JULY GUIDE TO THE BRIGHT PLANETS

Three of the five bright planets are easy to see in July, 2017: Jupiter, Saturn and Venus:

Bright Jupiter is the first "star" to pop into view at nightfall and stays out until late night.

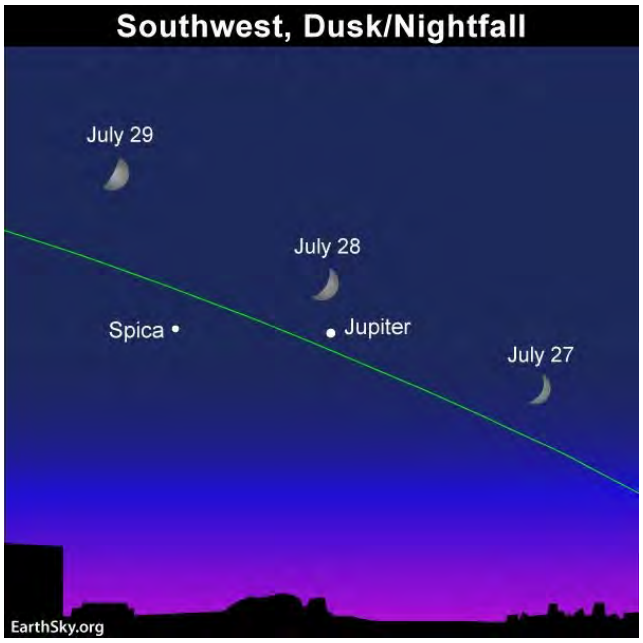
Golden Saturn is up in the east at nightfall and stays out for most of the night.

Brilliant Venus rises before the Sun, shining in front of the constellation Taurus the Bull.

But the other two are difficult:

Red Mars is buried deep in the glare of evening twilight and cannot be seen from Earth this month.

And elusive Mercury is not easy to catch, because it appears low in the west at dusk.



Jupiter brightest "star" in evening sky, in Virgo

Jupiter reached opposition on April 7. That is, it was opposite the Sun as seen from Earth, and so was appearing in our sky all night. The giant planet came closest to Earth for 2017 one day later, on April 8. So Jupiter shone at its brightest and best in April> But Jupiter still beams as the third-brightest celestial body in the nighttime sky, after the Moon and Venus. Watch for the Moon to join up with Jupiter for several days, centred on or near July 28. Wonderful sight!

From the Northern Hemisphere, Jupiter appears in the southwestern sky first thing at dusk; and from the Southern Hemisphere, Jupiter appears high overhead at dusk or nightfall. From all of Earth, Jupiter sinks in a westerly direction throughout the night, as Earth spins under the sky.

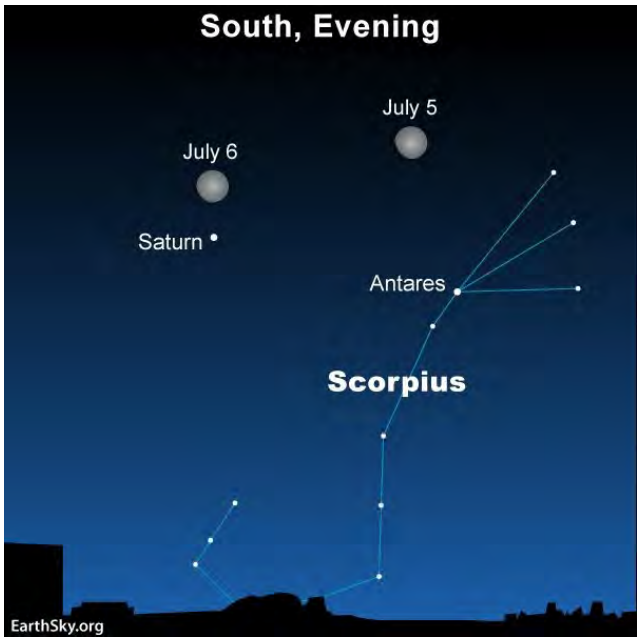
Jupiter shines in front of the constellation Virgo, near Virgo's sole 1st-magnitude star, called Spica.

If you have binoculars or a telescope, it's fairly easy to see Jupiter's four major moons, which look like pinpricks of light all on or near the same plane. They are often called the Galilean moons to honour **Galileo**, who discovered these great Jovian moons in 1610.

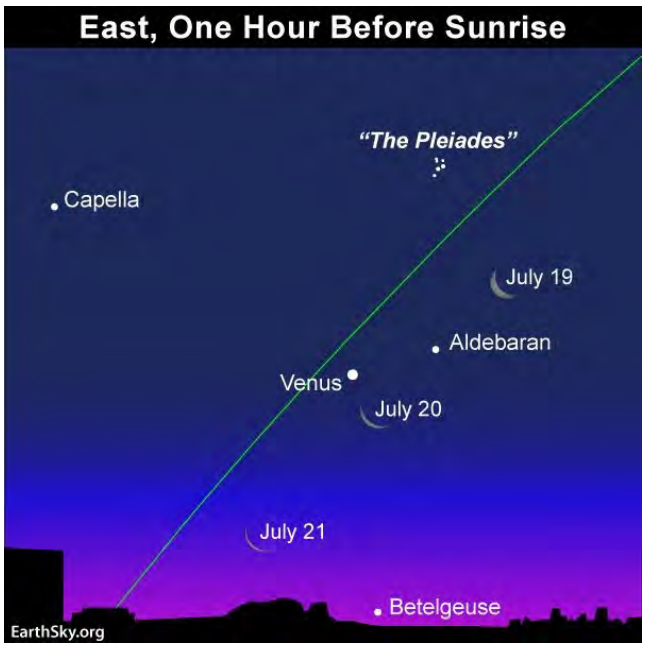
In their order from Jupiter, these moons are Io, Europa, Ganymede and Callisto.

These moons orbit Jupiter around the Jovian equator. In cycles of six years we view Jupiter's equator edge-on. So, in 2015, we were able to view a number of mutual events involving Jupiter's moons, through high-powered telescopes. Starting in late 2016, Jupiter's axis began tilting enough toward the Sun and Earth so that the farthest of these four moons, Callisto, has not been passing in front of Jupiter or behind Jupiter, as seen from our vantage point. This will continue for a period of about three years, during which time Callisto is perpetually visible to those with telescopes, alternately swinging above and below Jupiter as seen from Earth.

Saturn reached its yearly opposition on June 15. At opposition, Saturn came closest to Earth for the year, shone brightest in our sky and stayed out all night. It was highest up at midnight.



Saturn out nearly all night



Venus, brilliant in east at morning dawn in Taurus

In July 2017, Saturn shines higher in the sky at nightfall than it did in June. Moreover, Saturn transits – climbs its highest point for the night – a few hours earlier than it did in June 2017.

Look for Saturn above the horizon as soon as darkness falls. It's in the southeast as seen from Earth's Northern Hemisphere and more due east from the Southern Hemisphere. **But your best view of Saturn, from either the Northern or Southern Hemisphere, is around 11pm local time in early July. That's when Saturn climbs highest up for the night.**

Saturn, the farthest planet that you can easily view with the eye alone, appears golden in colour. It shines with a steady light. Binoculars don't reveal Saturn's gorgeous rings, by the way, although binoculars will enhance Saturn's colour. **To see the rings, you need a small telescope. A telescope will also reveal one or more of Saturn's many moons, most notably Titan**.

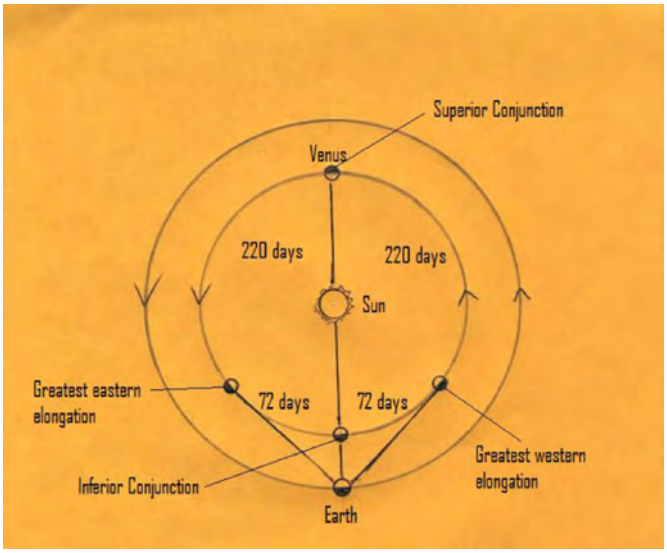
Saturn's rings are inclined at nearly 27º from edge-on, exhibiting their northern face. In October 2017, the rings will open most widely for this year, displaying a maximum inclination of 27º.

As with so much in space (and on Earth), the appearance of Saturn's rings from Earth is cyclical. In the year 2025, the rings will appear edge-on as seen from Earth. After that, we'll begin to see the south side of Saturn's rings, to increase to a maximum inclination of 27º by May 2032.

Let the Moon guide you to Venus and the star Aldebaran on July 19, 20 and 21. Venus, brilliant in east at morning dawn, it is always brilliant and beautiful, the brightest celestial body to light up our sky besides the Sun and the Moon. If you are an early bird, you can count on Venus to be your morning companion until the end of 2017.

Venus reached a milestone as the morning "star" when it swung out to its greatest elongation from the Sun on June 3, 2017. At this juncture, Venus was farthest from the Sun on our sky's dome, and the telescope showed Venus as half-illuminated in sunshine, like a first quarter Moon. For the rest of the year, Venus will wax toward full phase.

At temperate latitudes in the Southern Hemisphere (Australia and South Africa), Venus rises about three and one-half hours before sunup in early July. By the month's end that'll taper to about two and one-half hours.



Earth and Venus orbit the Sun counterclockwise as seen from North. When Venus is left of the Earth-Sun line, Venus is an evening "star". After Venus reaches its inferior conjunction, it moves right of the Earth-Sun line an becoms a morning "star.

Mars will transition out of the evening sky and into the morning sky on July 27, 2017, at which juncture Mars will be on the far side of the Sun at what astronomers call superior conjunction. Look for Mars to emerge in the East before dawn in late September or October 2017. The conjunction of Mars and Venus on October 5, 2017, will likely present the first view of Mars in the morning sky for many skywatchers.

Exactly one year after Mars's superior conjunction on July 27, 2017, Mars will swing to opposition on July 27, 2018. This will be Mars's best opposition since the historically close opposition on August 28, 2003. In fact, Mars will become the fourth-brightest heavenly body to light up the sky in July 2018, after the Sun, Moon and the planet Venus.

It's not often that Mars outshines Jupiter, normally the fourth-brightest celestial object.

Mercury is tricky. If you look too soon after sunset, Mercury will be obscured by evening twilight; if you look too late, it will have followed the Sun beneath the horizon. Watch for Mercury low in the sky, and near the sunset point on the horizon, being mindful of Mercury's setting time.

Throughout July, Mercury will move farther east of the setting Sun day by day, and will reach its greatest eastern elongation as an evening "star" on July 30, 2017.

AK, with EarthSky Notes

Image from February 8, 2016, shows all 5 bright planets at once