August 2025 – A spectacular month for sky watching, at least for early risers!

In August 2025, **before dawn is when the most beautiful scenery and impressive celestial events are to be enjoyed,** along with much more comfortable temperatures for sky watching. That is why we are featuring a **morning sky chart** this month. (Both an evening and a morning chart are included with this column.) At least three of the five bright planets, plus at least nine stars of first magnitude or brighter, are all simultaneously visible before dawn. By Aug. 14, the Dog Star **Sirius,** the brightest star – ranking next in brilliance after **Venus and Jupiter** -- rises in mid-twilight in ESE. For a few days near that date, binoculars will be useful for spotting it low in bright twilight. Find it by extending the 3-star belt of Orion down toward the horizon. Rising left of Sirius, a few degrees north of due east and, for mid-Michigan, about 30 minutes earlier, is **Procyon,** the "before the Dog" star, announcing the imminent rising of Sirius. The planet **Mercury,** to lower left of Venus, appears above the eastern horizon, **bringing the total to 4 bright planets and 11 bright stars.**

Here are **additional rewards for early risers:**

On the morning of August 3, and again on the morning of Aug. 19, Saturn's largest satellite Titan will cast its shadow on Saturn. If you have equipment capable of providing clear views of Saturn at a magnification of at least 150 or 200 power, skip ahead to the last section of this column for details.

On Tuesday, Aug. 12, **a close pairing of the two brightest planets, Venus and Jupiter 0.9° apart,** is the **most impressive planetary conjunction of this year**, with the 88-percent **waning gibbous Moon appearing close to Saturn** that same morning.

Also on Aug. 12, and again on the 13th, in predawn darkness hours, **the Perseid meteor shower is near its peak.**

On Sat. Aug. 16, the **Moon,** 48 percent lit, is nearly half-full and just past Last Quarter phase, **near the Pleiades star cluster,** a wonderful field for binoculars;

In addition, on Sunday, Aug. 17, a 37-percent **crescent Moon is widely north of Aldebaran and the Hyades star cluster.** The 'V' formation of Aldebaran and the Hyades makes up the head of Taurus, and fits nicely into the field of view of binoculars.

On Tues. Aug. 19, a 17-percent **crescent Moon appears near Jupiter.** On Wed. Aug. 20, a thinner 9-percent **Moon, with earthshine visible on its darker, non-sunlit side, appears near Venus and the Twin stars Pollux and Castor.** In addition, on Thurs. Aug. 21, a thin 4-percent **crescent Moon appears near Mercury.**

Mercury, after passing inferior conjunction nearly between Earth and Sun on July 31, enters the morning sky. Deep in bright twilight at first, it attains first magnitude by Aug. 14, when it can be spotted very low in ENE an hour before sunrise, 18° lower left of Venus. It gets better! Mercury brightens to

mag. zero by Aug. 18, when it's 16° to Venus' lower left. **Mercury climbs highest in twilight and approaches closest to lower left of Venus, by 15° on August 20-23.** Continuing to brighten as it heads toward the far side of the Sun, Mercury reaches mag. –1.0 on Aug. 27, while dropping lower to 17° lower left of Venus. By Aug. 31, Mercury shines at mag. –1.2, but is still lower in twilight, 19° lower left of Venus. Mercury will pass superior conjunction, hiding on far side of Sun, on Sept. 13.

The faint distant ice giant planets, 5.7-mag. **Uranus** and 7.8-mag. **Neptune,** can be viewed with optical aid in dark skies **before morning twilight begins.** Uranus is easy for binoculars, within 4.4° south of 3rd-mag. Alcyone, or Eta Tauri, the Pleiades' brightest star. Neptune is 1.1° N to 1.7° NNE of Saturn this month, so a small shift in the aim of the telescope after you inspect Saturn's rings will bring the faint planet into view. Change to a high power eyepiece to discern the tiny round disks of Uranus and Neptune, distinguishing them from background stars.

That makes a total of six planets visible in the August morning sky, after Mercury has become easy to see around mid-month. The six planets, in order from east to west, are Mercury, Venus, Jupiter, faint Uranus, faint Neptune, and Saturn. They span 124° on Aug. 15; 130°on Aug. 21; 135° on Aug. 25; and 146°on Aug. 31. **Over a span of ten mornings, August 12-21, the waning Moon passes eastward along the planetary lineup,** from Saturn to Mercury, and the much more distant background stars of the zodiac constellations Pisces, Aries, Taurus, Gemini, and Cancer.

In the evening sky about an hour after sunset on August 1, golden **Arcturus** high in WSW and blue-white **Vega** high in ENE are the brightest stars visible. **Altair** and **Deneb** complete the ***Summer Triangle*** with Vega. The **Moon,** 55 percent full and just past First Quarter phase, is in Libra, almost midway between blue-white **Spica** in SW and reddish **Antares** in south, 22° from Spica and 24° from Antares.. **Mars,** dim at mag. +1.6, is low in western sky, 27° lower right of Spica. It's no coincidence that Mars, Spica, Moon, and Antares lie ln a nearly straight line, since Spica and Antares lie only a few degrees south of the ecliptic (plane of Earth orbit), within 2.1° and 4.6°, respectively.

Watch the Moon shift position eastward by an average of 13.2° daily, returning to the same stars after 27.3 days. On the evening of Aug. 2, the 65 percent Moon is 12° west of Antares. On Aug. 3, from East Lansing, the 74-percent Moon appears 1.4° below Antares one hour after sunset. On Aug. 4, a far southern, 82-percent Moon appears in Ophiuchus, the Serpent-bearer, 12° lower left of Antares. Notice how unusually *low* the Moon is as it passes directly south that night, only 18° up from East Lansing, at 10:07 p.m. EDT, or 1.2 hours after sunset, nearly 6° lower than the December 21 winter solstice midday Sun. A little more than four hours later

that night, at 2:16 a.m. EDT on Aug. 5. watch the Moon set an unusually far 40° south of west.

On the evening of Aug. 5, the 89-percent Moon appears within the ***Teapot,*** an 8-star asterism within the constellation **Sagittarius, the Archer.** This is another unusually far southern Moon, passing its high point only 18° up when due south, at 11:02 p.m. as seen from East Lansing. On the next evening, the 94-percent Moon is east of the Teapot.

The Moon is full on the night of August 8-9, rising around sunset and setting shortly after sunrise. Thereafter, watch the waning gibbous Moon rise farther north and not much later each successive evening, but still before the end of twilight through Aug. 12. On the evening of Aug. 11, within two hours after sunset, watch for **Saturn** rising within 6° lower left of the 91-percent Moon. By an hour before sunrise on the next morning, Aug. 12, the 89-percent Moon and Saturn have closed to within 4° apart, high in SSW to SW sky. **This is the same morning Venus and Jupiter appear closest to each other,** 0.9° apart in ENE to E.

On the evening of Aug. 12, the 83-percent waning gibbous Moon rises 9° to the left of Saturn at nearly the same time, just before the end of evening twilight. On Aug. 14, six nights after the Moon rose very close to the time of sunset, the 63-percent Moon is still rising only 2½ hours after sunset. The daily delay in the time of moonrise over those six nights ranged between 21 and 26 minutes, much less than the long-term average of 50 minutes. This short delay of moonrise times from one night to the next around Full Moon, called the Harvest Moon effect, is caused by the shallow slope of the ecliptic relative to the horizon in the early evening in late summer and early autumn. The effect is enhanced this year because the Moon's orbit is oriented to reduce the slope of its path still more in relation to the horizon. The Moon's shift in position from one evening to the next at sunset is more northward – to the left – than downward. The Moon rises noticeably farther north each evening. But even if the Moon is just below the horizon as twilight ends, there would be a significant amount of scattered moonlight to spoil Milky Way viewing.

By Aug. 15, as seen from East Lansing, the Moon rises three hours after sunset. **The best dates for viewing the Milky Way** high in the sky with little or no moonlight at the end of evening twilight, are August 15-27.

The Moon returns to the evening sky on Aug. 24, as a 3-percent crescent, very low in west in bright twilight, one-half hour after sunset.

On Aug. 25, 40 minutes after sunset, the 8-percent crescent is very low, south of west. Try for faint Mars (mag. +1.6) within 7° upper left of Moon and 12° lower right of first=magnitude Spica.

On Aug. 26, the 14-percent crescent is low in WSW, with Mars within 6° to its upper right, and Spica 7° to Moon's upper left.

On Aug. 27, one hour after sunset, the 21-percent crescent is low in WSW, with Spica within 6° right, and Mars 11° lower right of Spica.

One hour after sunset on Aug. 28, the 30-percent crescent Moon in SW has Spica 18° to its lower right, and Antares 28° to its upper left. At the same stage of twilight on Aug. 29, the 39-percent Moon is 17° lower right of Antares.

On Aug. 30, one hour after sunset, the almost half (49%) Moon, nearing First Quarter phase, is in SSW, 5° lower right of Antares.

On Aug. 31, one hour after sunset, the 58-percent, slightly gibbous Moon is in S to SSW, 7° lower left of Antares. Mars ends August 8.5° lower right of Spica. Tomorrow night, our planet/Spaceship Earth, in its orbit around the Sun, will be carrying us toward a direction 5° north of Aldebaran in the morning sky, and racing away from a direction 5° north of Antares in the evening sky.

Very rare event, twice in August: Saturn's largest satellite Titan casts its shadow on Saturn.

Have you even seen the shadow of one of the Galilean satellites projected upon the disk of Jupiter? Jovian satellite shadow transits are common events, since Jupiter's equatorial plane and the nearly coplanar orbits of those moons are tipped only about 3° to the plane of Jupiter's orbit. However, Saturn's equatorial rings and the orbital plane of Titan and most of the major satellites are tipped nearly 27° to Saturn's orbital plane. This makes phenomena such as transits of the satellites and of their shadows, and occultations and eclipses of Saturn's moons much less common. They occur only around the occasions every 14-15 years around Saturn's equinoxes, when Saturn's equatorial rings are presented nearly edge-on to Sun (for eclipses and shadow transits), or edge-on to Earth (for occultations and satellite transits). We are now in such a season, surrounding Saturn's northern hemisphere autumnal equinox of May 6, 2025. From August through early October, we have five more chances to observe the shadow of Titan projected on Saturn's disk. Here are the dates and times for the two events in August, along with the positions of Saturn in the sky for Palm Springs:

Morning of August 3

On Sunday Aug. 3 at 2:25 a.m. EDT, Titan's *full* shadow is first visible on eastern (following) limb of Saturn, north of the rings. Titan itself is off the planet's northeast limb. From East Lansing, Saturn is then in southeast, and 34° above the horizon, where seeing may be good. You should get a better look later, as Saturn climbs higher.

At 4:52 a.m. EDT, 15 minutes after twilight gets underway in East Lansing, Titan's shadow crosses the central meridian of Saturn, well north of the center of Saturn's disk. Imagine the perpendicular bisector of the major axis of the apparent ellipse of Saturn's rings, and that is the central meridian of Saturn. The south pole of Saturn is tipped 3.35° toward us this morning, causing the rings to be tipped by the same 3.35° angle from edge-on, with the south face visible. The Sun is 1.32° south of the ring plane, causing Titan's shadow to be cast onto the planet's northern hemisphere. From East Lansing, Saturn is nearly due south and 46° up, while the Sun is 16° below our horizon, so the view of Saturn should be clearer than at the start of the shadow transit.

Titan's shadow is last fully on the northwest (north preceding) limb of Saturn's disk at 7:04 a.m. EDT, more than half an hour after sunrise, so the latter stages of this transit will not be seen from East Lansing.

Morning of August 19

On Tuesday Aug. 19 at 1:52 a.m. EDT, Titan's full shadow is first visible on eastern (following) limb of Saturn, north of the rings. Titan itself is off the planet's northeast limb. From East Lansing, Saturn is then 38° up in southeast, where seeing is expected to be good. Expect to get an even better look later, as Saturn climbs higher throughout tonight's event.

At 4:01 a.m. EDT, Titan's shadow crosses the central meridian of Saturn, even farther north of the center of Saturn's disk than on Aug. 3. Imagine the perpendicular bisector of the major axis of the apparent ellipse of Saturn's rings, and that is the central meridian of Saturn. The south pole of Saturn is tipped 2.96° toward us this morning, causing the rings to be tipped by the same angle of 2.96° from edge-on, with the south face visible. The Sun is 1.56° south of the ring plane, farther south than 16 days ago, causing Titan's shadow to be cast farther into the planet's northern hemisphere this time. From East Lansing, Saturn is in azimuth 183° (just past due south) and 45° up, so the view of Saturn should be quite good, if atmospheric seeing conditions allow.

When Saturn reaches its high point in the south is a great time to look around the sky and take in some perhaps more ordinary, yet still beautiful sights: On the morning of Aug. 19, Jupiter 8° below the crescent Moon in ENE; Venus just rising 7° lower left of Jupiter, one week after these planets' brilliant conjunction; Orion rising in the east, with the binocular

showpiece Hyades and Pleiades star clusters of Taurus above; Uranus in the same binocular field as the Pleiades, 4.4° SSE of its brightest star, 3rd-mag. Alcyone; Neptune only 1.4° NNE of Saturn; the Summer Triangle in the west; Fomalhaut, Mouth of the Southern Fish, low in SSW, to lower right of Saturn; the Great Square of Pegasus above Saturn and Fomalhaut, with its east and west sides, respectively, pointing downward to those two luminaries; and Andromeda Galaxy overhead. Within two hours after Saturn reaches its high point directly south, Procyon and Sirius have risen into view, completing the Winter Triangle with Orion's Betelgeuse, while the Summer Triangle of Vega, Deneb, and Altair hovers above the west to northwest horizon. Can you see both triangles simultaneously? The best time to do so occurs 4 minutes earlier each day, or two hours earlier per month, until it backs up through the night to dusk in mid-January.

Titan's shadow is last fully on the northwest (north preceding) limb of Saturn's disk at 6:00 a.m. EDT this morning, when Saturn is 37° up in southwest. However, it is mid-twilight then in East Lansing, with the Sun just 9° below the horizon.

Three more occasions remain for viewing the shadow of Titan projected onto the disk of Saturn. They occur at 16-day intervals, corresponding to the synodic period of revolution of Titan around Saturn, or how often Titan appears at New Moon phase as seen from Saturn:

Morning of September 4; morning of September 20 and morning of October 6.

After these, you will need to wait until 2038-39, when Saturn's rings and Titan's orbit will again be presented edgewise to Sun (once, at Saturn's northern spring equinox) and to Earth (three times).

Here is a photo of a Titan shadow transit posted on ***Astronomy Picture of the Day:***

https://apod.nasa.gov/apod/ap250724.html

See article, ***"Titan Throws Shade on Saturn",*** by Bob King, in ***Sky & Telescope*** magazine's May 2025 issue, pp. 48-49 and another article by King, ***"Titan Shadow Transit Season Underway",*** in the **Celestial News and Events** section of the ***Sky and Telescope*** website, posted May 14, 2025. Here is a direct link:

https://skyandtelescope.org/astronomy-news/observing-news/titan-shadow-transit-season-underway/