The Pocket Planetarium ★

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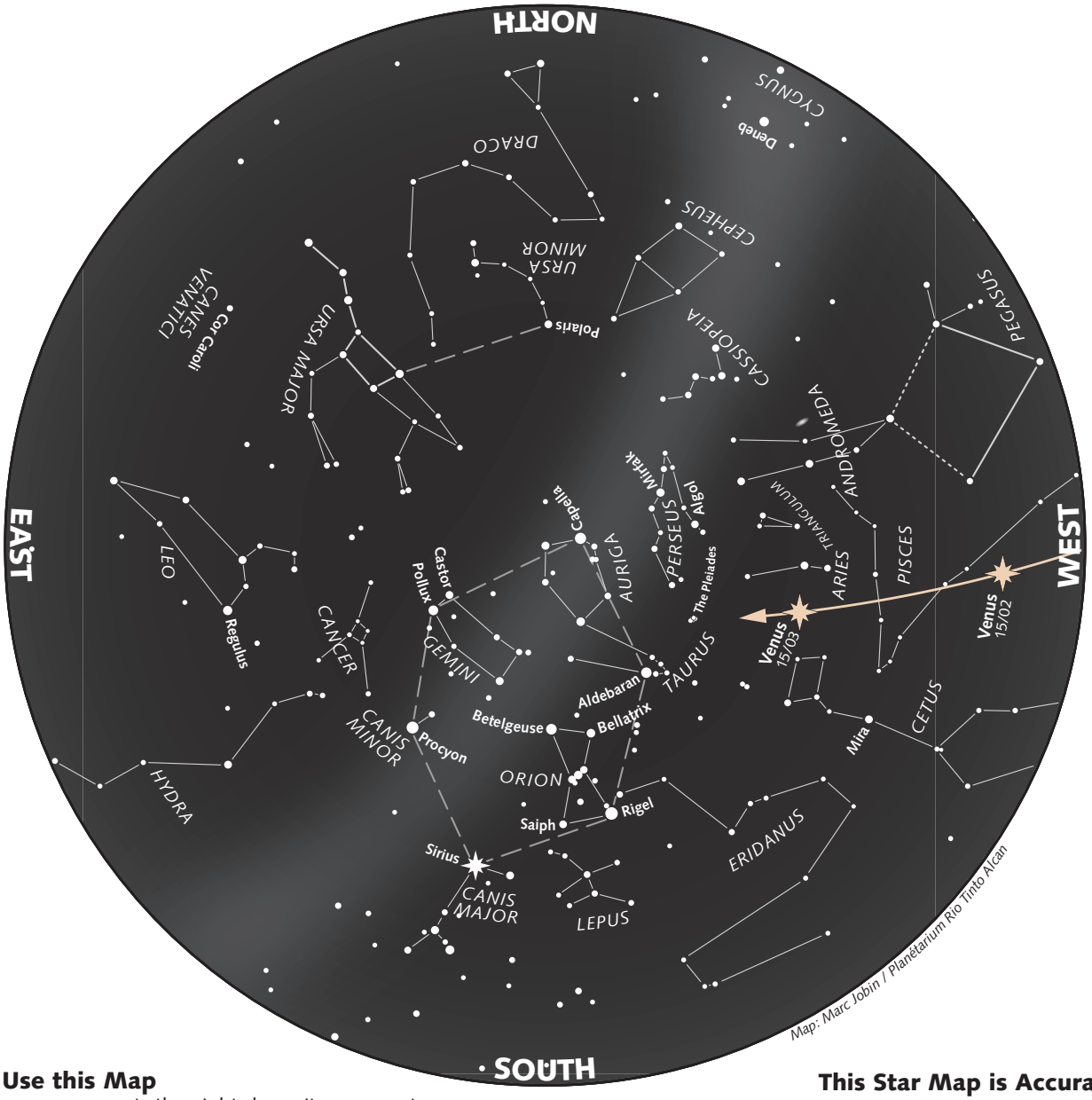
Astronomical Information Newsletter of the Rio Tinto Alcan Planetarium

The Starry Sky — Winter 2019-20



Map: Marc Jobin / Planétarium Rio Tinto Alcan

How to Use this Map

The above 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 light-coloured area outlines the Milky Way.

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This Star Map is Accurate on...

(Eastern Standard Time)

December 21 at midnight
January 6 at 11 p.m.
January 21 at 10 p.m.
February 6 at 9 p.m.
February 21 at 8 p.m.
March 6 at 7 p.m.

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

The Sky This Winter

Mars, Jupiter and Saturn will remain inconspicuous over the next few months, leaving Venus to steal the show this winter. But don't overlook Mercury, which also makes a fine appearance after the Sun sets.

Venus, queen of the evening

Venus is THE Evening Star, coming into view as soon as the sky darkens after sunset. In late December, the dazzling planet appears about 15 degrees above the southwestern horizon as twilight settles in. But the show is just getting started: Over the coming weeks, Venus climbs ever higher and glides toward the right along the horizon. In January, its altitude exceeds 20 degrees and by February, it dominates the west-southwestern horizon, rising more than 30 degrees high. In March, Venus shines like a spotlight about 40 degrees above the western horizon as darkness falls. This means it can be spotted well into the evening since it sets more than four hours after the Sun.

A small telescope is all you need to clearly make out Venus's phases, much like those of the Moon. From the December solstice to the March equinox, the planet will transform from gibbous to "half-Venus" before our very eyes, while its apparent size increases as the planet draws closer to Earth. Take note that April and May are when the most spectacular changes occur.

The crescent Moon will join Venus every month this winter. **The evening of December 28,** it will lie less than 3 degrees below the planet. **The evening of January 28,** the thin crescent will hang 6 degrees to the left of Venus. And finally, **the evening of February 27,** the waxing Moon will again pass 6 degrees to the left of the Evening Star.

Seasonal Milestones

The **winter solstice** occurs on December 21, 2019 at 11:19 p.m. EST, and the **spring equinox** happens on March 19, 2020 at 11:50 p.m. EDT. Winter will last exactly 88 days 23 hours 31 minutes.

Earth is at **perihelion,** closest to the Sun, on January 4 at 9:48 p.m. The Earth-Sun distance is then "only" 147 091 144 km.

The **switch to Daylight Time** takes place early on the morning of Sunday, March 8: Set your clocks ahead one hour.

Phases of the Moon

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

New moon	First quarter
December 26 at 0:13	January 2 at 23:45
January 24 at 16:42	February 1 at 20:41
February 23 at 10:32	March 2 at 14:57
March 24 at 5:28*	April 1 at 6:21*
Full moon	**Last quarter**
January 10 at 14:21	January 17 at 7:58
February 9 at 2:33	February 15 at 17:17
March 9 at 13:47*	March 16 at 5:34*
April 7 at 22:35*	April 14 at 18:56*

Jupiter and Saturn reappear at dawn

Jupiter and **Saturn** are currently celestial neighbours and are both starting the winter season lost in the Sun's glow. Jupiter is in conjunction with the Sun on December 27, and then Saturn, located about 10 degrees to the east, follows suit on January 13. Jupiter is therefore the first to reappear at dawn by mid-January, when the planet can be found low on the southeastern horizon 45 minutes before sunrise. Jupiter pulls away from the Sun with each passing day and becomes easier to see against an increasingly darker sky. In the second half of February, Jupiter rises just before daybreak and shines about 10 degrees high, 30 minutes before sunrise.

Saturn emerges at dawn in early February, lower and to the left of Jupiter. (Jupiter is the brighter of the two.) The ringed planet rises before dawn starting in early March.

Jupiter and Saturn currently shine in the constellation Sagittarius. Jupiter is slowly catching up to Saturn since it orbits the Sun at a faster speed (orbital period of 12 years compared to more than 29 years): Note how the gap between the two planets decreases gradually throughout the year. They will converge for a beautiful conjunction in December 2020. Also keep an eye on Mars, which is rapidly approaching Jupiter from the right: The Red Planet will pass less than one degree below the Giant Planet **on the morning of March 20** and will encounter Saturn on the 31st.

The morning of January 22, the thin waning crescent Moon hangs 7 degrees to the upper right of Jupiter; the show will take place very low in the southeast at dawn, 30 minutes before sunrise. **The morning of February 19,** the lunar crescent lies 4 degrees to the right of Jupiter, low in the southeast at the very end of the night and at dawn, and **the next morning, on February 20,** the thin waning crescent Moon can be found 2½ degrees to the lower right of Saturn, very low in the southeast at dawn. **The morning of March 18,** the waning Moon lies only 1½ degrees below Mars and 2 degrees to the lower right of Jupiter (Saturn can be spotted 7 degrees to their left); look for them low in the southeast around 5:30 a.m., one-and-a-half hours before sunrise. **The next morning, on March 19,** the thin waning Moon hangs 6 degrees to the lower left of Saturn.

Mercury at twilight

Mercury, the closest planet to the Sun, never appears more than 28 degrees away from our star as seen from Earth. As such, Mercury is only alternately visible during dawn or dusk. After its passage in superior conjunction (on the other side of the Sun) on January 10, the tiny planet gradually emerges in the evening sky, where it makes a very good showing **from January 23 to February 18.** Mercury, which can be spotted above the west-southwestern horizon 30 to 45 minutes after sunset, is considerably brighter at the beginning of this viewing period and quickly dims after February 15, as it plunges back toward the horizon and disappears in the Sun's glow. The prime viewing window extends from January 25 to February 15.

Mercury then makes a poor morning apparition **between March 7 and 31,** sitting very low on the east-southeastern horizon 30 minutes before sunrise and making it very difficult to spot. During this viewing window, Mercury slowly gains in brightness but sinks ever lower in the sky.

Mars prepares its return

Mars will only be in opposition next fall. For now, the Red Planet is still very far from Earth and remains a relatively inconspicuous object, appearing as a modest orange star, visible in the southeast after 5 a.m. and at dawn. But if you look closely, you will be able to see that this "star" is moving eastward through the constellations with each passing day: Mars starts the winter in Libra, enters Scorpius on January 7, almost immediately crosses the border into Ophiuchus on January 15, and then transits Sagittarius beginning on February 11. Mars steadily approaches Jupiter and Saturn: The Red Planet will successively be in conjunction with the two gaseous giants, the morning of March 20 for Jupiter and that of the 31st for Saturn, with each pairing separated by less than one degree.

The morning of January 20, the crescent moon can be found 4 degrees to the upper right of Mars. **The morning of February 18,** the lunar crescent hangs less than one degree to the upper right of Mars; the gap continues to shrink as the duo rise up into the sky and day breaks. Finally, **the morning of March 18,** the waning crescent Moon lies only 1½ degrees below Mars and 2 degrees to the lower right of Jupiter (Saturn can be spotted 7 degrees to their left); look for them low in the southeast around 5:30 a.m., 90 minutes before sunrise.

Clear skies!

Research and text: **Marc Jobin**

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