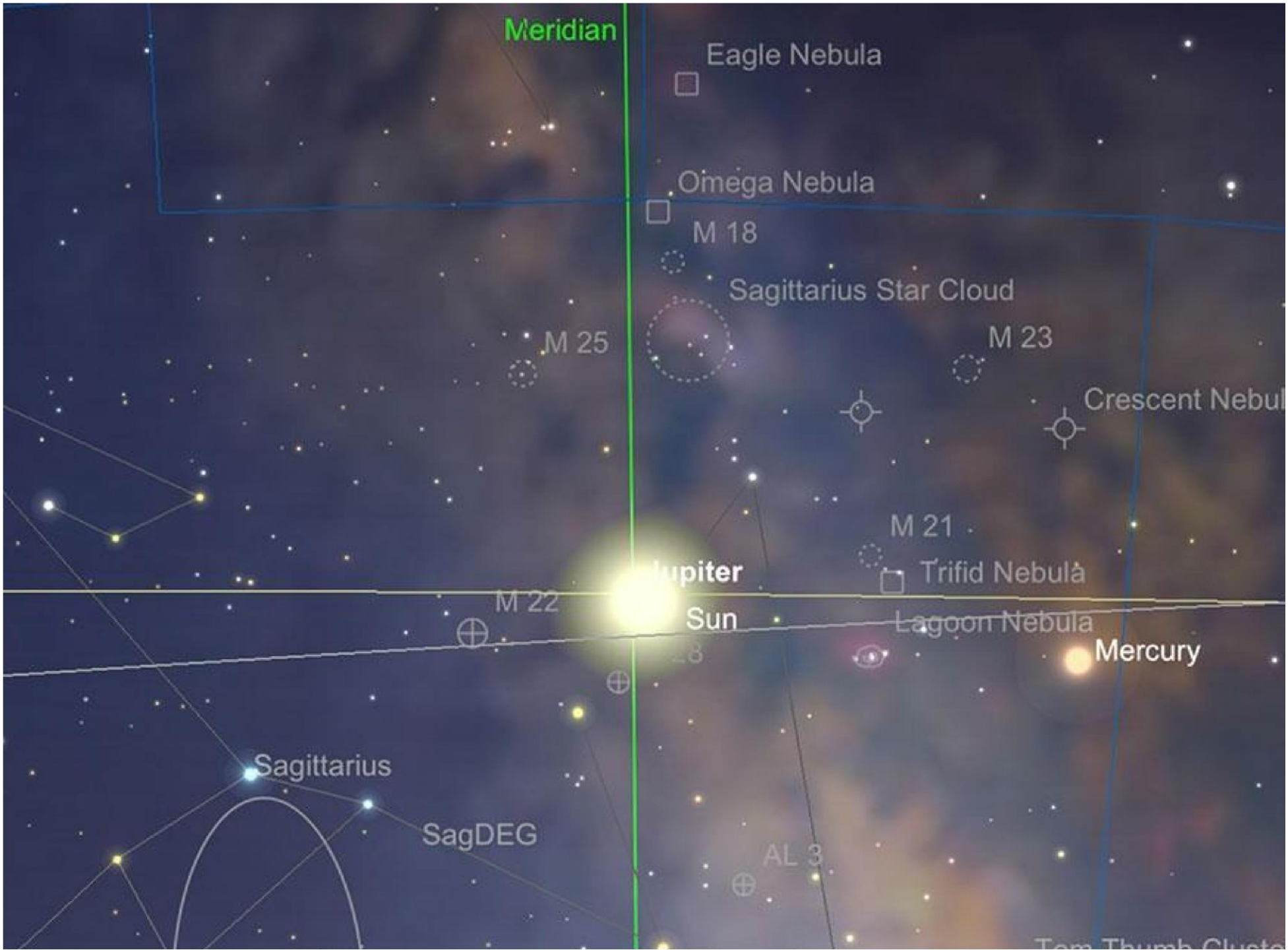
The Red Planet ends 2019 as a a distinctly underwhelming target. At +1.7 mag and just under 4 arc seconds diameter, it is found in the morning sky amongst the stars of Libra. While it is separated from the Sun by just under 31 degrees, neighbouring Mercury, though closer to the Sun, is the much more inspiring to seek out at this time. Slowly Mars will increase its separation form the Sun as we catch the planet up on our faster interior orbit. However, it will be October 2020 before Mars is next at its peak and will then be brighter than any planet, bar Venus - so there's some way to go before then.

Mars ends the year having brightened a little to +1.6 magnitude and is now displaying a 4.3 arc second diameter disk. Its separation from the Sun is now just under 41 1/2 degrees.


Mars
Scutum
Jupiter Mercury
Scorpius
SE

Jupiter

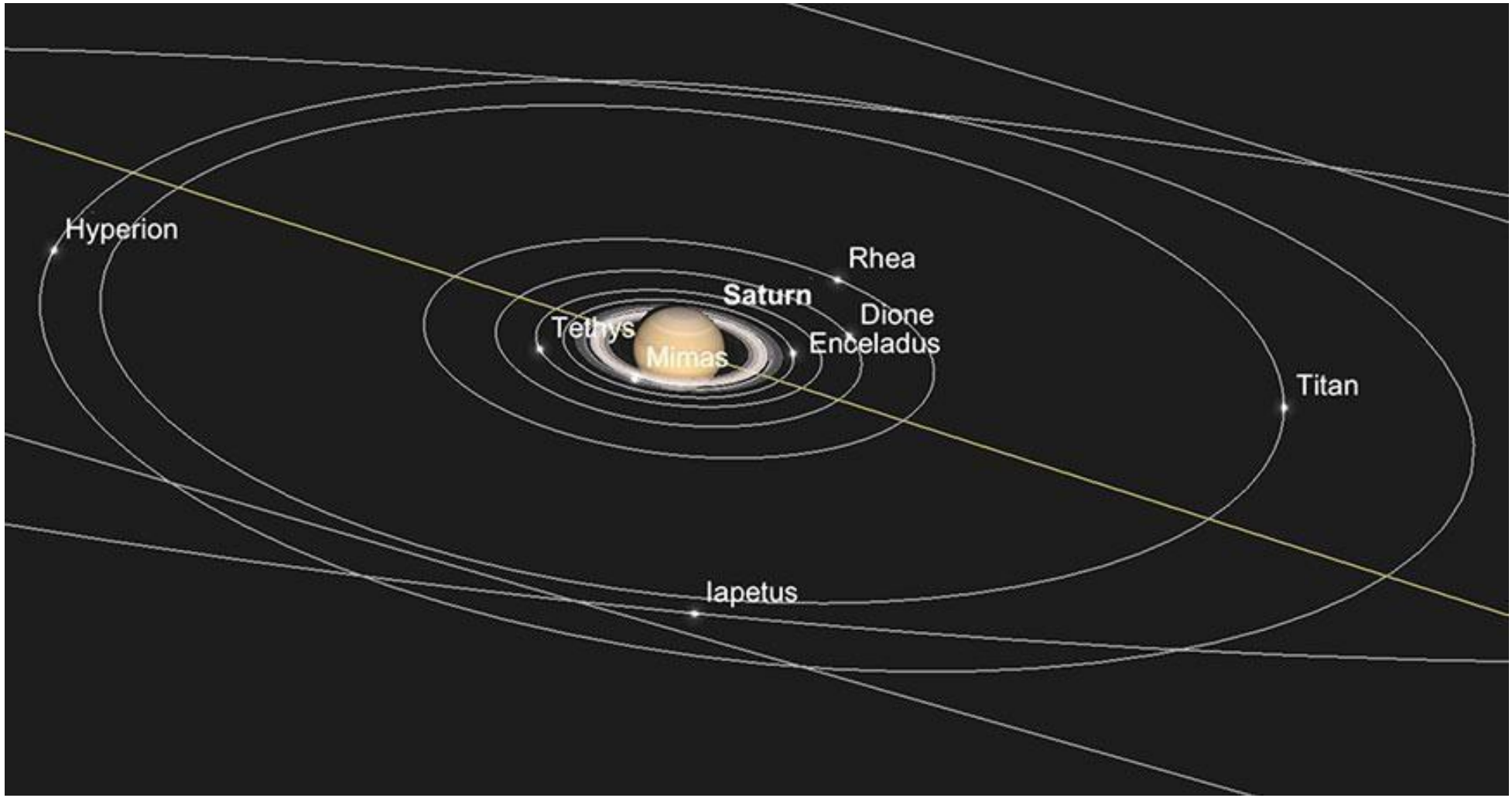
As mentioned last month, we have pretty much lost Jupiter for this year. Although it's certainly possible to see the planet before sunset in the early part of December, it won't be at its best, being very low in the west and separated from the Sun by just over 20 degrees. Jupiter reaches Superior Conjunction on the 27th December, after which it will emerge as a morning object. By the end of 2019, Jupiter will be found 3 degrees from the Sun on the western side — unobservable until later in January, but still not too inspiring by this point.


Meridian
Eagle Nebula
Omega Nebula
M 18
Sagittarius Star Cloud
M 25
M 23
Crescent Nebul
M 21
Trifid Nebula
Jupiter
M 22
Sun
Lagoon Nebula
Mercury
Sagittarius
SagDEG
AL 3

Jupiter at Superior Conjunction, 27th December. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Saturn

Being further east in the Ecliptic than Jupiter, Saturn has a slight reprieve until January as far as Superior conjunction goes, but is now slipping away during the early evening. The planet is around 15 degrees high in the SSW at sunset (from 51 degrees N) on the 1st, shining at a steady +0.6 magnitude. The planet sets a little under three hours after the Sun on the 1st, which doesn't leave too much in the way of opportunity for catching it at reasonable altitude.

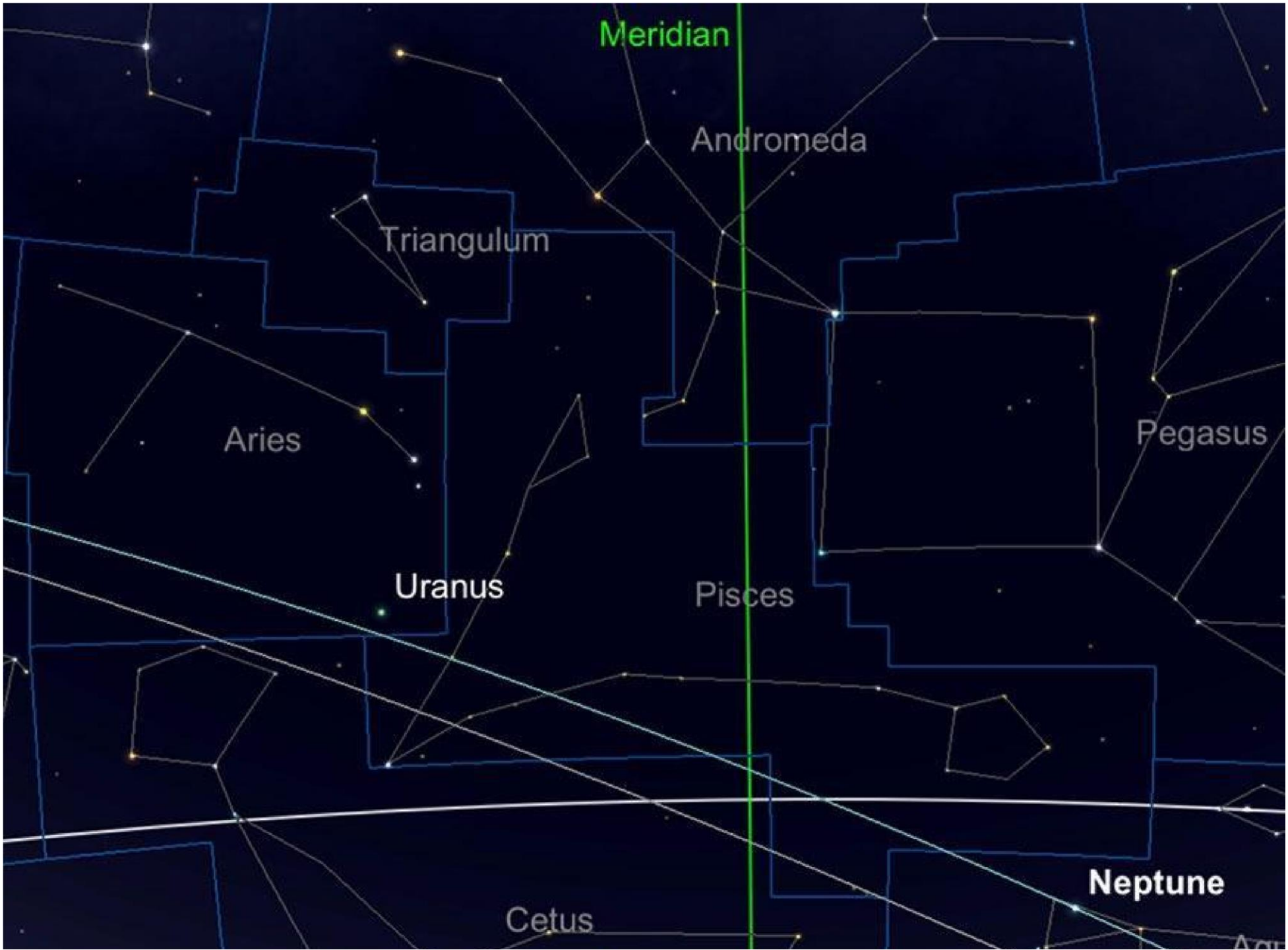


Satrun and Inner Moons, 1st December.

As the month progresses, the window closes: on the 15th, Saturn sets just two hours after the Sun; on the 31st, this figure has dropped to just over an hour. By this point, evening Saturnian observations will most definitely be at a practical end.

Uranus and Neptune

The Outer Giants are putting on a good show in the evening sky during December. While they are nowhere near as spectacular to observe or easy to find as the brighter planets, they have a charm all their own and the sense of achievement having found either is palpable. As often mentioned in this sky guide, both Uranus and Neptune present tiny disks in telescopes, which are akin to Planetary Nebulae in size and brightness. Astrophotography of both will reveal brighter albedo features and the more prominent moons of both planets.


Meridian
Andromeda
Triangulum
Aries
Pegasus
Uranus
Pisces
Neptune
Cetus

Urnaus and Neptune relative positions, early evening, 15th December. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Neptune is found further to the west in the Ecliptic in Aquarius and at =7.9 mag and 2.3 arc seconds across is definitely the more challenging of the two to find. It can be found within the bounds of the triangle of stars Psi, Phi and Lambda Aquarii in the eastern part of the constellation. If you have dark skies, it's possible to find Neptune with reasonable binoculars, though ready identification its disk can only really be judged in telescopes at more powerful magnification.

Uranus is the easier object at +5.7 mag and 3.7 arc seconds diameter. You can technically find it from a dark site if you have good eyesight and know exactly where you're looking. Binoculars will find it much more easily and it is possible to define it as not exactly starlike in a powerful pair. However, more generous telescopic magnification will reveal it as a definite green-grey disk. Uranus is found in Aries at present and although is lacks any brighter stars around it can be found relatively easily by tracing a line between Alrischa, Alpha Piscium and Hamal, Alpha Arietis. Uranus can be found just south of the half way point between these two stars.

A quick guide to locating Uranus, found between Hamal and Alrischa. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Comets

Although it now seems that C/2017 T2 PanSTARRS will in all likelihood not reach naked eye brightness as previously hoped for, it should still be an interesting comet to track down in telescopes and larger binoculars. The comet begins the month just under 4 degrees to the west of Capella in Auriga and continues to track its way northwest in to Perseus as the month continues, finally crossing over into the southern part of Camelopardalis on the 19th/20th, before rejoining Perseus in its upper northerly reaches on the last day of the year. At time of writing, the comet is hovering around the 10th magnitude, but by the end of the year could be as bright as the 6th magnitude, but is more likely to be around +7.5 mag - still reasonable if you've got a telescope or binoculars, but not quite the showstopper we'd initially hoped for. Such are the ways of comets…


2020 Jan 18
2020 Jan 09
2019 Dec 31
Zenith
2019 Dec 22
2019 Dec 13
Perseus
2019 Dec 04
C/2017 T2 (PANSTARRS)

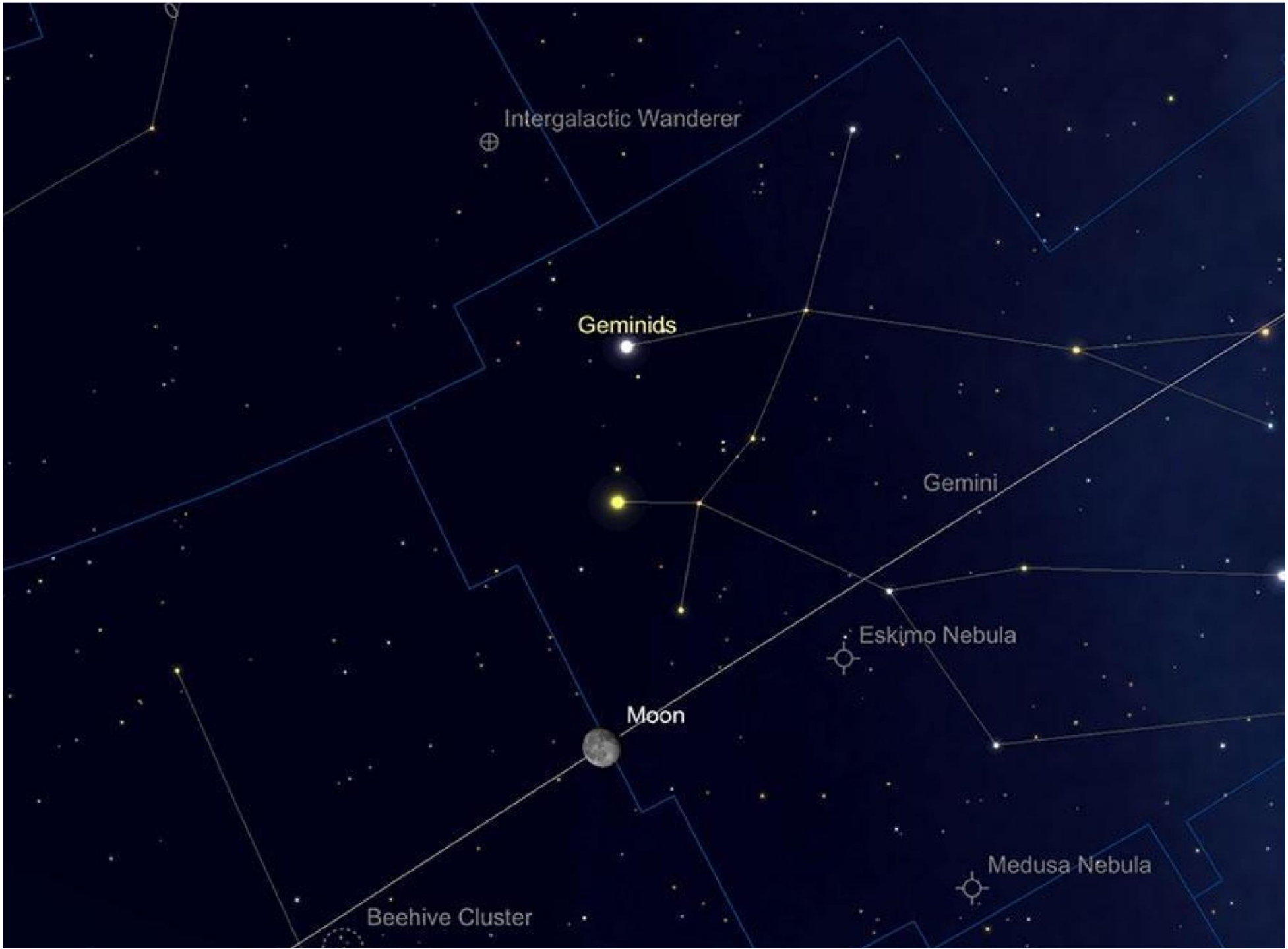
Comet 2017 T2 (PanSTARRS) path through December 2019 (comet position shown 1st Dec). Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Meteors

Arguably the best meteor shower of the year, the Geminids, peaks on 14th December. Giving a regular zenith hourly rate of in excess of 100-120 meteors (though in practise much less are actually seen from any given location), the is shower is a reliable one, fed by the mysterious "rock comet" asteroid 3200 Phaethon. The shower is expected to be visible from 4th/5th to the 17th December this year.

The Geminids radiate from an area inside the constellation of Gemini and are usually very well seen from the northern hemisphere. 2019 is a west case scenario in terms of the influence of Moonlight: the evening of the 14th will be influenced by the Waning Gibbous Moon at

around 91% illumination, sat right on the Gemini-Cancer borders. However, the second week in the month does present some opportunity for seeing some of the Geminids - albeit at a reduced rate of frequency - in the early hours, after the Moon has set.


Intergalactic Wanderer
Geminids
Gemini
Eskimo Nebula
Moon
Medusa Nebula
Beehive Cluster

The Geminids Radiant, with the Moon nearby, peak night (14th December). Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Normally, the shower presents great opportunities for astrophotographic record - all you need is a solidly mounted camera, capable of timed exposures, with a reasonably wide field lens. Once set up - even in a fairly light polluted environment - you will be unlucky not to capture a couple of brighter meteors, given an hour-or-so's multiple exposures. The brightest of the Geminids will cut through some influence of moonlight. Though the lead up to the shower's peak, rather than the peak itself, will present better the opportunities this year.

Deep Sky Delights in Auriga and Taurus


Meridian
Zenith
Mirfak
Almach
M 34
Perseus
Algol
Capella
Menkalinan
Auriga
California Nebula
Starfish Cluster
Pinwheel Cluster
M 37
Elnath
Pleiades
Maia Nebula
Merope Nebula
M 35
Gemini
Taurus
Hyades
Aldebaran
Alhena

Taurus and Auriga - Image created with SkySafari for Mac OS X, ©2010-2012 by Southern Stars, www.southernstars.com.

The zodiacal constellation of Taurus, The Bull, is home to some of the most outstanding deep sky objects in the sky, the most notable of these is perhaps M45, the Pleiades, or the Seven Sisters. At collective magnitude of +1.5, M45 is easily seen with the naked eye and has been recorded by numerous cultures throughout the world. The ancients knew the Pleiades by different names: Subaru in Japanese, Krittika in Hindi, Soraya in Persian amongst many others. The Pleiades are mentioned in Homer's Odyssey and Iliad, the Bible and the Quran. It is known that cultures as far apart as the Maori and Aborigines and the Native Plains Tribes of North America had knowledge of this star cluster - which makes it pretty well-known worldwide!

M45 presents its nine major members, (named after siblings from classical Greek mythology), the "sister" stars of Merope, Sterope, Electra, Maia, Tygeta, Celaeno and Alcyone - along with the "parent" stars Altas and Pleione - to the naked eye from a very dark location, but most people with reasonable eyesight can split six under average skies. Telescopes and binoculars reveal many more of the 1000-or so members of the cluster and larger instruments and photography can pick up blue-hued reflection nebulosity surrounding the cluster - particularly around Maia and Merope. This nebulosity is caused by illumination of left-over material from the cluster's formation. The view of M45 with a widefield, low power eyepiece is one of the most glorious sights in any telescope, though at 2 degrees in diameter, one has to be careful about eyepiece choice in order to get the outlying members in a useable field of view.

M45, The Pleiades Cluster. Image Credit: Kerin Smith

The Pleiades are thought to be around 100 million years old and lie between 430 and 440 light years away.
Next door - though not cosmically speaking - to the Pleiades is the older and more spread-out Hyades cluster. Its major naked eye members are arranged in a V-shape which marks the head of Taurus. Again, similarly to M45, the Hyades have been known since antiquity and were traditionally seen by the Ancient Greeks as being the sisters of the Pleiades - via their shared father Atlas.

The Pleiades and the distinct "V" of the Hyades below (with Geminid Meteor). Image Credit: Kerin Smith

The Hyades lie 152 light years away, and as such are nearest star cluster to us on Earth (though arguably the stars in the Plough or Big Dipper in Ursa Major can actually be thought of as a cluster and are closer). The Hyades consist of over 300 individual stars and modern estimates put its age at around the 600+ million year mark - making it markedly older than the Pleiades. The Hyades share a galactic trajectory with M44, the Beehive in nearby Cancer, again suggesting a common origin point in space. However, the Beehive appears to be slightly older at 600-730 million years.

Line of sight puts Taurus' principle Alpha star Aldebaran - the eye of the Bull - within the boundaries of the Hyades, though this Red Giant is unrelated and distinctly closer to us at 65 light years.

Reaching East down the Southerly "horn" of the Bull, we come to the +3 mag star Zeta Tauri. This star is a convenient location point for another jewel of the night sky - the Crab Nebula, M1 on Messier's List.

The Crab Nebula is the remnant of a star which went Supernova in the year 1054 (to us here on Earth). This event was recorded throughout the world, from New Mexico to China. It would have been a dazzling sight, peaking at -6 mag, brighter than the planet Venus and visible in daylight. After it faded, the event receded from popular consciousness and it was nearly 700 years later, in 1731, that the object than would become known as the Crab was discovered by Astronomer John Bevis. Messier rediscovered it when searching for the return of Halley's Comet 27 years later in 1758. First thinking the object was a comet, it was the Crab that prompted Messier to compile his list, so other comet-hunters would not be confused by these static, cloud-like objects when searching the heavens.

Lord Rosse, observing the Crab with what was then the largest telescope in the world at his Birr Castle Observatory in Ireland, in 1844, made a sketch that showed claw-like protrusions - presumably the filament structure of the outer lying regions. The object was nicknamed the Crab - and the moniker stuck.

Early both Century photographic observations of M1 showed that the object was expanding rapidly. This expansion was extrapolated backwards and it was noted that the object should have started its expansion around 900 years previously. A little bit of astronomical detective work ensued and the events of 1054 and the Crab were tied together.

Although a hardly dazzling +8.39 mag, the Crab's is quite well condensed and as such its surface brightness is fairly high. It can be found as a misty patch with ordinary binoculars, though larger binoculars reveal it as a definite elongated, round-edged feature. Telescopically, the texture of the Crab becomes evident in refractors of 4-inches aperture or reflectors of the 6-8-inch class. Reflectors of 16+ inches in aperture and dark skies are needed to glimpse the filament structures of M1's outlying regions and real striation in its core.

Filtration will help with this object, especially in small instruments where it can sometimes be difficult to isolate the nebulosity of the object from the rich background of the Milky Way.

Photographically, the Crab Nebula is a rewarding target, with the "Hubble Palette" of H-Alpha, OIII and SII being particularly useful in bringing out the tangled, chaotic structure of the object's core. Though it can be very effectively recorded with single shot colour cameras, as displayed by Mark Blundel's picture below, which was taken with a Canon 1100D via a Meade 6000 Series Triplet Refractor on a Skywatcher HEQ5 Pro mount, guided via the Orion Magnificent Mini Autoguider package.


M1 Crab Nebula
Consl: Taurus
By Mark Blundell
30th November 2016

The Crab Nebula. Image Credit: Mark Blundell

No-one with any form of optical equipment should ignore the Crab Nebula. While not as spectacular is the neighbouring Orion Nebula, it is the only easily-observed remnant of a Supernova that humans have actually observed in relatively recent history. Given the dearth of Supernovae in our galaxy in recent times, the Crab remains a special object to us.

Moving northwards into Auriga, the Charioteer, following straight line from Zeta Tauri, the more southerly tip of the Bull's two horns, through Elnath, one of the few stars in the sky that is shared between two constellations, giving it the classification of both Beta Tauri and Gamma Aurigae, we come to the Flaming Star Nebula, IC405. Found 6 degrees north of Elnaith, this object is a partial emission, partial reflection nebula, meaning that one part of its structure glows under excitement from radiation, whereas the other part merely reflects light from the stars imbedded in the object. Measuring around 30 x 19 arc minutes, IC405 is centred around the star AE Aurigae, a star which was ejected from the nearby Orion Nebula under 3 million years ago. At +10 mag, it is not an intrinsically bright object, but condensed enough to be seen in small telescopes from a decent location. It is unsure if any of the material that makes up the Flaming Star Nebula was once a part of the Orion Molecular Cloud - it is more likely that it is material that the star is merely passing through. As previously mentioned, this is an area rife with gas and other star forming material. IC405 lies some 1500 light years from Earth.


IC 405 Flaming Star Nebula
Const: Auriga
7th/15th January 2016
By Mark Blundell

The Flaming Star Nebula. Image Credit: Mark Blundell

Just under 3 degrees to the NE of the Flaming Star lies the first of Auriga's three great open star clusters, the lovely M38, otherwise known as the Starfish Cluster. It's difficult to see exactly what resemblance this +6.4 mag, 20 arc minute diameter collection of stars has to the titular marine invertebrate, but it is certainly a pretty sight in any sort of optical instrument. M38 was first recorded by the preeminent Sicilian astronomer Giavanni Batista Hordierna in 1654 and re-squired much later by French observer Le Gentil in 1749. Le Gentil's observations alerted Charles Messier to M36's location and it was included in his original list in 1764.

At over a third of a degree angular diameter, M38 is ripe for observation in most telescopes and binoculars. Observers will note long chains of stars, many of which are blue, but there are also some lovely contrasting yellow and gold-coloured members. In total, M38 has around 100 stars as members and lies around 4200 light years from us. It is thought to be around 200-225 million years old.


Copyright Intihuatana

M38 (bottom left). Image Credit: Christos Doudoulakis, Creative Commons.

2 and 1/3 degrees to the SE of M38 we come to the second of Auriga's great clusters, M36. This cluster is a good deal more compact than its neighbour at 10 arc minutes diameter and slightly brighter as a resultant +6 mag. Through a telescope, this collection of hot white stars can appear quite brilliant in comparison to M38 - indeed, it is said that if M36 were placed in the position of the Pleiades, it would outshine them by a factor of three. M36 was again discovered by Hordierna, in 1654, rediscovered by Le Gentil and added to the Messier list in 1764.

M36. Image Credit: Ole Neilsen, Creative Commons.

This cluster is a good deal younger than its neighbour and contains many young hot blue main sequence stars, of spectral type B2 and B3. There are no older population stars to speak of in M36, so it is thought to be just 25 million years old. Lying at around 4300 light years hence, M36 is one of the many objects that share the moniker "The Pinwheel" - though apart from a circular collection of stars to the NE side of the cluster, it is difficult to see why it has picked up such a name - especially in the light of the other "Pinwheels" in the sky. Perhaps we should come up with a new more original nickname for this great cluster - it deserves better.

The last of Auriga's fine open clusters is its best - the spectacular M37. There are many great clusters in this area of sky: the much nearer Hyades, Pleiades, Beehive, the nearby M35 in Gemini and the Double Cluster in Perseus - but M37 is one the most beautiful of these and is a lovely sight is any telescope or binoculars. At a quarter of a degree in diameter, M37 is about the same angular size as the Full Moon in the sky. It is also the brightest of Auriga's "Trio" at +5.59 mag and the oldest at an estimated 300 million years of age. Like its neighbours, M37 contains many hot blue stars, but also significantly many more mature yellow, orange and red giant stars. This

more evolved stellar population makes for some fine viewing for we astronomers here on Earth as the blues of the newer, hotter population contrast superbly with the warmer tones of the older stars.

M37. Image Credit: Ole Neilsen, Creative Commons.

M37 was again discovered by Hodierna, though almost inexplicably was missed by Le Gentil - Messier himself found it again at catalogued it in 1764. M37's total stellar population is thought to number in the 500+ levels, of which maybe 150-or-so are observable in amateur telescopes. It is the furthest lying of Auriga's clusters at 4500 light years distance and the largest at 25 light years across.

Sitting astride (from a northern hemispherical perspective) this rich are of sky is Auriga's principle star, Capella. At +0.08 mag, Capella is the sixth brightest star in the night sky, being a shade fainter than Vega. It is comprised of two large G-type stars - roughly the same temperature as our Sun - but these are much larger in mass and diameter and have already begun to exhaust their nuclear fuel. Despite being a little over 42 light years away, this system is not split-able (as yet) with even the largest of Earth-bound telescopes, as the two main component stars orbit a common centre of gravity which keeps them around 60 million miles apart, roughly 2/3rds of the distance between the Earth and Sun. There is a much fainter outlying star system which is gravitationally bound to the main Capella pairing, though this comprises itself of two faint M-class dwarf stars, making the whole system technically a Quadruple star.

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