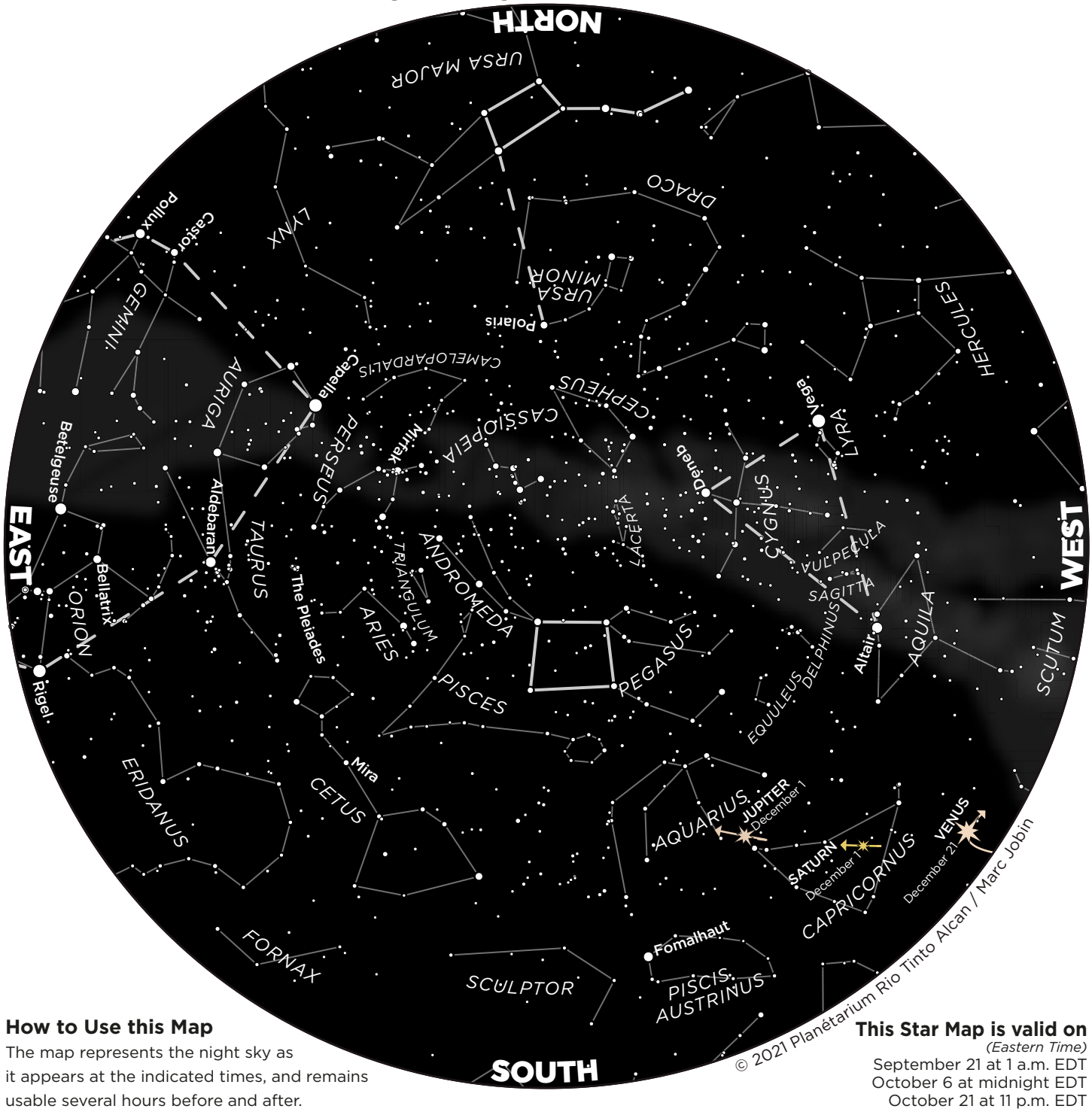
The Pocket Planetarium ★

Volume 25
Number 4
Autumn 2021

Astronomical Information Newsletter of the Rio Tinto Alcan Planetarium

The Starry Sky — Autumn 2021



How to Use this Map

The map represents the night sky as it appears at the indicated times, and remains usable several hours before and after.

Hold the map up to the sky in front of you and turn it so the direction you are facing appears at the bottom. Lines identify the constellations. The shaded area outlines the Milky Way.

This Star Map is valid on

(Eastern Time)

September 21 at 1 a.m. EDT
October 6 at midnight EDT
October 21 at 11 p.m. EDT
November 6 at 9 p.m. EST
November 21 at 8 p.m. EST
December 6 at 7 p.m. EST

Visit us on montrealspaceforlife.ca

espace pour la vie montréal
planétarium rio tinto alcan

Further details and more phenomena at espacepourlavie.ca/en/monthly-sky

The Sky This Autumn

Venus draws our attention at twilight this fall before leaving the stage wide open all evening long for Saturn and Jupiter. Mercury offers its best apparition of the year at dawn in October and November. Mars, on the other side of the Sun, is not visible.

Venus turns up at twilight

Venus, the dazzling Evening Star, emerges within minutes of sunset. The geometry of this apparition in the evening sky is poor: Through most of this fall, Venus doesn't get higher than 10 degrees above the southwestern horizon at twilight and sets just one hour after the Sun. The situation improves only marginally at the end of the year: Venus barely reaches a height of about 15 degrees in the southwest at the beginning of December, achieving maximum brightness (magnitude –4.9) on the 9th before it quickly plunges back toward the horizon during the last evenings of 2021. Venus will be in inferior conjunction, between the Earth and the Sun, on January 8, 2022.

Point a telescope at Venus and you'll see it undergo a spectacular transformation. In early fall, the planet appears as a gibbous disc, 18 arc seconds in diameter and 65% illuminated. As the weeks go by, its size grows ever so slowly, while the illuminated portion shrinks: When the planet reaches its greatest elongation on October 29, you'll be treated to a "half-Venus" (50% phase), 25 arc seconds in diameter. The pace really picks up at the end of the year: By late November, Venus's disc appears as a crescent, 39 arc seconds in diameter and 29% illuminated; on December 21, a few days before the planet disappears in the glare of the setting Sun, its disc measures 54 arc seconds and is only 10% illuminated.

Venus has a few lovely encounters with the lunar crescent this fall. **On the evening of October 9,** the thin crescent shines just 2 degrees above Venus. **On the evening of November 7,** the Moon can be found 5 degrees to the right of the Evening Star. Finally, **on the evening of December 6,** the thin crescent Moon lies 3 degrees below Venus.

Saturn and Jupiter in the evening

Saturn and **Jupiter** start the season in retrograde motion in the constellation Capricornus, about 15 or so degrees from each other. However, Jupiter (the brighter of the pair on the left-hand side) resumes its direct eastward motion as of October 18 and crosses into Aquarius on December 14. Saturn orbits the Sun more slowly than its sister giant, and the gap between the two planets will again widen by the third week of October.

The two gas giants are clearly visible in the evening this fall. In early October, they appear above the southeastern horizon at dusk and culminate in the south at about 10 p.m.; Saturn disappears first in the southwest around 1:30 a.m., followed by Jupiter 90 minutes later. By mid-November, both planets are in the south at nightfall and set about four hours later. Remember that a planet is best positioned for viewing through a telescope when it is culminating, i.e., when it reaches its highest point in the sky above the southern horizon. And because its light takes a shorter path through the atmosphere, you'll get a much clearer view of fine details, such as Saturn's rings and Jupiter's cloud bands. In December, Saturn will already be too low in the southwest at nightfall, but you'll still have a chance to see Jupiter.

The Moon will draw close to Saturn and Jupiter several times this fall, starting on October 13, 14 and 15, then on November 10 and 11 in the evening, and again on the evenings of December 7 and 8.

Mercury shines at dawn

Mercury, the closest planet to the Sun, has an excellent apparition in the morning sky **from October 16 to November 10.** Look for a tiny dot of light in the glow of dawn, low on the east-southeastern horizon, 30-45 minutes before sunrise. When it reaches greatest elongation on October 25, 18 degrees east of the Sun, Mercury will be visible for a good hour before sunrise. Too faint to be easily detected before October 15, the tiny planet is much brighter at the end of this appearance, but it quickly loses altitude after November 10. The prime viewing period extends from October 20 to November 1. **At dawn on the morning of November 3,** the very thin waning Moon lies a mere 3½ degrees above Mercury.

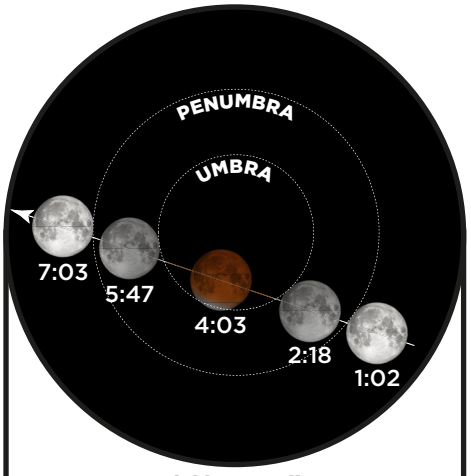
Clear skies!

Research and text: **Marc Jobin**

SEASONAL MILESTONES

The **autumn equinox** occurs on September 22, 2021 at 3:21 p.m. EDT, and the **winter solstice** happens on December 21 at 10:59 a.m. EST. Autumn 2021 will last exactly 89 days 20 hours and 38 minutes.

We return to Eastern Standard Time early on Sunday morning, November 7: Clocks are set back one hour.



M. Jobin / Planétarium Rio Tinto Alcan; data courtesy of F. Espenak, NASA/GSFC; Moon images NASA SVS

Partial lunar eclipse

A partial lunar eclipse will take place **on the night of November 18-19,** and will be visible in its entirety from North America. What sets this one apart? The fact that it could be called an "almost total" lunar eclipse, since the Moon will plunge very deeply into the Earth's umbral shadow. At maximum eclipse, around 4:03 a.m. (ET) on November 19, 97.4% of the Moon's diameter will be darkened by our planet's shadow, leaving only a very thin border still lit by direct sunlight. This will result in the Moon taking on the characteristic reddish hue of a total eclipse, at least for the few minutes before and after the mid-eclipse. The partial phases—during which we see the circular profile of Earth's shadow cast on the Moon—start at around 2:18 a.m. and end at 5:47 a.m., for a duration of 3 hours 28 minutes and 23 seconds. At the peak of the eclipse as seen from Montreal, the Moon will be 29 degrees high in the west, beneath the Pleiades and Hyades star clusters.

The next total lunar eclipse completely visible from Quebec will occur on the night of May 15-16, 2022.

PHASES OF THE MOON

*(Eastern Daylight Time, except * = Standard Time)*

New moon	First quarter
September 6 at 20:52	September 13 at 16:39
October 6 at 7:05	October 12 at 23:25
November 4 at 17:14	November 11 at 7:46*
December 4 at 2:43*	December 10 at 20:35*
Full moon	**Last quarter**
September 20 at 19:55	September 28 at 21:57
October 20 at 10:57	October 28 at 16:05
November 19 at 3:57*	November 27 at 7:28*
December 18 at 23:35*	December 26 at 21:24*

The Pocket Planetarium *is a seasonal information newsletter published by the Rio Tinto Alcan Planetarium, 4801, avenue Pierre-De Coubertin, Montréal (Québec) H1V 3V4*
Texts and illustrations are excerpted from Hyperespace, *the newsletter of La Société d'astronomie du Planétarium de Montréal, and are published with permission.*