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CNY Outdoors

Upstate NY Stargazing in February: Lunar eclipse, Kopernik star party, 'Dog Nights of Winter'

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By [Special to nyup.com](#)

Blog_star 1.JPG

The Moon on Jan. 5, 2017.

(Photograph courtesy of by Larry Slosberg)

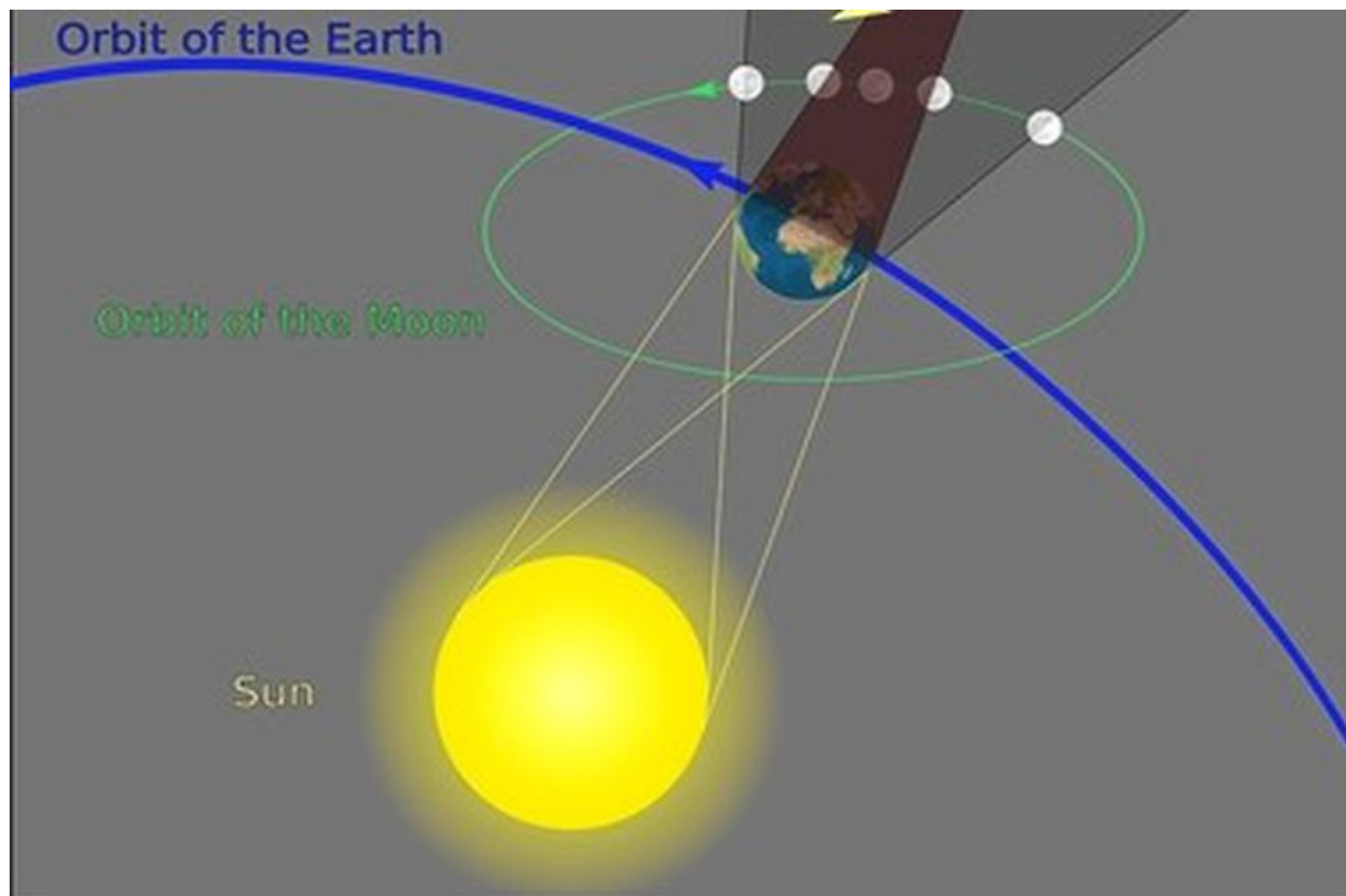
By **Damian Allis**, Contributing Writer

The Moon has seen a thing or three in 4 billion years. The seemingly smooth surface appears quite cratered in low-power binoculars, with hundreds of these named impact remnants visible for study with the help of labeled lunar maps. All current evidence indicates that some event early in the history of the Solar System involving a Mars-sized object impacting the Earth's surface kicked up enough material to form the Moon. This common origin is solidly supported by some solid evidence - moon rocks returned during the Apollo Moon landings indicate, among other things, that the age and composition of the Earth's crust and the Moon appear to be nearly identical.

Those looking up at the Moon and down at maps of the Earth will also note that a lot has changed between us in 4 billion years despite our cataclysmic common origin. The Moon's cratered surface is a largely undisturbed snapshot from the end of a violent theorized period in our Solar System's history called the Late Heavy Bombardment, yet another insight into our shared history brought to us by rocks returned during the Apollo Missions. The current lunar vista is a stark contrast to Earth's surface, where tectonic activity, the eroding power of weather and water, and a host of other factors have erased much of the visual history of our distant past.

The Moon is about 1/400th the diameter of the Sun and is about 1/400th the distance to the Sun - meaning they appear to be nearly the same size in our sky. Right now, this makes for some dramatic solar eclipses, when the Moon in its elliptical orbit may either completely or nearly-completely obscure the daytime Sun to produce what are the most dramatic solar eclipses in the Solar System. The continental U.S. is preparing for one such eclipse on Aug. 21.





The umbra, penumbra, and path of the Moon. The Moon is tilted 5.14 degrees off the Sun-Earth plane, meaning the Moon sometimes passes through the umbra (total lunar eclipse) or penumbra (partial eclipse), but often misses both.

This Feb. 10, New Yorkers will be treated to a different, more subtle kind of eclipse - a penumbral lunar eclipse. We know the difference between daytime and nighttime on the Earth's surface, but the Earth also does a decent job of blocking sunlight, casting a shadow into space in the process. This shadow is divided into an umbra - the darkest part of the shadow we cast, and penumbra. During total lunar eclipses, the Moon passes into Earth's umbra, turning the Moon red-orange in the process. The display of countless stars and even the band of the Milky Way galaxy during a total lunar eclipse is one of the great sights in astronomy.

A penumbral lunar eclipse is a far more subtle thing, often only obvious to those taking pictures of the entire process. If you've clear skies and enough patience to see the eclipse through, you might be able to tell for yourself that the Moon has dimmed a bit as it passes into part of the Earth's shadow. The penumbral eclipse begins at 5:34 p.m., is at its greatest at 7:44 p.m., and will finish at 9:53 p.m.

Lectures and observing opportunities

New York has a number of evenly-spaced astronomers, astronomy clubs, and observatories that host sessions throughout the year. Many of these sessions are free

and open to the public, often close to the New Moon when skies are darkest and the chance for seeing deep, distant objects is greatest. These observers and facilities are the very best places to see the month's best objects using some of the best equipment, all while having very knowledgeable observers at your side to answer questions and guide discussion. Many of these organizations also hold monthly meetings, where seasoned amateurs can learn about recent news and discoveries from guest lecturers, and brand new observers are encouraged to join and begin the path towards seasoned amateur status.

Announced public sessions from several respondent NY astronomy organizations are provided below for February. As wind and cloud cover are always factors when observing, please check the website links or email the groups for directions and to find out about an event a day-or-so before the announced session. Also note that some groups will include weather-alternate dates for scheduled sessions.

Astronomy Events Calendar

Organizer	Location	Event	Date	Time	Contact Info
Adirondack Public Observatory	Tupper Lake	Public Star Gazing	Feb. 3	6:00 PM	email , website
Adirondack Public Observatory	Tupper Lake	Public Star Gazing	Feb. 17	6:00 PM	email , website
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	Senior Science Day	Feb. 6	3:00 - 4:00 PM	email , website
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	AAAA Meetings	Feb. 16	7:30 - 9:00 PM	email , website
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	Night Sky Adventure	Feb. 21	7:00 - 8:30 PM	email , website
Baltimore Woods	Marcellus	Penumbral Lunar Eclipse	Feb. 10	6:30 - 8:30 PM	email , website
Baltimore Woods	Marcellus	Solar Viewing Program	Feb. 18	1:00 - 3:00 PM	email , website
Green Lakes State Park	Fayetteville	Winter Skies Observing	Feb. 17	7:00 - 9:00 PM	(315) 637-6111, website
Kopernik Observatory & Science Center	Vestal	Lunar Explorations & Public Observing	Feb. 3	6:00 - 9:00 PM	email , website
Kopernik Observatory & Science Center	Vestal	Winter Skies Public Program	Feb. 10	7:00 PM	email , website
Kopernik Observatory & Science Center	Vestal	Winter Star Party	Feb. 18	7:00 PM	email , website
Mohawk Valley Astronomical Society	Waterville	Public Star Gazing	Feb. 18	7:30 PM - 11:00 PM	email , website

Of special note this month is the Winter Star Party at Kopernik Observatory and

Science Center in Vestal, which will feature a keynote lecture by Father George Coyne, S.J. Ph.D., observatory director emeritus of the Vatican Observatory and currently McDevitt Chair of Religious Philosophy at Le Moyne College. With luck and clear skies, observing to follow. For details, visit www.kopernik.org.

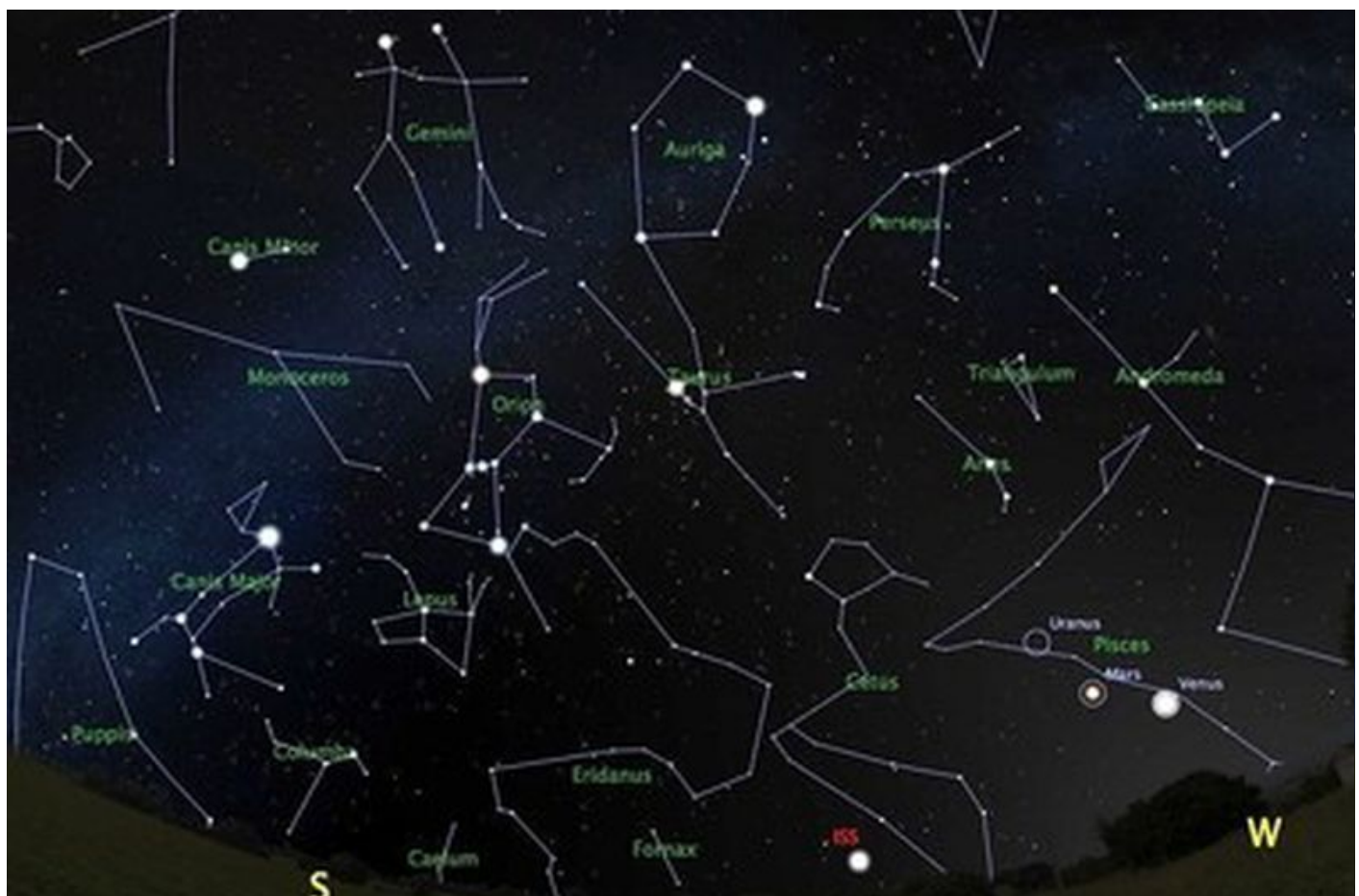
Interested attendees in the Cazenovia area are invited to a lecture on Extra-solar Planets and Stellar Astrophysics on March 1 in Hubbard Hall at Cazenovia College, given by Dr. Leslie Hebb from Hobart and William Smith Colleges and co-sponsored by the Cazenovia College Science Cafe and CNY Observers. For details, email info@cnyo.org.

Lunar Phases

New:	First Quarter:	Full:	Third Quarter:	New:
Jan. 27, 7:07 PM	Feb. 3, 11:18 PM	Feb. 10, 7:32 PM	Feb. 18, 2:33 PM	Feb. 26, 9:58 PM

The Moon's increasing brightness as Full Moon approaches washes out fainter stars, random meteors, and other celestial objects - this is bad for most observing, but excellent for new observers, as only the brightest stars (those that mark the major constellations) and planets remain visible for your easy identification. If you've never tried it, the Moon is a wonderful binocular object.

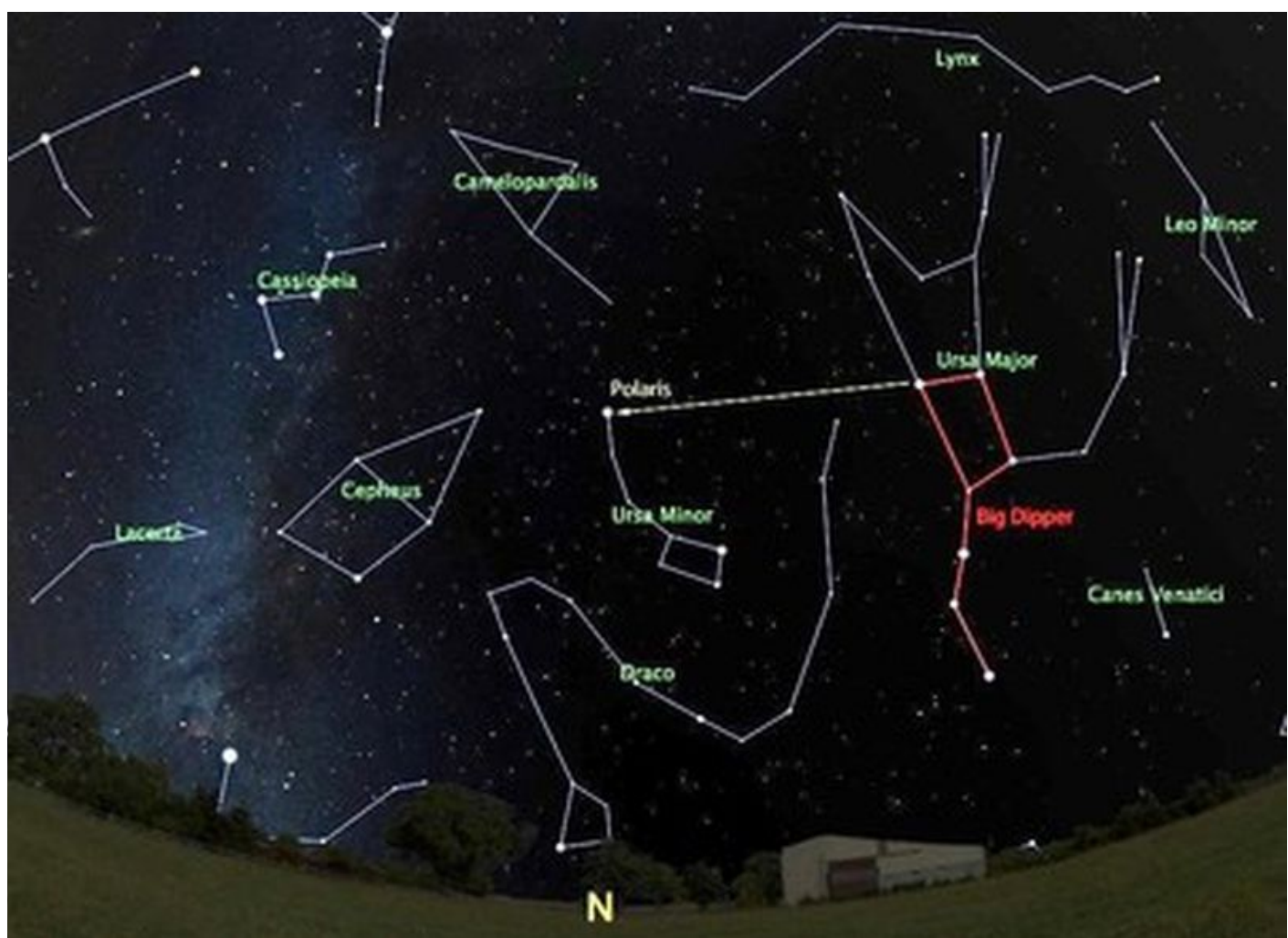
Evening And Nighttime Guide



The view looking southwest at 8 p.m. on Feb. 14 (except for the changing Moon position, this mid-month view is accurate for all of February). Click for a larger view.

Items and events listed below assume you're outside and observing most anywhere in New York state. The longer you're outside and away from indoor or bright lights, the better your dark adaption will be. If you have to use your smartphone, find a red light app or piece of red acetate, else set your brightness as low as possible.

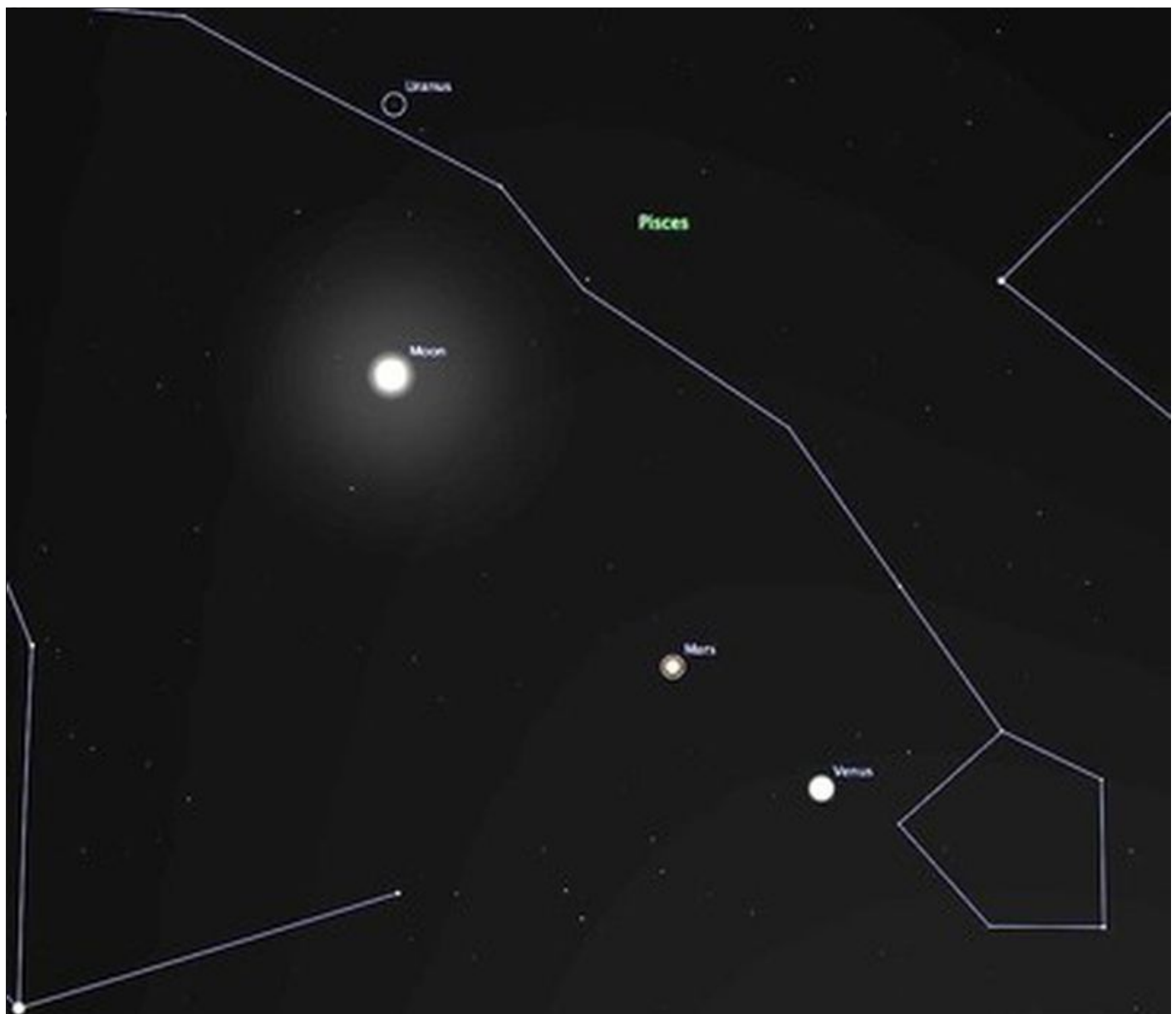
Southern Sights: The Moon reaches full on February 10th and, after enjoying the penumbral lunar eclipse, the Moon will be absent from pre-midnight observing for the second-half of February - perfect for those looking to do deep sky observing without having to compete with moon glow. Orion, Canis Major, Taurus, and Gemini are increasingly well suited for binocular viewing, high enough to float above the western tree line but low enough to not strain your neck. Once you've found Orion, it takes only a little effort to identify the brightest stars in its neighboring constellations ([see last month's column](#)). Those willing to brave the pre-midnight cold are treated to winter's best constellations in the western sky and Jupiter, which rises just before the bright star Spica in Virgo, in the eastern sky.



The view looking north at 8 p.m. on Feb. 14. Click for a larger view.

Northern Sights: The southern sky has been full of planets, bright constellations, and the core of the Milky Way since July, but we're approaching a bit of a waning period for southern sights where we can finally turn some proper attention to the view north. The timing is impeccable, as observers out during late-evening hours are treated to a prominent Big Dipper standing high in the northeastern sky and a prominent "E" shape in the northwest - the constellation Cassiopeia. The ancient king Cepheus sits near the horizon before midnight, looking like a dilapidated old barn. Once you've found the Big Dipper, take the two stars at the end of the bowl and guide your way to a moderately bright star surrounded by a mostly empty, dark piece of sky - this is the north star and tip of the Little Dipper handle, Polaris.

Planetary Viewing



The Moon, Mars, and Venus after sunset on Feb. 1. Click for a larger view.

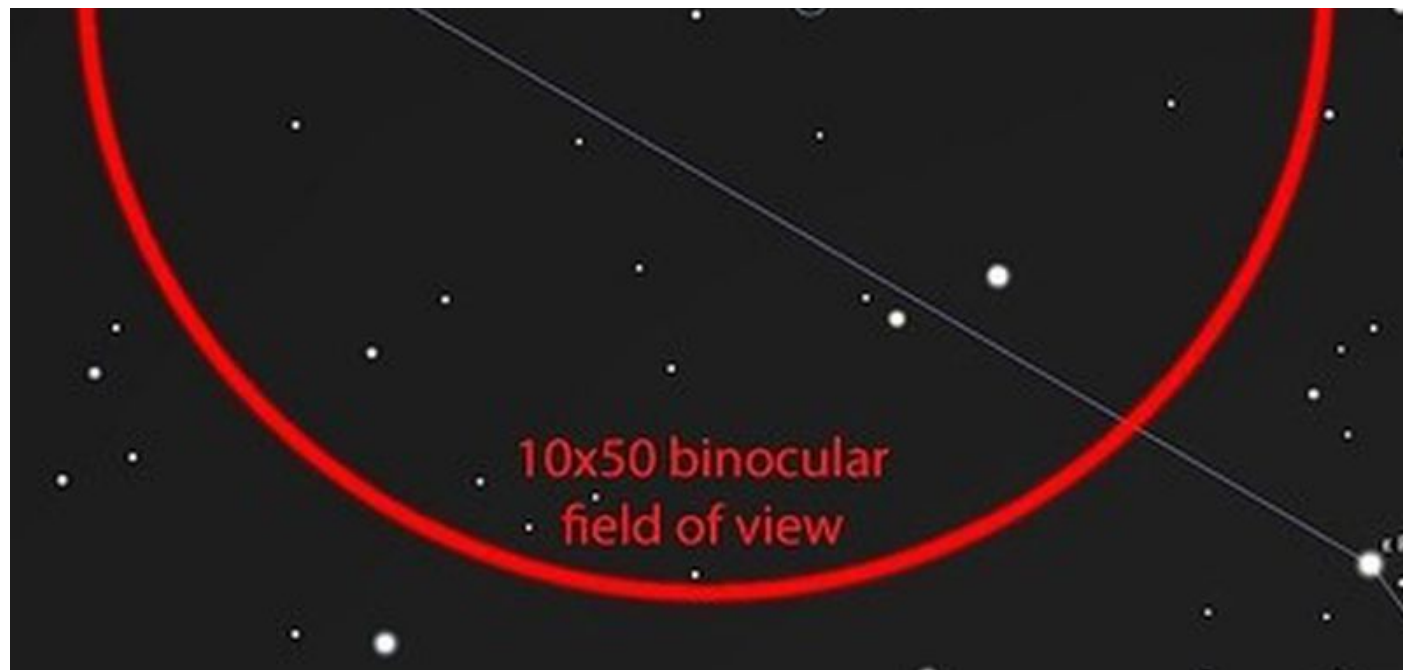
Venus and Mars: Visual observers have been fortunate the past few months, as Venus and Mars have appeared to travel together and in close proximity - a rare, bright twofer that spares the neck as much as it does the gears on cold telescopes. Anyone observing or simply outside after sunset on January 1st, 2nd, and 3rd of this year were treated to the remarkable grouping of Venus, Mars, and the waxing crescent Moon. Facebook groups and twitter feeds alike were full of clear sky captures of this trio.

We lose Venus after 8:30 p.m. and Mars after 9 p.m. on Feb. 1. While Venus will set under a minute earlier each night thereafter, Earth and Mars are moving in such a way that Mars will seem to set at the same time each night this month. Both Venus and Mars remain in Pisces this month - a considerable feat given how quickly both appear to move against the backdrop of stars.

The closest grouping of the Moon, Mars, and Venus this month occurs on Feb. 1, although this straight line will be a bit less impressive than the tight grouping of the three on Jan. 31. Despite the short month, the three will again group together on Feb. 28. That said, Mars and Venus will appear to drift apart more and more this and the following months, so the triangle on the 28th with the thin waxing crescent will be quite a bit larger than the one on Jan. 31.

Mars will even serve a purpose for binocular observers this month, as it will provide a marker for the faraway planet Uranus. From February 17th to March 7th, Mars and Uranus will together be within the field of view of 10x50 binoculars. Closest approach for this pair will be on February 26th. With luck, Uranus will appear as a dim, blue-green star against the bright orange color of Mars.





Use Mars to find the distant planet Uranus this month. The view above is closest-approach on Feb. 26.
Click for a larger view.

Jupiter: Jupiter will be the reason amateur astronomers get to sleep a bit later than usual this month. Our Solar System's largest planet rises above the eastern horizon just after 11:30 p.m. on February 1st and after 9:30 p.m. on the 28th, never straying far from the bright star Spica in Virgo. In Jupiter's absence, Spica would be the most prominent object in that part of the sky, but it will be mightily outshone to the eyes of overnight observers.

Jupiter and Spica will have two close encounters this month, with the waxing Moon to the right of the pair before midnight on Feb. 14 and to the left on the 15th.

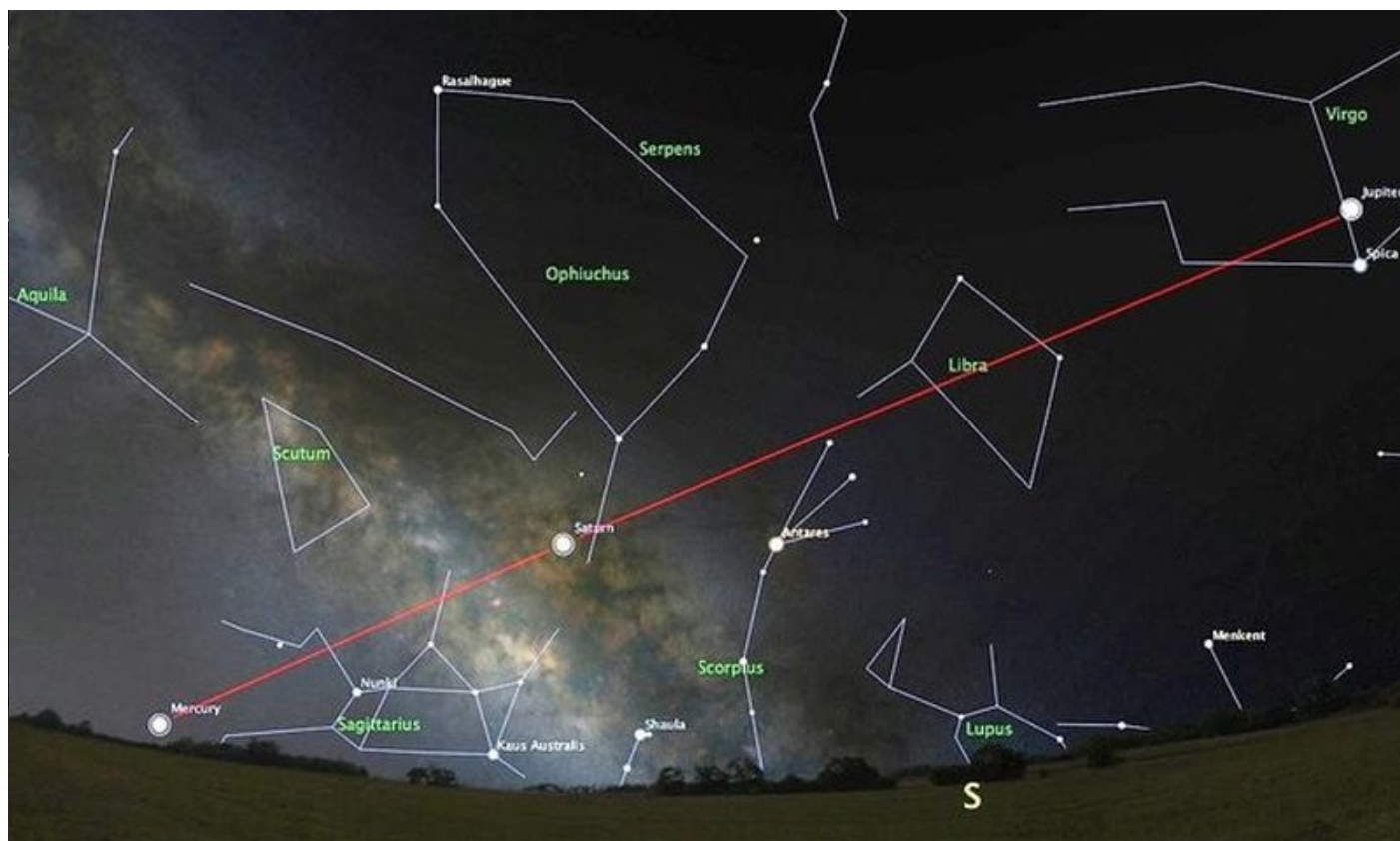


The Moon, Jupiter, and Spica group in the pre-midnight sky on Feb. 14. Click for a larger view.

Saturn: Saturn rises to the southeast around 4:45 a.m. at the beginning of the month and around 3:15 a.m. by month's end, when it's just within the same field of view as the Milky Way's center in 10x50 binoculars. Saturn spends most of the month in the summer constellation Ophiuchus, crossing the Ophi/Sagittarius border on Feb. 24.

For those attempting an early morning sight, you might first see the red-orange star Antares in Scorpius, which rises about 30 minutes earlier. Your brightest marker for finding Saturn this month will be the waning crescent Moon, when Saturn will be to the crescent's left on the 20th and to its right on the 21st.

Mercury: The fleet-footed Mercury passes through Sagittarius, Capricornus, and Aquarius this month. Your best chance to see Mercury occurs on February 1st, when it rises from the southeast just after 6:40 a.m. It rises over the horizon with the Sun on March 2nd, but sunlight in the pre-dawn sky will overpower any views of Mercury by the second week of February. For those attempting an early morning sight, there will be nothing else as bright as Mercury along the southeast horizon before sunrise, so that pinpoint of light you see above the tree line is it. Given how close to sunrise it rises, your best bet at seeing Mercury may be through low-power binoculars - but DO NOT use those binoculars ANYWHERE near the Sun, as the damage to your eyes is instantaneous and permanent.



Mercury, Saturn, and Jupiter line up in the pre-dawn skies in early February. Click for a larger view.

ISS And Other Bright Flyovers

Satellite flyovers are commonplace, with several bright passes easily visible per hour in the nighttime sky, yet a thrill to new observers of all ages. Few flyovers compare in brightness or interest to the International Space Station. The flyovers of the football field-sized craft with its massive solar panel arrays can be predicted to within several seconds and take several minutes to complete.

ISS viewing will be limited to late-evenings this month and it will disappear completely from our nighttime skies after February 17th until early March. The latest February flyover occurs at 8:15 p.m., meaning all flyovers this month are early enough to enjoy before the coldest parts of the evening occur. Note the number of days (7) this month where we're treated to two evening flyovers. Simply go out a few minutes before the start time, orient yourself, and look for what will at first seem like a distant plane.

ISS fly-bys

Date	Brightness	Approx. Start	Start Direction	Approx. End	End Direction
2/1	extremely	5:42 PM	SW	5:48 PM	E/NE
2/1	very	7:19 PM	W/NW	7:21 PM	N/NW
2/2	very	6:26 PM	W	6:31 PM	NE
2/3	moderately	7:11 PM	W/NW	7:14 PM	N
2/4	very	6:18 PM	W/NW	6:23 PM	NE
2/4	somewhat	7:56 PM	NW	7:56 PM	NW
2/5	moderately	7:03 PM	NW	7:06 PM	N
2/6	moderately	6:11 PM	NW	6:16 PM	NE
2/6	somewhat	7:48 PM	NW	7:48 PM	NW
2/7	very	6:55 PM	NW	6:58 PM	N/NE
2/8	moderately	6:03 PM	NW	6:07 PM	NE
2/8	somewhat	7:39 PM	NW	7:40 PM	N/NW
2/9	very	6:47 PM	NW	6:50 PM	N/NE
2/10	very	5:54 PM	NW	5:59 PM	E/NE
2/10	very	7:31 PM	NW	7:33 PM	NW
2/11	very	6:38 PM	NW	6:43 PM	E/NE
2/11	somewhat	8:15 PM	W/NW	8:15 PM	W/NW
2/12	extremely	7:22 PM	W/NW	7:25 PM	W/SW
2/13	extremely	6:30 PM	NW	6:35 PM	E/SE
2/13	somewhat	8:07 PM	W	8:08 PM	W/SW
2/14	very	7:14 PM	W/NW	7:18 PM	S
2/15	extremely	6:21 PM	W/NW	6:28 PM	SE
2/16	somewhat	7:06 PM	W/SW	7:09 PM	S/SW

2/17	moderately	6:13 PM	W	6:18 PM	S
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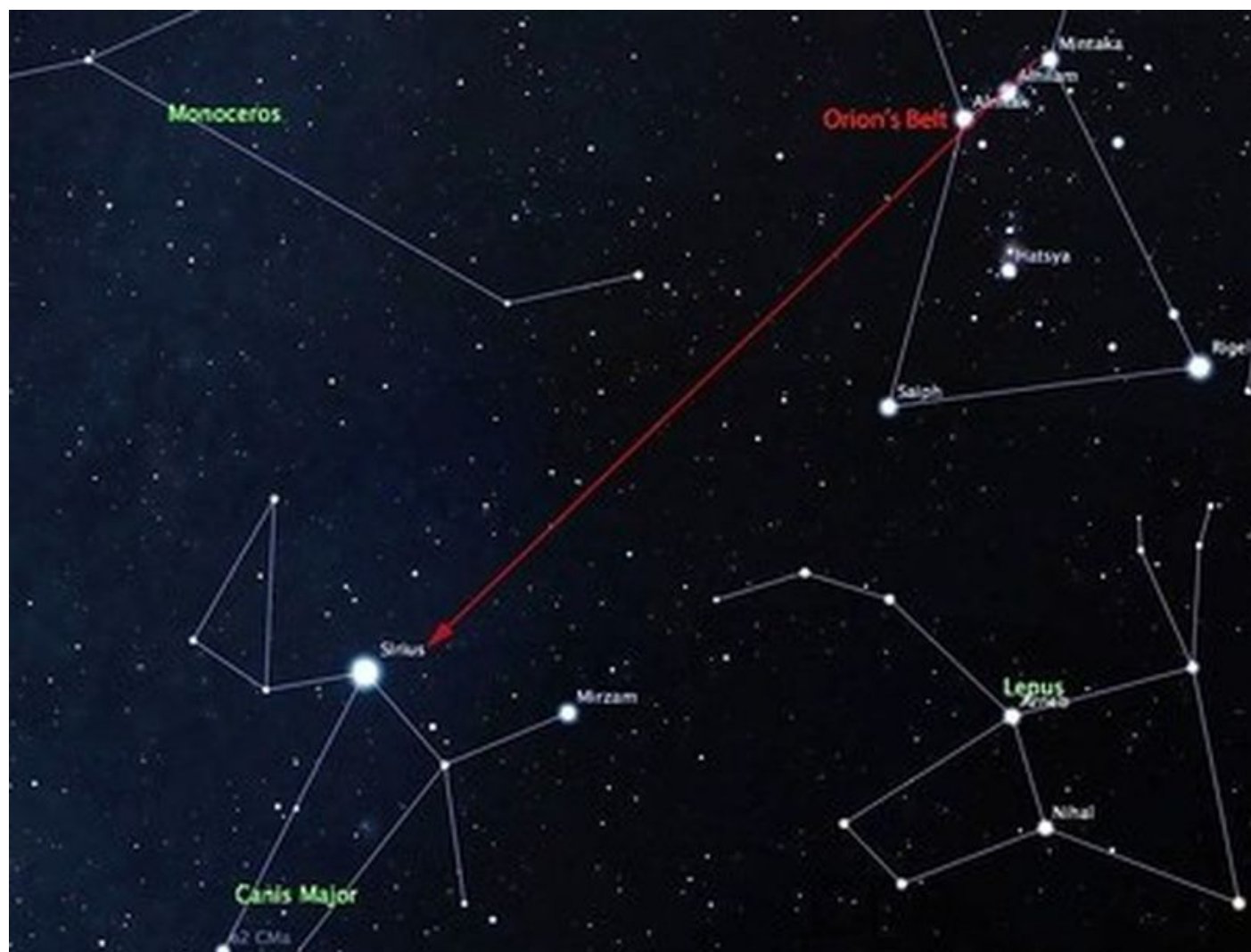
Predictions courtesy of

heavens-above.com

Meteor Showers: No Major Showers This Month

As has been discussed in previous articles, meteor showers are the result of the Earth passing through the debris field of a comet or asteroid. While the orbits of scores of these objects bring them close to Earth's orbit, a limited number produce enough debris to produce significant meteor shower activity. February and March mark yearly lulls in major meteor shower activity, with the next prominent shower being the Lyrids that occur in April. The astronomy community recognizes many minor showers that are predictable in their timing and are predictably unimpressive. Those interested in seeing a full list should check out the [American Meteor Society meteor shower calendar](#).

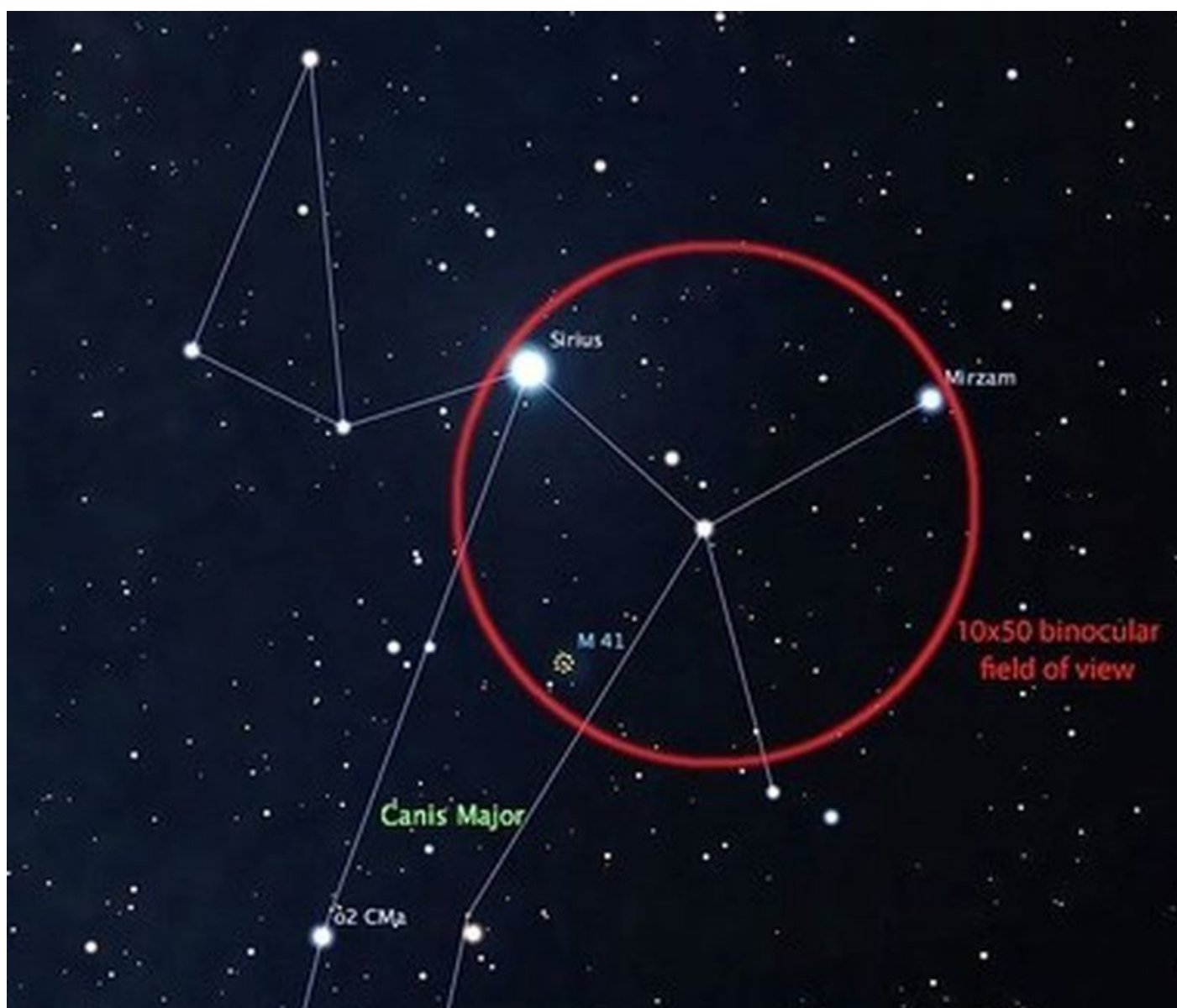
Learn A Constellation: Canis Major





Canis Major, including Orion's belt as a guide to an unmissable star. Click for a larger view.

Much has been said of Orion and its surroundings in the previous articles. Winter skies are often as clear as they are cold, giving observers some of the very best sights the night sky has to offer. Part of this observing time allows us see how the planets stand out brightly against the backdrop of distant stars. That said, the transition from bright planets to brightest stars is not sharply defined, as there are a smattering of stars that can outshine our nearest planetary neighbors.





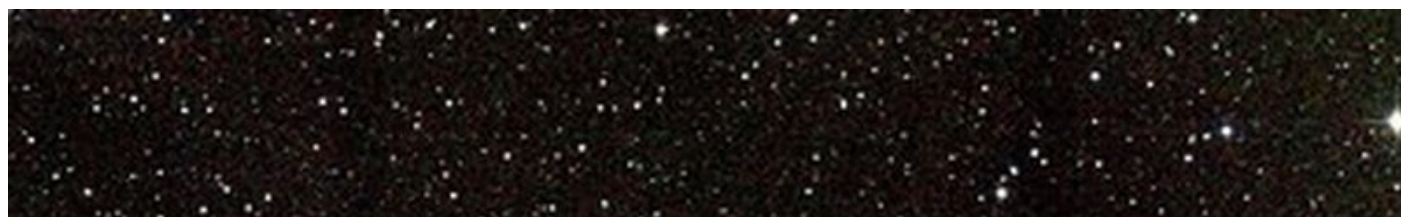
Canis Major and labels, including the location of the open star cluster M41. Click for a larger view.

Canis Major, just off the eastern foot of Orion the Hunter, is marked by such a star.

Sirius is the brightest star in the night sky and, like at least half the stars catalogued in the history of astronomy, is actually a binary system. The two stars of Sirius are too close to separate without decent magnification, but there are a number of professional and amateur astronomers who've imaged the large Sirius A and its much smaller companion, blue Sirius B.

Sirius is brilliantly bright, but if the sheer number of bright stars around Orion confuse you at first sight, draw a straight line to the left that connects all of Orion's belt stars. Sirius will be the bright star you might confuse for an incoming plane. Once you've found Sirius and its surroundings, you'll soon see that the grouping of stars that define Canis Major actually look a bit like a four-legged animal - and it's always a treat when the constellation makes it easy to remember the name.

All representations you will see will likely have Sirius as the front shoulder star, Mirzam as the front paw, Wesen as the hip or tail set, Adhara as the back paw or knee, and Aludra as the tail star. Despite being in the band of the Milky Way, Canis Major does not offer much more to binocular observers than the open star cluster M41, known colloquially as the Little Beehive. With Sirius and Mirzam at the very edge of a 10x50 binocular field of view, M41 will sit somewhere near the opposite edge to Mirzam.





A quality image of M41, courtesy the Two Micron All-Sky Survey/NASA. Click for a larger view.

And one final bit of trivia about Sirius - Canis Major is a very old constellation, having been defined as a dog since at least 1100 B.C. Over the course of the year, Sirius will make its major appearance in the nighttime sky in winter, then will disappear from view in mid-Spring until its early morning re-appearance around early August, when it hits the horizon just before the rising Sun. The old phrase "the dog days of summer"

refers back to ancient observers associating the rise of the dog star Sirius in the morning with the hottest days of the summer.

Dr. Damian Allis is the director of CNY Observers and a NASA Solar System Ambassador.

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