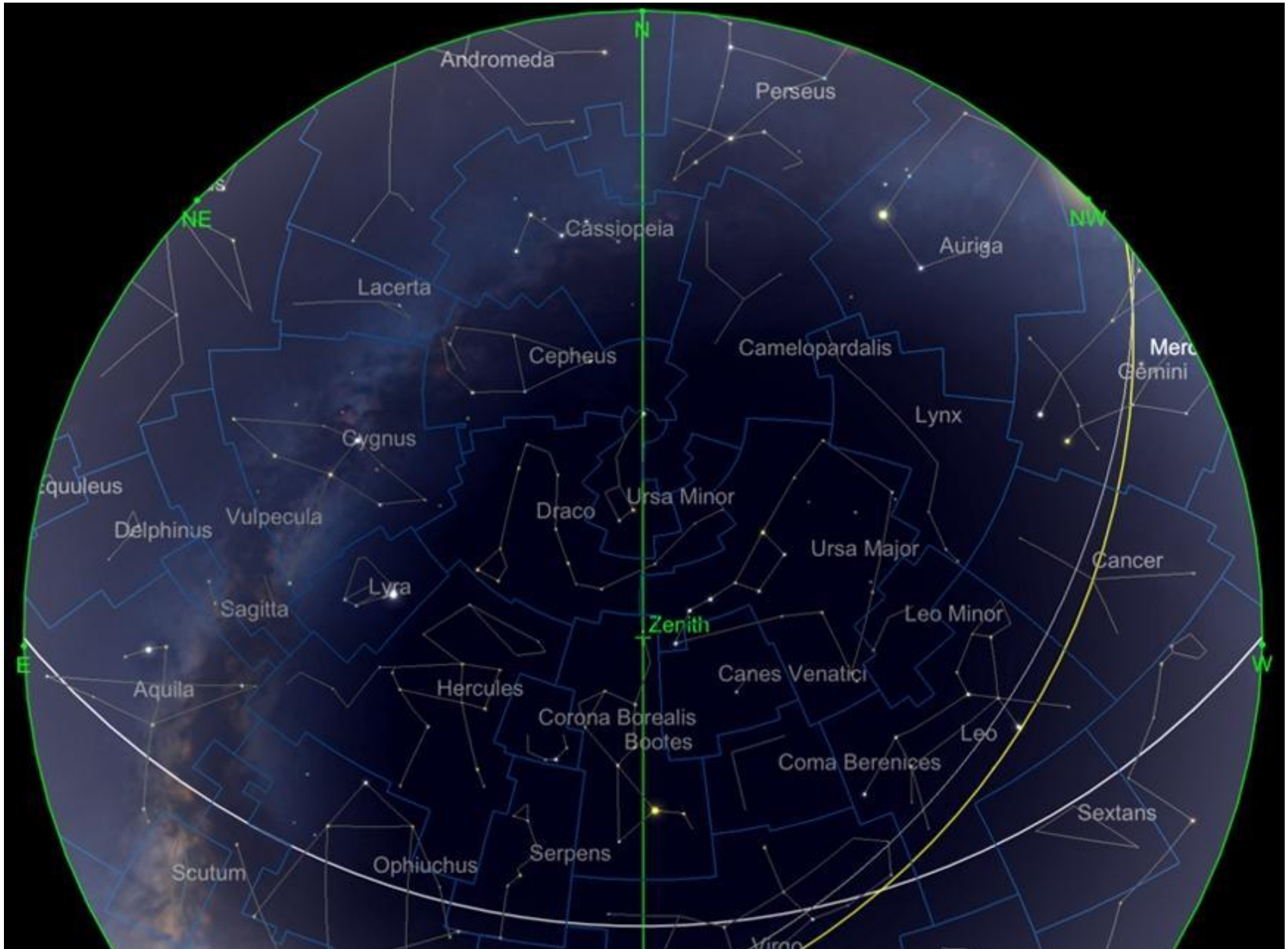
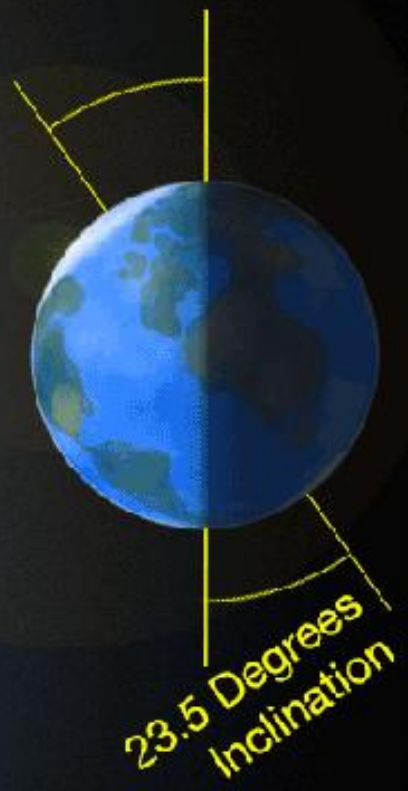

N
Andromeda
Perseus
NE
Cassiopeia
NW
Auriga
Lacerta
Cepheus
Camelopardalis
Gemini
Lynx
Cygnus
Draco
Ursa Minor
Delphinus
Vulpecula
Ursa Major
Cancer
Lyra
Sagitta
Zenith
Leo Minor
E
W
Aquila
Hercules
Canes Venatici
Corona Borealis
Bootes
Leo
Coma Berenices
Sextans
Serpens
Ophiuchus
Scutum

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

June is here and along with it both a Summer *and* a Winter Solstice - depending on which hemisphere you find yourself. For those of us who find ourselves in the Northern Hemisphere, June is the lightest part of the year. This owes itself to the Summer Solstice falling on the 20th June for the Northern Hemisphere in 2020. At this point, the Sun reaches the most northerly point in the Ecliptic and its highest separation from the horizon as it crosses the meridian. Of course, for every action, there's an equal and opposite reaction - while we Northerners bask in the glory of Midsummer, those in the Southern Hemisphere are in the grip of Midwinter. The cause of these extremes - and all our seasonal weather on Earth - is our planets' rotational tilt (around 23.5 degrees from "vertical") in comparison to the plane of our orbital path around the Sun. During the Summer time, the leading hemisphere is pointed towards the Sun, thus receiving more light to warm up the land and sea. Days are subsequently longer and nights are shorter, the further towards the pole you find yourself. In Midsummer, those above the Arctic Circle experience 24 hour daylight. Of course, the opposite is true for all of this if you find yourself in the trailing hemisphere.

Earth's Orbital Inclination During June

Northern Hemisphere of Earth turned further
Towards the Sun in June = longer days

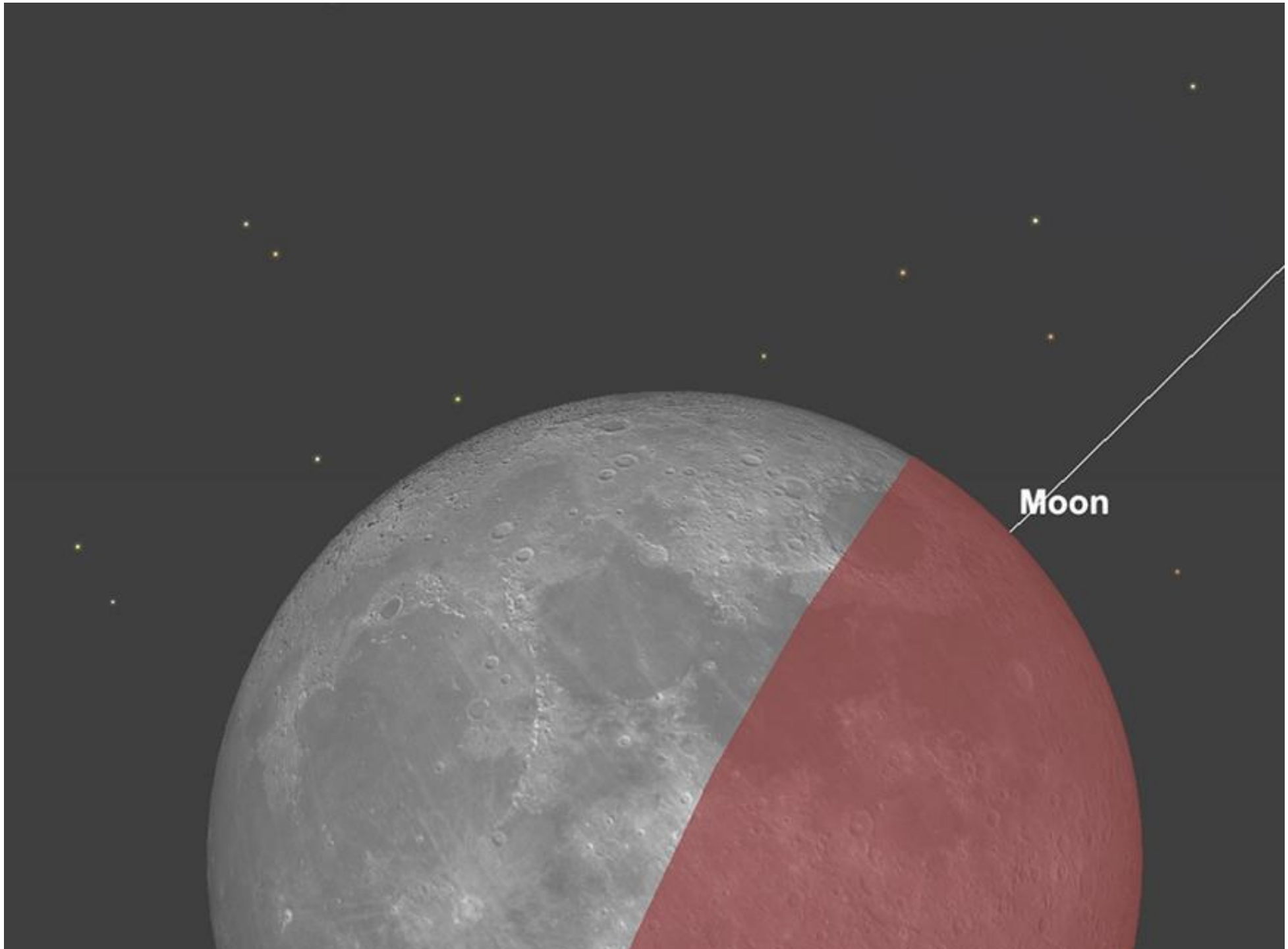


The Solar System

The Moon

The Moon starts May in Virgo, at Waxing gibbous phase. The Moon will rise at around 3.30pm and be transiting in the south a little after sunset during the early part of the month.

The Moon will reach Full on the 5th, when it will be found in the non-zodiacal constellation of Ophiuchus. This coincides with a Penumbral Lunar Eclipse, which will be visible as the Moon rises over Europe. A Penumbral Lunar Eclipse occurs when the Moon enters the ring of “shadow” caused by light passing through the Earth’s atmosphere. This is not a full eclipse, when the Moon enters into the full shadow of the Earth, but can still be quite noticeable. Given a reasonable easterly horizon, the eclipse will be visible, but quite how “deep” it appears, depends on the state of the Earth’s atmosphere. At times after large volcanic eruptions, Penumbral shadow can be quite deep. Given the comparative lack of air traffic around the world, it’ll be interesting to see quite how prominent this appears.


Moon

The Moon rising mid-Penumbral Eclipse, 5th June. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Naturally, around the 5th isn't the greatest part of the month for visual deep sky observations, or imaging without narrowband filtration. After becoming Full, the Moon will continue its gentle path through the most southerly parts of the Ecliptic the descending southern section of the Ecliptic, through Ophiuchus and into Sagittarius and Capricornus - passing south of Jupiter and Saturn as it does on the early hours of the 9th.

Last Quarter will occur on the 13th, when the Moon will join Mars and Neptune in Aquarius.

The Moon will reach New on 22nd, gliding to the south of the Sun in Gemini. 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. While the latter part of the month is most certainly going to give us the best opportunity for imaging or observing deep sky targets, this must be tempered somewhat by the fact that true astronomical darkness for those of us in the temperate northern hemisphere and above, is going to be some way off.

From this point, the Moon becomes an evening object and may just be found a few days later as a very thin crescent in Cancer and Leo. As the Sun is now in the most northerly part of the Ecliptic, Crescent Phase now occurs in the "descending" part of the Solar System's path through eh sky, as viewed from the northern hemisphere. The Moon reaches First quarter, in Virgo, on the 28th, transiting at around 7.40 pm BST. The Moon ends the month on the 31st, back at Gibbous Phase, having crossed over the border into the neighbouring constellation of Libra.

Mercury

The early part of the month is the best time to catch the illusive innermost planet. The 1st finds Mercury in Gemini, shining at +0.3 magnitude, at 7.7 arc seconds diameter, showing a 43% crescent phase. The planet will just be visible to the naked eye under ideal conditions, but will definitely be well-seen in binoculars and telescopes at the beginning of June.


Auriga
Mercury

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

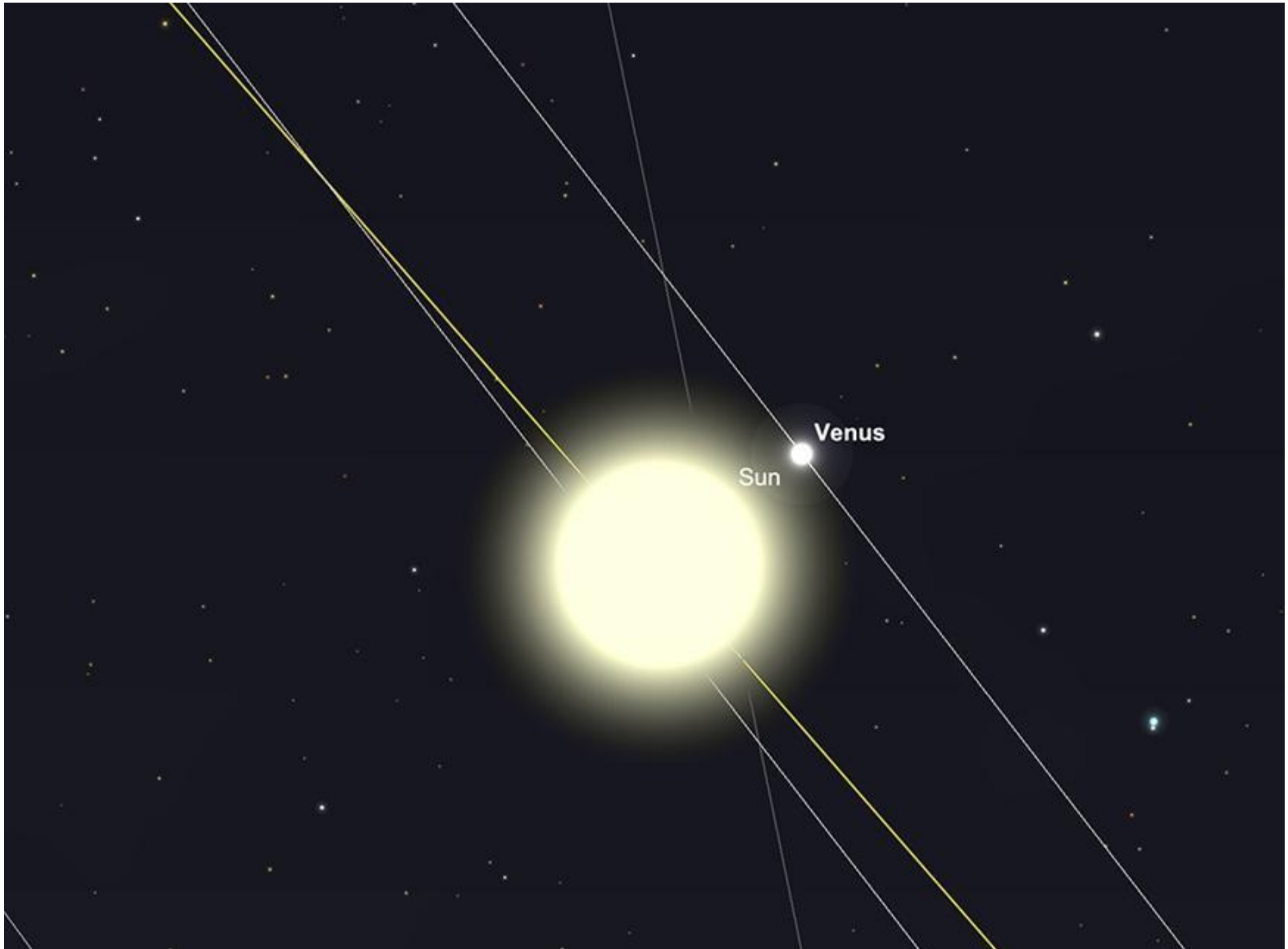
Mercury reaches maximum eastern elongation from the Sun on the 4th June, when it will have faded a little to +0.6 mag and showing a 36% phase. At this point it will reach an elevation of 15 1/2 degrees high at sunset (from 51 degrees N). Beyond this point it will begin to head down towards the Sun rapidly, loosing altitude as it does and fading quite considerably too, making it much more difficult to spot.

By the 15th June, Mercury is only 16% illuminated and as a consequence +1.9 magnitude brightness. The elevation from the horizon at sunset will now be just over 9 degrees (from 51 degrees N).

Inferior Conjunction, where Mercury is found between Earth and the Sun occurs on 30th June. Naturally, at this point in time it is completely invisible to us and will emerge as a morning target in July.

Venus

We have had a tremendous run of observing opportunities as far as Venus is concerned over the past few months, but all good things must come to an end. Venus sunk like a stone in late May and is now at its closest point to Earth. Like Mercury, Venus' inferior conjunction occurs in June, this time on the 3rd. At this time Venus will be invisible in the sun's glare for us here on Earth.


Venus
Sun

Venus at Inferior Conjunction, 3rd June. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.
By the end of the month, Venus will have climbed to a reasonable altitude in the morning sky. The planet can be found at 15 degrees altitude (from 51 degrees N) at sunrise on the 30th, shining away at a brilliant -4.5 magnitude in Taurus.

The next really favourable evening apparition of Venus will come in the spring of 2023. While it will be visible between now and then, the planet won't appear as high in the sky as it has recently, for those of us in the northern hemisphere, until then.

Mars

Mars continues to improve. On the 1st, it is found in Aquarius, shining at a steady +0.0 magnitude. It is 9.3 arc seconds across and will stand just under 22 1/2 degrees high in the sky in the SE as the Sun rises.

On the morning of the 13th, Mars come together in with Neptune and the Moon in the morning sky. While Mars' proximity to Neptune would normally provide a helpful pointer to the much fainter world, the Moon's proximity may make Neptune a difficult target, though a telescope will reveal the planet. By this point, Mars will have brightened a little to -0.2 mag.


Neptune
Mars

Mars, Neptune and the Moon in conjunction, sunrise, 13th June. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

By the end of the month, Mars will have brightened again to -0.5 mag and will now display a 11.4 arc second diameter disk. The planet will now be found in Pisces, having climbed a little higher in the sky. While there's still a while before Mars is at its best, when it reaches opposition in October of this year, the Red Planet is definitely improving and worth taking a look at in a telescope, if you're up early enough.

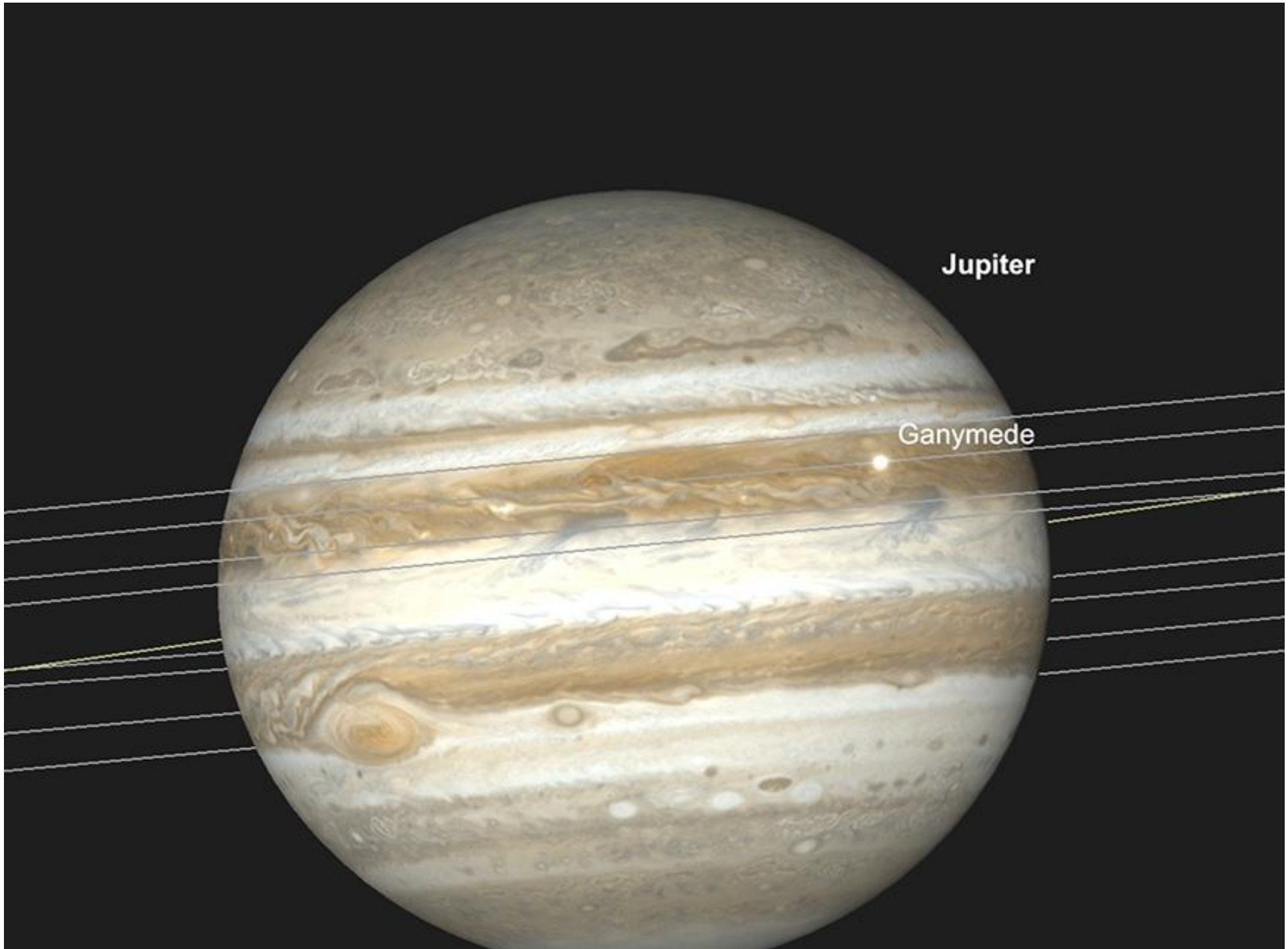
Jupiter

Jupiter is also morning object and at the beginning of June is just six weeks away from Opposition. At the start of the month Jupiter will be found a little over 134 degrees from the Sun on the western side — standing at an altitude of just under 18 degrees at sunrise on the 1st (from 51 degrees N). At -2.6 magnitude and just under 45 arc seconds across, it will be a easy find in the dawn sky (if you have reasonable easterly horizons), but it will be at lower than optimal elevation, so will be require some reasonable sky conditions to be observed at decent powers in a telescope.

By mid-month, the situation has changed a little: Jupiter's brightened fractionally to -2.7 mag and is now 46.2 arc seconds angular diameter. Rising just under 7 hours before the Sun, it approaches transit point around 3.30am.

By the 31st, Jupiter will reman at magnitude to -2.7 and will sit at 9 degrees elevation in the south at sunrise. We are headed towards Jovian opposition in mid-July, so the trend is most definitely positive as far as Jupiter's concerned. By the time the month ends, Jupiter can be found 164 degrees to the west of the Sun, rising at a little after 10pm.

There's a couple of good mutual transit events visible from Europe: on the 19th there's a mutual Great Red Spot and Ganymede transit at around 1.20am (BST) and another GRS/Ganymede transit again at around 2.20am on the 26th.


Jupiter
Ganymede

Jupiter Great Red Spot and Ganymede transit, 1.23am (BST), 19th June. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

It’s worth pointing out again that for those readers in the northern hemisphere, Jupiter is not especially well-placed, reaching a maximum altitude of just under degrees at the end of the month (from 51 degrees N, though naturally will be higher in the sky for thise further south). Those attempting observations are encouraged to keep magnifications modest when it comes to telescopic viewing. Atmospheric haze and movement will inevitably be something we’ll have to deal with and those attempting to image Jupiter would be best to go down the high speed filming route, preferably using an Atmospheric Dispersion Corrector, which can compensate for atmospheric refraction, which affect objects increasingly, the closer they appear to the horizon. An ADC won’t combat poor seeing, but it will make a difference in keeping everything tighter from a spectral point of view, as is aptly displayed by Geof Lewis' image of Jupiter below, taken around l2018's opposition.

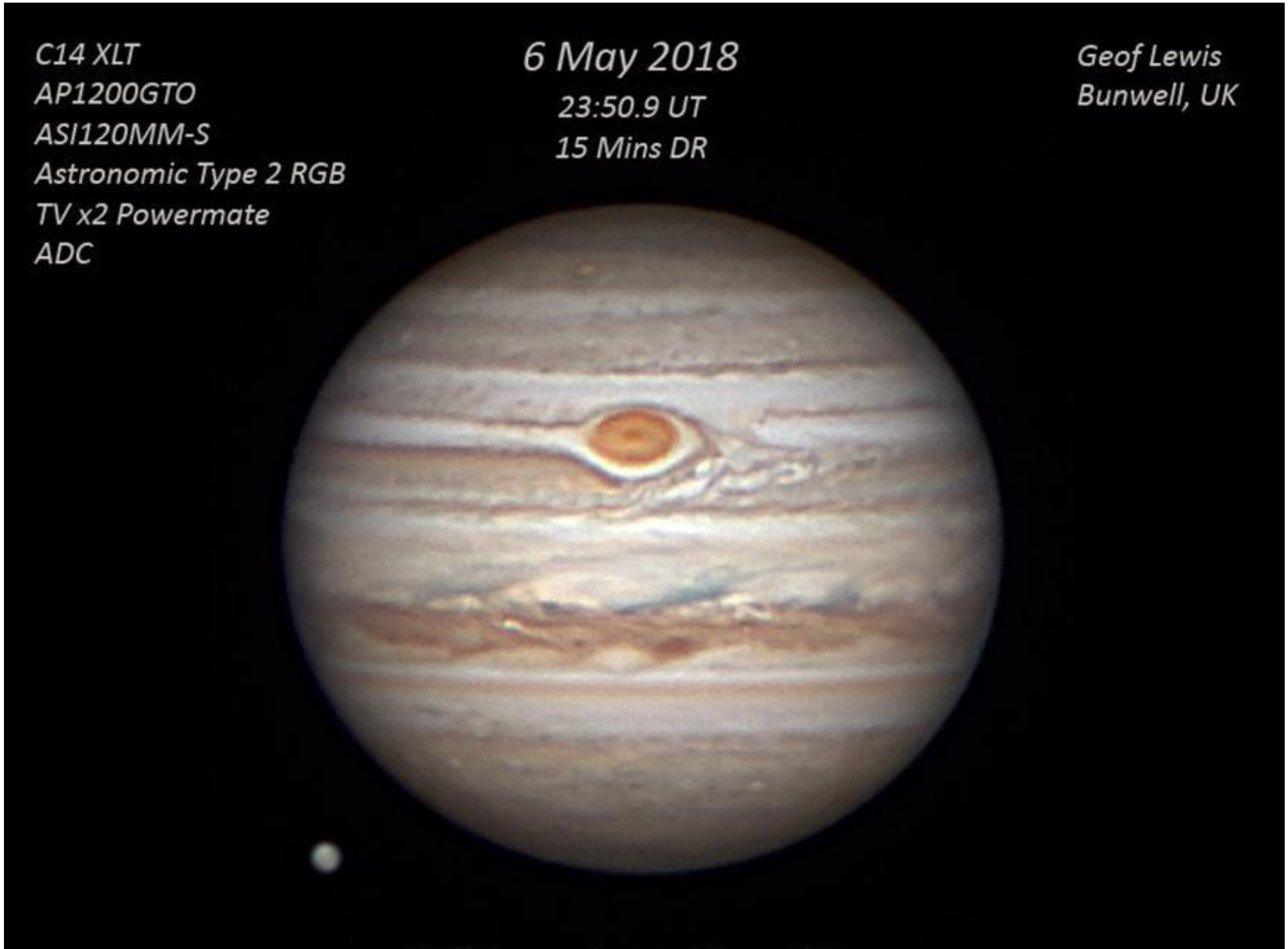

C14 XLT
AP1200GTO
ASI120MM-S
Astronomic Type 2 RGB
TV x2 Powermate
ADC
6 May 2018
23:50.9 UT
15 Mins DR
Geof Lewis
Bunwell, UK

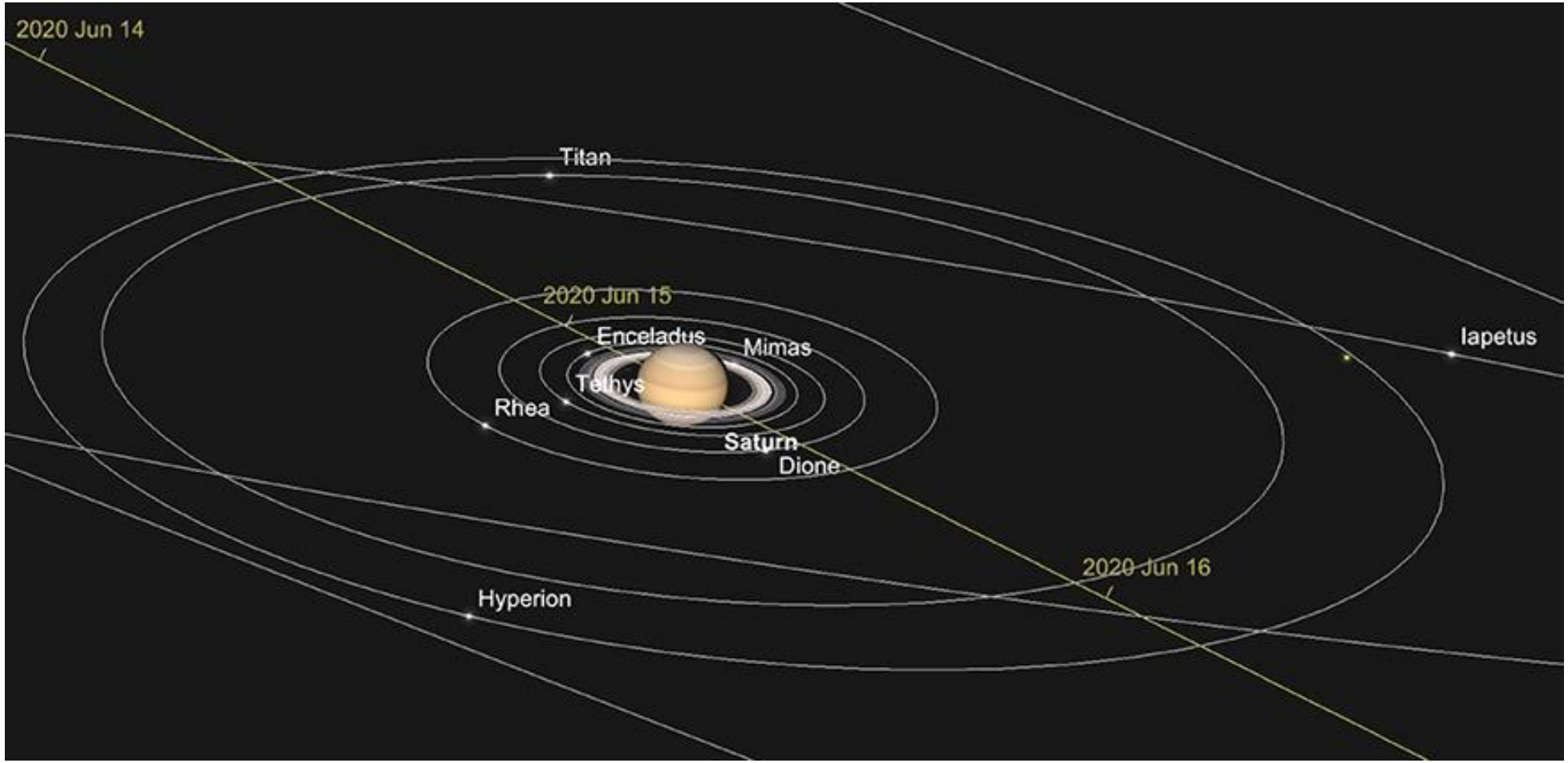
Image credit: Geof Lewis. Image used by kind permission.

Saturn

Like Jupiter and Mars, Saturn is found on the morning side of the Sun, rising at a little after 12.30am (BST, from 51 degrees N) and stands just over 19 degrees high in the S at sunrise. At +0.4 mag, and 17.8 seconds of arc diameter, Saturn isn't especially prominent, but still brighter than any star in its resident constellation of Capricornus (though somewhat overshadowed by the much brighter Jupiter, just under 5 degrees to the west, in Sagittarius). It is separated from the Sun by just under 129 degrees on the 1st.

By mid-month, Saturn is a shade brighter, at +0.3 magnitude and a little larger in angular size at 18.1 degrees of arc. The Ringed Planet will rise at 11.30 pm and will reach transit point - the highest point in the sky - at a little before 4am BST (from 51 degrees N).

By the end of the month, the Ringed Planet has now brightened to +0.2 mag and is 18.3 arc seconds across - a definite upward trend, which will continue up to late July’s Saturnian Opposition. The planet now rises at just before 10.30am (BST), transiting at 2.48am.



Saturn and major moons, 15th June. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Uranus and Neptune

Neptune is a morning object, but separated from the Sun by a little over 80 degrees at the beginning of the month and as a consequence, doesn't gain a huge amount of altitude before dawn. As previously mentioned, Mars provides a handy guide to Neptune's location on

the morning of the 13th, (though the proximity of the Moon may hamper observations). At +7.9 magnitude, Neptune is always a tricky target, but its early morning observing window is opening slowly.

Further East in the Ecliptic than Neptune, Uranus is brighter at +5.8 magnitude, but closer to the Sun, so will be a real challenge to observe, even at the end of the month - especially with the lack of true astronomical darkness at this time of year.

Uranus and Neptune relative positions, 30th June. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

The latter half of the year will be when both the outer planets rise earlier and also reach opposition - this occurs in late October for Uranus and mid-September for Neptune. This will be an easier and more productive time to try and find these outlying worlds.

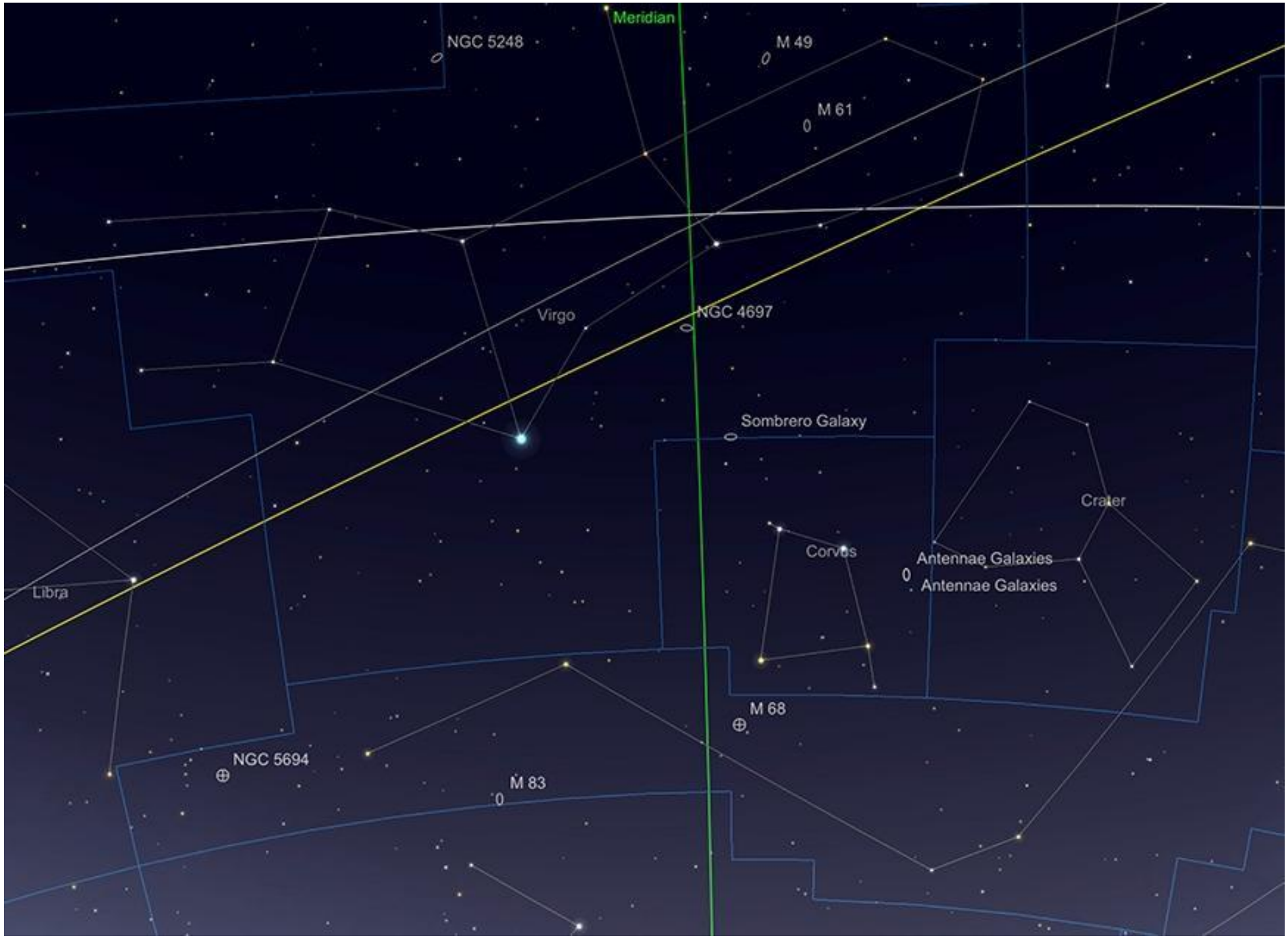
Noctilucent Clouds

Noctilucent Clouds are often seen in June - their bright gossamer-like structures can normally be seen low on the northerly horizon, between latitudes of 50-65 degrees, when the Sun is between 6 and 16 degrees below the horizon. These clouds are mysterious - there were no recorded sightings of them before 1885. Some researchers believe they are formed as a result of volcanism, human-induced atmospheric pollution or even the condensation of water vapour along the trails of meteors. Whatever their origins, now is the best time to see them from Northern latitudes. Interestingly, whilst Noctilucent Clouds have been observed in the Southern Hemisphere, their incidence appears much, much less than their Northern Hemispherical counterparts. Whatever their origins, now is most definitely the right time to witness their ghostly displays.

A fine display of Noctilucent clouds taken by Anke Morbitzer of Bresser GMBH in 2018. Image used with kind permission.

Deep Sky Delights in the East of Hydra, Corvus and the South of Virgo

We covered Coma Berenices and the northern part of Virgo in last month's sky guide. This month we will turn our gaze to the southern part of Virgo and the constellations that sit yet further south below it: the tail of Hydra, the Water Snake and Corvus the Crow and Crater the Cup, which sit atop his back.


Meridian
NGC 5248
M 49
M 61
Virgo
NGC 4697
Sombrero Galaxy
Crater
Corvus
Antennae Galaxies
Antennae Galaxies
Libra
M 68
NGC 5694
M 83

Eastrn Hydra, Corvus, Crater and the south of Virgo. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

The first major object south of the Bowl of Virgo is the galaxy NGC4697, which is a brighter elliptical galaxy, discovered by William Herschel in 1784. This galaxy is fairly easy in small telescopes, as is its neighbour NGC4699, an attractive but compact spiral, which lies just under 3 degrees due South. At +9.19 mag NGC4697 is not especially bright, but is fairly easy to find, lying at the bottom of an imaginary equatorial triangle formed by the stars Porima, Gamma Virginis, a notable binary and good test of optics, and its neighbour Theta Virgis, also a double star. Tracing a line between the two stars, once you come to about half way, head South by just over 3 degrees. Here you will find NGC4697. This galaxy is thought to lie some 40 million light years away from us.

NGC4697, Hubble Space Telescope Image. Public Domain.

Virgo has many splendours, but a particularly popular one is M104, the Sombrero Galaxy, which can be found around 6 degrees to the south of NGC4697. The Sombrero was discovered in 1767 by Pierre Machain and though noted by Messier in an addendum to his original list, had to wait until Camille Flammarion rediscovered it in Messier's original notes in the early 1920s for it to be officially added as a Messier object. William Herschel made an independent discovery of it in 1784 and remarked upon the appearance of a "dark stratum" in the object. We now know this to be a prominent dust lane which rings the outer spiral structure of the Sombrero and gives it its distinctive - and apt - nickname.

The Sombrero Galaxy, taken with 80mm Apo and Explore Scientific 7.1MP Deep Sky Camera. Image used with kind permission.

The Sombrero is bright for a galaxy at + 8 mag and a decent size, (though hardly over-large) at 8.6 x 4.2 arc minutes in dimensions. It can be found in telescopes and binoculars of all sizes, though contrary to what is stated in many publications (which tend to overstate the size of telescope required), a good quality 4-inch refractor and a dark observing site and decent dark adaption will be needed to see its dust lane. Admittedly, the lane is much easier with a reflector of 8-10 inches in aperture, which will also resolve the true shape of the Sombrero better, but this should not put off observer with smaller instruments from attempting to spot it. Once found, M104 will not be forgotten in a hurry, it is a lovely object. M104 is even more spectacular when imaged, though from UK locations astrophotography of this target has to be timed carefully, as it is only at a reasonable height from the horizon for a limited period.

M104, the Sombrero Galaxy - Hubble Space Telescope Image. Public Domain.

M104 is thought to lie around 30 million light years away and calculations show that although it is around half the diameter (50,000 light years) of our own Milky Way Galaxy, it is considerably more luminous and has many more than our own galaxies number of attendant

Globular Clusters - 1200 to 2000 compared to the Milky Way's estimated 160 - more in line with a much larger Spherical Galaxy like the nearby Virgo A. M104 is also thought to be home to a supermassive black hole and the first object to have its redshift measured, which proved that it was clearly not a part of the Milky Way in 1912.

Leaving Virgo on a high note, we head further South into Hydra and its attendant constellations. Hydra is the largest constellation in the sky: a huge serpentine arrangement of stars in the southern celestial hemisphere, reaching all the way from its northerly borders with Cancer and Monoceros to the constellations of Libra, Lupus and Centaurus at is southerly tip. From a dark location, the Water Snake and its attendant and mythologically associated constellations of Corvus and Crater are easy enough to spot, but these constellations are much more of a challenge from light polluted areas.

In ancient Greek myth, Corvus the Crow was distracted from his assignment of delivering water in Crater the Cup to the god Apollo. He was waylaid waiting around for figs to ripen and forgot all about Apollo. Upon realising his mistake, he flew quickly to the god, picking up the unfortunate Hydra on the way, claiming that the Water Snake had stolen Crater from him and thus caused the delay. Apollo saw through this fabrication and cast all three into the heavens, charging the unfortunate Hydra with the task of guarding Crater forever, denying Corvus water in perpetuity. A little harsh maybe, but small fry compared to some of the punishments meted out by the gods in classical mythology.

The rather faint constellation of Crater the Cup sits atop the Water Snake's back and is home to many galaxies, though sadly none of these is brighter than +11 mag, apart from the reasonably prominent spiral NGC 3887, which at +10.60 mag is observable in larger telescopes of 8-inches aperture and above and a worthy photographic target. NGC 3887 was discovered by Sir William Herschel in 1785 and displays itself as a compact, almost face-on spiral which displays itself as a brighter core with its spiral arms shown a surrounding halo of misty light. The large amount of other galaxies in Crater are the preserve of these with yet larger instruments and dark skies.

Neighbouring Corvus the Crow is a little brighter as a group of stars, which are formed into in a noticeable quadrilateral arrangement. Arab astronomers identified Corvus as a tent, Chinese astronomers as a Chariot and others as a sail. In a similar situation to neighbouring Crater, Corvus contains many galaxies - the vast majority of these being overspill from the nearby Virgo cluster. However, most are, like Crater's quite faint. The brightest galaxial target is however spectacular in both telescopes and astrophotographs; NGCs 4038 and 4039 - the Antennae Galaxies.

Again, discovered by Herschel in 1785, these two spiral galaxies are the closest and most recent example of colliding galaxies in the whole sky. At 40-45 million light years distance, the Antennae really do look like their nickname, as the tidal interaction of the collision has sent out two huge, long arcs of stars in either direction - over 350,000 light years into deep space.

At +10.30 mag, the Antennae can be picked up in reasonable-size telescopes with little effort, with both galaxies displayed as adjoining ear-shaped objects. Larger instruments of 8-10-inches plies will show the beginnings of the more southerly arc of stars as a small spur-like point, sticking out from the "earlobe" of NGC 4039. However, it is in astrophotographs that the true nature of this amazing object is revealed. For those with suitable equipment, skies and location (remember this object is very far south for those in the UK) the Antennae is a a great subject for imaging.

The Antennae Galaxies, Hubble Space Telescope Image. Public Domain.

Five degrees to the east and a little to the north of the Antennae, lies the compact but pretty planetary nebula NGC 4361. Common with many planetaries, it is not that bright - in this case + 11 mag - but NGC 4361 is compact (at 1.6 x 0.6 arc minutes), which makes it quite an easy target in a 6-8-inch scope. NGC 4361 forms the right angle point of a right angled triangle with Gienah Corvi (Gamma Corvus) and Algorab (Delta Corvi). From a dark site it will be easy to pick out from the background stars and has an uneven, almost rough appearance. Its central star is +13 mag. As with most planetaries, when it comes to visual observations, gains can be made by keeping magnification fairly high and using either OIII or UHC filters to help keep contrast with the background sky healthy.

NGC 4361. Image Credit: Adam Block/Mount Lemmon SkyCenter/University of Arizona - http://www.caelumobservatory.com/gallery/n4361.shtml. Creative Commons.

The last two objects we turn our attention to this month are always challenging for observers in the northern hemisphere as they are located so far south. The first of these, the globular cluster M68, lies 15 degrees almost due south of the Sombrero, back inside Hydra. M68 is a true Messier object, it was discovered by Messier in 1780, though is often erroneously attributed to Mechain. M68 is not the brightest of globulars at +7.84 mag, though at 3 arc minutes diameter is almost as large as the prominent M13 in Hercules. Easily seen, once located, in most telescopes and binoculars, though M68 is naturally better resolved by larger instruments, which will show the shallow curve of dark lanes around the south of the cluster. M68 lies around 33,000 light years distance from us here on Earth.

M68, Hubble Space Telescope Image. Public Domain.

Last, but by no means least though, we come to the marvellous galaxy M83 - a true showstopper of an object, though a real challenge for those in northerly climes, standing as it does just 13 degrees high at most from 51 degrees N. Observers in the Southern Hemisphere will see this wonderful target much better than those in the North, lying as it does on the border between Hydra and Centaurus. This barred spiral galaxy is bright at +7.5 mag and 12.9 x 11.5 arc minutes dimensions and is presented face on to us - displaying its beautiful structure in all its glory. As with all Deep Sky observation, the larger the telescope and the darker the site, the more an observer will see, but anyone will be able to see something of M83 with some form of optical aid. The elongated part of M83's central bar is the most prominent part of the galaxy and will be picked up easily in large binoculars. However, its expansive looping spiral arms, bisected by dark dust lanes are really the preserve of telescopic observation.

M83. Image Credit: ESO. Creative Commons.

M83 lies a comparatively close at 15 million light years distance from us, as part of the extended Centaurus cluster of galaxies. It is comparable in size with the Milky Way, with a diameter of around 100,000 light years. M83 is active in star formation and contains a large amount of hot young blue stars and active Hydrogen star-forming nebulae. As active as M83 is in star formation it is also rich in terms of the demise of stars: M83 previously held the record for the largest amount of Supernovae observed in one galaxy, though this has recently been surpassed by NGC 6946 and its count has also been equalled by M61.
Unsurprisingly, M83 presents itself exceptionally well in imaging terms, but it is really the preserve of astrophotographers considerably further south than those in the UK and Northern Europe and the Northern parts of America or Asia. Readers in the Southern Hemisphere are encouraged to make the most of M83 for both visual and astrophotgraphic terms - it's a beauty!

Text: Kerin Smith