Telescope House August 2020 Sky Guide

Solar System

The Moon

The Moon begins August in Sagittarius as a Waxing Gibbous of just over 96% illumination. At barely over a day before Full, this naturally isn't the best part of the month for Deep Sky observing or imaging (without heavy filtration). Our natural satellite passes to the south of Jupiter and Saturn on the morning of the 1st and 2nd on the Sagittarius/Capricornus borders. The Moon actually reaches Full after passing into the constellation of Capricornus in the small hours of the 3rd from Europe.

It's uphill within the southern part of the Ecliptic as the Moon reaches First Quarter in the 11th while in Aries, before which on the early morning of the 9th, it slinks to the south of Mars (by just over 2 degrees) on the Pisces/Cetus borders.

The Moon then continues its coast up and over the most northerly part of the Ecliptic, until it reaches New in Leo on the 19th, passing to the north of the Sun and Mercury on the "evening" eastern side of our parent star.

The Moon reaches its visible Evening Crescent phase in a relatively low part of the Ecliptic from the northern hemisphere, drifting through the eastern reaches of Virgo and Libra until it comes to First Quarter in Scorpius on 25th August. Before ending the month at just shy of Full again, the Moon again joins Jupiter and Saturn in Sagittarius for another close encounter on the 28th and 29th August.

Mercury

The Innermost Planet starts the month as a -0.8 mag, 6.1 arc second diameter, 70% illuminated target, standing just under 12 degrees high in the east at sunrise (from 51 degrees N). Mercury is drawing round the Sun away from us, decreasing its separation from the Sun and its brightness as it does.

By the beginning of the second week of August, Mercury will have increased its brightness to -1.3 magnitude and is 5.5 arc seconds across. But by this point, the planet has decreased its separation from the Sun and will stand just over 9 degrees high at sunrise.

By the month's mid-point, Mercury will have dipped back towards the Sun significantly and decreased it's angular separation from our parent star by a very great degree. Mid-August finds Mercury at a brilliant -1.8, but will be so close to the Sun that it will be impractical to observe, being just two days from Superior Conjunction, after which it will re-emerge on the evening side of the Sun.

Mercury slowly increases its separation from the Sun after Superior Conjunction, but the evening side of the Sun finds Mercury in a very shallow setting part of the Ecliptic from Northern Latitudes and above, meaning the while the planet will have increased its separation from the Sun to nearly 13 degrees by the month's end, it will be just under 4 degrees separation from the horizon at sunset on the 31st. Subsequently, it is definitely the early part of the month that rewards the early riser as far as Mercury's concerned.

Venus

The brilliant Venus starts August as a relatively well-placed object for observations in the morning sky, sitting in Taurus at -4.4 magnitude at a 43% illuminated crescent phase. Venus is just under the magic 30 degree elevation mark (from 51 degrees N) at sunrise on the 1st, meaning it will be above the majority of the increasing poor seeing that makes its presence felt the lower an object is in the sky.

Venus is increasing its separation from the Sun currently, but also moving away from us as it does, so mid-month finds the planet just under 33 1/2 degrees high in the sky at sunrise, but having faded fractionally to -4.3 mag and increased its phase to just over 51%. The 15th finds Venus in Gemini, forming a very attractive pairing with the Waning Crescent Moon on the morning of the 15th, with the planet sitting just under 5 degrees below the Moon as the day begins.

By the time we reach the latter stages of August, Venus has decreased in brightness just little to -4.2 magnitude, but is still a very brilliant target, sitting over 35 degrees high in the east as the sun rises (again, from 51 degrees N). By this point, Venus is just over 59% illumination and just under 20 arc seconds angular diameter. Sitting in gemini as Venus does, it is now in the most northerly part of the Ecliptic and thus at its greatest angular separation from the horizon. While it will continue to put on a good show for the next few months, by October's end the planet will have entered into the southern celestial hemisphere and will start to noticeably sink in the sky from a temperate northern hemisphere observational perspective. However, there will be plenty of observing potential before this occurs.

Mars

At -1.1 and 14.6 arc seconds diameter at the month's beginning, mars is really beginning to brighten up and while there's still some time to go before mid-October's Opposition, the Red Planet is becoming a really worthwhile target for observation in telescopes of all sizes. July saw Mars climb into the northern celestial hemisphere of the sky and the planet transits at just after sunrise, in Pisces, on the 1st, standing 43 degrees high in the south (from 51 degrees N).

By mid-month, Mars has increased its magnitude to -1.4 and its angular size to 16.4 arc seconds diameter. The planet rises at 10.38pm, becoming notable in the east before midnight, where it will be clearly the brightest object in its area of the sky (bar the odd lunar visit to Pisces).

At the month's end, Mars will rise at 9.43pm (BST) and will have reached a magnitude of -1.8 and now sits at 18.8 arc seconds diameter - almost rivalling Venus in size. By the end of August, we are a matter of a little over a week before Mars appears to go retrograde within the Ecliptic - the true heralding of a major outer planet's lead up to Opposition. Mars has nearly a whole magnitude in brightness to gain before then, so there's plenty more to come.

Jupiter

The giant planet Jupiter is very well-placed for evening observing, being just past Opposition and at -2.7 magnitude at the month's beginning. Jupiter is never poor in a telescope, but caution must be advised for those of us in the northern hemisphere, as the planet is low in the south of the ecliptic and subject to much more in the way of potential atmospheric disturbance. Keeping magnification sensible will help combat poor seeing conditions to a certain extent. It's pointless making any planetary target bigger and consequently appear lower in brightness and contrast detail. The 80A Filter is a light blue and is regularly recommended for Jovian observations. While it can't help with atmospheric seeing, it can help isolate cloud belt detail and is useful in observing and isolate transits and shadow transits. Heavier filters, such as the No. 29 Dark Red filter can really tighten things up in larger telescopes, though this does add a significant caste to the appearance of a planet in the eyepiece. Those looking for a slightly sharper view, without filtration are encouraged to try there more sophisticated Atmospheric Dispersion Corrector, as this can help defeat the effects of the spectral spread caused by atmospheric lensing and also really helps those attempting imaging. At just over 47 arc seconds across at the beginning of August, Jupiter presents a fine sized target.

Jupiter rises at a little before 8pm (BST) on the 1st and reaches transit point at just before midnight. Post-Opposition planets rise earlier and earlier as time progresses and by the end of the month, Jupiter will rise at just past a quarter to six in the evening and transit at a little before 10pm. By this point the planet will be fractionally dimmer at -2.6 mag and still an impressive 44 arc seconds in diameter.

In terms of Jovian events, visible from Europe, there's a nice dual Great Red Spot and Europa Transit/Shadow Transit on the evening of 3rd August and on into the early morning of the 4th that's visible from Europe. This is followed by a dual Ganymede Transit/Shadow Transit along with an Io and GRS transit starting on the evening of the 7th and going on until the small hours of the 8th. On the following evening of the 9th there's an early dual GRS and Io Transit/ Shadow Transit. On the late evening/early morning of the 10th/11th, there's a GRS and Europa Transit. in the early evening of the 11th there's a rarer gas and Callisto Shadow Transit. Then there's a bit of a gap until the early evening of the 28th when there's a dual GRS and Europa Transit.

Saturn

Again, like Jupiter, Saturn is very well seen in the evening. Again, like Jupiter, it's low for observers in the temperate northern hemisphere, but is always worth seeking out, no matter where in the world you find yourself. At the beginning of the month, being just a little past Opposition, Saturn is near peak size (18.4 arc seconds diameter) and brightness (+0.2 mag) and will present a wonderful view in any telescope, with its glorious rings, while now past their point of maximum opening, very well presented.

Saturn rises at 8.15pm (BST) on the 1st, reaching transit point at just past 12.30am the following morning. By the month's end the planet rises at a little after 6pm and transits at a little before 10.30pm (again, BST).

Saturn tends to appear slightly less affected by atmospherics that Jupiter is. But this is more of a perceptual difference - Jupiter being that much brighter, disturbances are easier to see. If you have a telescope, check this phenomenon out, as Saturn and Jupiter are at much the same

altitude during the mid-to-late evenings in August. You will always be able to see Titan, Saturn's largest moon in pretty much any telescope (even in larger Binoculars, under reasonable conditions), but Saturn's other major moons: Rhea, Dione, Tethys, Enceladus and Mimas will require larger instruments to see with any certainty.

Uranus and Neptune

The outer planets are visible largely as morning objects, but Neptune, being further west in the ecliptic in Aquarius, rises in the latter part of the evening during August. The brighter Uranus rises in Aries a little before midnight on the 1st, but neither attain significant altitude until the small hours of the morning.

Come mid-month, Neptune will transit at a little before 3am (BST), naming attained a brightness of +7.8 and an angular diameter of 2.3 arc seconds. The planet is headed for Opposition on 11th September.

Uranus will transit at a little after sunrise, 5.49am (BST) on the 15th, and as ever will be significantly brighter that Neptune, at +5.8 magnitude and 3.6 arc seconds across. While technically a naked eye object under exceptional conditions, most will need binoculars or preferably a telescope to make a positive identification.

Comets

C/2017 T2 PanSTARRS remains an interesting comet to track down in telescopes and large binoculars. The comet begins the month in Coma Berenices, dropping in a south easterly trajectory during the month into Bootes and Virgo. At +9.7 mag at the month's beginning, this is definitely a comet for telescopic or high power binocular observation.

In a similar part of the sky to C/2017 T2, we find C/2019 U6 LEMMON. This is another comet for the with larger binoculars or telescopes. Post-perihelion, from mid-July, the comet has started to climb up into the northern celestial hemisphere. The comet has peaked at around 6th magnitude, though will fade considerably throughout August. It will climb through Coma Berenices into the Virgo/Bootes borders and on into Serpens at the month's end.

Last but not least, C/2020 F3 NEOWISE has delivered spectacularly. - peaking at around +0 magnitude However, during the August it it will journey through Coma Berenices into Bootes and fade somewhat. However, it should still be an easy comet to observe the month progresses, though it is unlikely to be the naked eye target it was during peak brightness in July. Binoculars and small telescopes should still pick it up without too much issue though.

For detailed predictions of cometary locations, those interested are encouraged to check in to the BAA Comet Section on their website here: https://people.ast.cam.ac.uk/~jds/

Meteors

It wouldn’t be August without the Perseid meteor shower, which actually run from mid-July to late August. They will normally reach their peak on (or around) August 12th. Last year’s shower peaked with a zenith hourly rate of around 80 meteors and this year is expected to put on a similar show, if not slightly more. ZHRs are those quoted under perfect seeing conditions and very dark skies, so it’s normal to halve this figure at least to work out a more realistic showing form a less-than-dark site. However, this year, the eternal nemesis of meteor observation, the Moon, will be around to spoil the party a little and will further degrade this. At Waning Crescent phase of 45%+ illumination, around the shower’s peak, the Moon will rise by just before midnight (BST) on the morning of the 12th (for observers in Northern Europe). Although the moon is in Taurus, near to the Perseid radiant, meteors can appear in every part of the sky, so needn’t be a direct impediment to observing the shower. As ever, the opportunity to photograph the shower shouldn’t be neglected - just make sure you’re in the darkest accessible area whilst attempting to capture the best of the Perseids. Even if you are in the centre of cities, the brightest of the Perseids will cut through the worst light pollution, with many peaking in the minus magnitudes - meaning they will (briefly) be as bright as the brighter planets.

Photographic recording of the shower requires a regular DSLR, with a wide angle lens, set to a reasonably high ISO (800+) - this will undoubtedly pick up at least a couple of bright examples of the Peseids during an evening's worth of timed exposures. Multiple exposures of 30 seconds-or-so - depending on your sky conditions - will be more than adequate to pick up some Perseids over the space of an hour or so. Just make sure you have plenty of memory in your camera and that your batteries are fully charged, prior to any attempt.

Deep Sky Delights - Climbing the Spine of the Milky Way

Last month we looked at the expanse of Sagittarius, with its riches of Globular clusters and nebulosity and the eastern part of Sepens (Serpens Cauda - the tail of the serpent) and the compact but notable constellation of Scutum, the Shield. This month we move northwards and climb the spine of the Milky Way Galaxy from its central bulge and explore some of the plentiful objects along this track of sky.

Firstly, we come to the major constellation of Aquila, The Eagle. Despite its size and prominent position along the plane of there Milky Way, this constellation is curiously lacking in major Deep Sky objects. The only one of great note is the interesting NGC 6741, otherwise known as The Phantom Streak. This object is a planetary nebula of +11.69 mag and diminutive in size (as many planetaries are), at just 0.1 arc minutes across. Looking like a ghostly parallelogram, the Phantom Streak is not an easy object, but its cocoon-like structure can be discerned by those with access to larger telescopes. It is a rewarding find for those with the ability to find it. The distance of NGC 6741 is not certain. Some sources list it as lying 7000 light years distant, though others think it a closer object at around 5000 light years from us. The Phantom Streak is notable for the possibility that its central star, a white dwarf remnant of a star much like the Sun, may be running out of hydrogen fuel and its dropping in luminosity. This means the Phantom Streak may not be visible in its present form for much longer - a sign we live in a dynamic Universe. Catch it while you can!

NGC 6741 - HST image. Public Domain.

Moving up past Altair (Alpha Aquilae), the bottom-most star in the famous "Summer Triangle" (which also contains Vega and Deneb in Lyra and Cygnus respectively), we take a

brief dog leg East into the tiny constellation of Delphinus, The Dolphin. This lovely little collection of stars, though not especially bright, can easily be made out under dark conditions. Delphinus' kite-shaped arrangement of four stars and the Dolphin's tail marked by the prominently blue Epsilon Delphini is unmistakable.
Delphinus contains two globular clusters - nether particularly bright, but worth seeking out nonetheless. NGC 6934 is the more Southerly and is found just under 11 degrees almost due east of Altair. At +8.8 mag and 1.4 arc minutes in diameter it is hardly prominent, but is location in the rich star fields of the Milky Way go someway to explaining this. Small telescopes show the cluster as a soft, rather indistinct ball of light, but larger instruments will be needed to show the scant detail it offers up to observers. Lying over 50000 light years away, NGC 6934 was one of William Herschel's many discoveries - he first catalogued it in 1785.

NGC 6934 - HST image. Public Domain.

Herschel also discovered NGC 7006 which is located some 11 degrees to the NE of NGC 6934. At +10.56, it is one of the fainter of our galaxy's globular clusters. This faintness is understandable when one considers NGC 7006's distance - an amazing 135,000 light years hence. This cluster is described by various observers as quite comet like in appearance - a condensed central region and a halo of stars are not as distinct as they are in its neighbour. A very large telescope of 16+ inches aperture will be needed to resolve individual stars in this challenging target.

NGC 7006 - HST image. Public Domain.

Delphinus also contains a good planetary nebula: the Blue Flash, or NGC 6905. This is more easily seen in small telescopes than either of the globular clusters previously mentioned. Indeed, it is often overlooked, due to its proximity to the nearby M27 (more of which later), but the Blue Flash deserves more observation. A blue-white ball of light, with extending lobes either side, NGC 6905 is +10.89 mag and 0.8 x 0.6 arcminutes in dimension and lies 2200 light years away. Larger telescopes will start to pick up more of the object's uneven shape and central star. It seems decidedly egg-shaped to some.

NGC 6905 HST image. Public Domain.

Just under 7 degrees to the west of The Blue Flash, over the border into Sagitta, The Arrow, sits another globular cluster - M71.

M71 - HST image. Public Domain.
Discovered in 1746 by Philippe Loys de Cheseaux, M71 is a very loose globular, which was perhaps understandably classed as an open cluster for a considerable amount of time. Binoculars show it well, but smaller telescopes will start to resolve it into stars. At 3.3 arcminutes diameter and +8.18 mag, M71 is a curious beast: its spectral makeup and spread of differing star types is much more suggestive of an open cluster, though observations of the radial velocities of its constituent stars have pointed to its globular nature. It is thought to be particularly young for a globular cluster, being "only" 9 billion years of age.
Moving further Westward, over the border into Vulpecula, The Fox, we come to one of the most celebrated clusters in the whole sky - Collinder 399, otherwise known as The Coathanger, for obvious reasons! The asterism of The Coathanger contains ten bright stars,

one of which is an orange-yellow colour, which contrasts nicely with the blue-white of the other nine. A perennial binocular favourite, The Coathanger is a large object at 89 arc minutes diameter is best seen in widefield instruments at low powers. Its unlikely appearance always raises a wry smile, as it is one of the sky's greatest practical jokes.

The Coathanger, Collinder 399. *Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.*

From the ridiculous to the sublime, the next object is one of the best examples of its type in the entire firmament - M27, The Dumbell Nebula. This planetary nebula is to be found 8 1/3 degrees to the east of The Coathanger and is a richly rewarding object to observe in any telescope. Small telescopes show it as an elongated glowing box. Larger apertures show more and more of the distinctive "apple core" shape. Long duration exposure images show the whole object, including its ghostly outer layers, beautiful colours and complex internal structure. The Dumbell is a true Messier object, as it was discovered by Charles Messier in 1764 and at about half the diameter of the Moon and +7.09 is easily one of the most prominent examples of its kind in the sky.

M2. Image Credit: Mark Blundell.

We see M27 from the side on - hence its less-than-planetary shape. Were we observing it from a polar viewpoint, it would appear ring-like. But we are fortunate that the inner structure of the nebula is so well-defined from our perspective. M27's distance is heavily debated, but now appears to be around 1200-1700 light years away. Its age is thought to be relatively young - 3-4000 years-or-so. It is an easy object to locate and should not be missed by any observer.

NGC 6885 is another inhabitant of Vulpecula and lies 4 2/3 degrees NE of the Dumbell. It is a +8.10 open cluster, around 20 arc minutes in size. Although not exceptionally bright, NGC 6885 is easily located in binoculars and is probably best-seen in a large pair. This cluster contains over fifty member stars and has distance of around 1900 light years.
Eight and a half degrees NE of NGC 6885, across the border into Cygnus is the enchanting target of the Veil Nebula. The Veil Complex – NGCs 6960, 6974, 6979, 6992 and 6995 in Cygnus is a famous Supernova remnant, spread out over six times the diameter of the Full Moon. At combined brightness of +5 mag, The Veil can supposedly be glimpsed with the naked eye under truly exceptional conditions, but is much more likely to be seen (and better observed) in large binoculars and telescopes. The veil lies underneath the wing of Cygnus, close to Gienah (Epsilon Cygni). The brightest section this nebula is NGC6960, otherwise known as The Witches' Broom, due to its obvious broom-like shape, which reveals itself best in long duration exposures. NGC6960 has the star 52 Cygni apparently buried within it (it is in fact at least 10 times nearer to us), making this part of the nebula an easier target to find with non-Goto scopes. The Veil responds terrifically well to the OIII filter – indeed, it is almost the best-responding nebula to this particular narrowband wavelength. This beautiful structure can be seen in all manner of telescopes, but large instruments with low power, widefield eyepieces present it spectacularly well.

The Eastern Veil Nebula. Image credit: Mark Blundell
Drifting Westwards, past one of the finest double stars in the entire sky, the Creamy Yellow and Electric Blue of Albireo (Beta Cygnii), just across the border into Lyra, The Lyre, sit two notable objects, the first of which is M56, which lies roughly equidistant between Albireo and

Sulafat (Gamma Lyrae). At +8.27, it is of similar brightness to the aforementioned M71, though at 2.2 Arcminutes diameter – when compared to the larger M71 at 3.3 Arcminutes in size – is slightly more condensed and appears brighter. Indeed, both objects would possibly appear more prominent were they not lying so close to the axis of our Galaxy and therefore obscured by parts of the Milky Way.
Roughly halfway between Sulafat and the neighbouring naked eye variable star, Sheliak (Beta Lyrae) sits one of the showpieces of the sky, the wonderful M57, the Ring Nebula. M57's enduring popularity as a Deep Sky target may be partially down to the ease with which its location is to be found. Looking like an elongated smoke ring drifting through space, the Ring Nebula is perhaps the archetype of all planetary nebulae. Discovered in 1779 by the astronomer Antoine Darquier de Pellepoix, Messier was hot on his heels and independently discovered it a matter of days afterwards. Rather disappointing in binoculars, yet easily spotted in most telescopes due to its comparatively high surface brightness, M57 takes magnification and filtration (especially the OIII filter) extremely well. Naturally, the larger the telescope you point at it, the more the keen observer is likely to see, but those with smaller telescopes will not be disappointed as long as you keep magnification up.

M57 - HST Image. Public Domain.

M57's distance is still up for debate, modern estimates of the central star put it at about 1400-4000+ light years away - quite a variation! It is thought is the former figure is the more correct, M57 is about a light year across from widest point to widest point and is a cylinder shape which we see from the end - quite the opposite, in fact, to M27's aspect. It is thought that The Ring Nebula is around 5-8000 years old.
Back into Cygnus, climbing higher North up the spine of the Milky Way, we come to a reasonably diminutive, but nonetheless fascinating object: NGC 6888, The Crescent Nebula. a bright, compact nebula, which is the expanding shell of a Wolf-Rayet Star (HD 192163), which is steadily shedding its outer layers. The nebula glows due to the fact that it is gas is superheated by the collision of the boundary layer of a faster-moving inner solar wind, meeting a less energetic layer of solar wind formed when the gaseous layer of HD192163's former outer atmosphere was ejected in its previous red giant phase. This bow shock is about 25 light years across and appears to us as a crescent shape, glowing at +7.40 mag. The "surface" of this crescent is incredibly detailed and its complicated texture can be noted in larger telescopes using OIII and UHC filtration. Much beloved of Astrophotographers, the Crescent Nebula is a rewarding target for imagers.

Crescent Nebula, NGC 6888. Image Credit: Mark Blundell
Right next door to the Crescent, clustered around the star Sadr (Gamma Cygni) is the vast expanse of the Gamma Cygni Nebula. Glimpsed in large binoculars and telescopes from an appropriately dark locale, IC 1318, as it is otherwise known, is a huge patch of red nebulosity, slightly larger in dimensions than the Veil. However, this nebula is very spread out, so its surface brightness is inherently low. It is best visually isolated with H-Alpha Filters, but is more easily captured in long duration astrophotography. The Gamma Cygni Nebula reaches out behind the Crescent and the star that is takes its name from. Sadr is around 750 light years away, whereas estimates for the distance of the nebula vary wildly from 2000-5000 light years distance.
Further up the spine of Cygnus, just beyond its principal star, Deneb, is another vast nebula system: the North American Nebula (NGC7000) and tucked underneath it, the Pelican Nebula (IC5070). Of the two, the North American is undoubtedly brighter (at +4 mag, compared to the Pelican's +8 mag) and can be seen very well in large binoculars from a dark site. An OIII or H-Beta filter can be used successfully to enhance NGC7000 in widefield telescopes, but the

complex does not respond well to magnification. Both nebulae are part of the same gas cloud, which may be ionised by emissions from nearby Deneb. If this is the case, their distance would be in the region of 1800+ light years away from our Solar System.

The "Mexico" section of the North America Nebula, NGC7000. Image Credit: Mark Blundell. Last but not least is a much smaller object, the Blinking Planetary or NGC 6826. This nebula is 2.1 arc minutes in diameter and located towards Iota Cygni. Dimensionally, NGC6826 is fractionally larger than the Ring Nebula and about the same brightness. The “blinking” nature of this planetary is caused when an observer stares at the nebula’s central star, at medium to high power, this overwhelms the eye and the nebula fades from view. When you look away to the nearby +8.5 magnitude star in the same field, the nebula reappears. This is not a unique phenomenon and is noted in other compact planetary nebulae with prominent central stars, but is best seen in the Blinking Planetary. Visually, the NGC6826 present two brighter regions on either side of its disc. These regions are Fast Low-Ionization Emission Regions or FLIERs for short. These FLIERs are parts of the planetary formation which are expanding at extreme speeds in comparison to the surrounding nebula. It is postulated that these areas are so dense that the ionising effect of the ultraviolet radiation emitted from the parent star cannot penetrate them. The Blinking Planetary and the Saturn Nebula are two of the best known examples of planetaries that exhibit these FLIERs.

NGC 6826 - HST Image. Publc Domain.

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