CENTRAL NY OUTDOORS

Upstate NY Stargazing in January: Supermoon, Quadrantids by moonlight, Uranus by binoculars

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By Special to nyup.com, feedback@nyup.com

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Light pillars over New Berlin, NY on Dec. 14. Photo courtesy of Nihal Dhanoa.

The interest within the space science community about Martian habitability may leave you with the question, "Just how inhospitable is Mars?" A small part of the answer comes from Canada this past week, reporting that parts of North America were colder than Mars that same day. On Dec. 28, Gale Crater on Mars peaked at -23 C, while Montreal never cleared -24 C. While the Martian night will slip much lower in temperature, it is remarkable

to consider that, despite the differences in mass, atmosphere, and distance from the Sun, there are at least two places in our Solar System where a person could be easily kept warm enough to complain about the cold.

New York winters afford us opportunities for both crystal-clear astronomy and interesting physics. Light pillars, what at first blush might look like the northern lights, occur when light from the ground reflects off of ice crystals in the atmosphere. The stunning image of the phenomenon shown above is likely powered by the Chobani Plant in New Berlin. Given the positions of the most prominent stars and the knowledge that the photo is from Dec. 14, one can even pull out a star chart and deduce that the shot was taken at around 9 p.m. from a point just south of the plant.

Lectures And Observing Opportunities In Upstate/Central New York

New York has a number of astronomers, astronomy clubs, and observatories that host public sessions throughout the year. Announced sessions from respondent NY astronomy organizations are provided below for January. As wind and cloud cover are always factors when observing, please check the provided contact information and/or email the groups a day-or-so before an announced session, as some groups will also

schedule weather-alternate dates. Also use the contact info for directions and to check on any applicable event or parking fees. And bring one more layer of clothing than you think you are going to need!

Astronomy Events Calendar

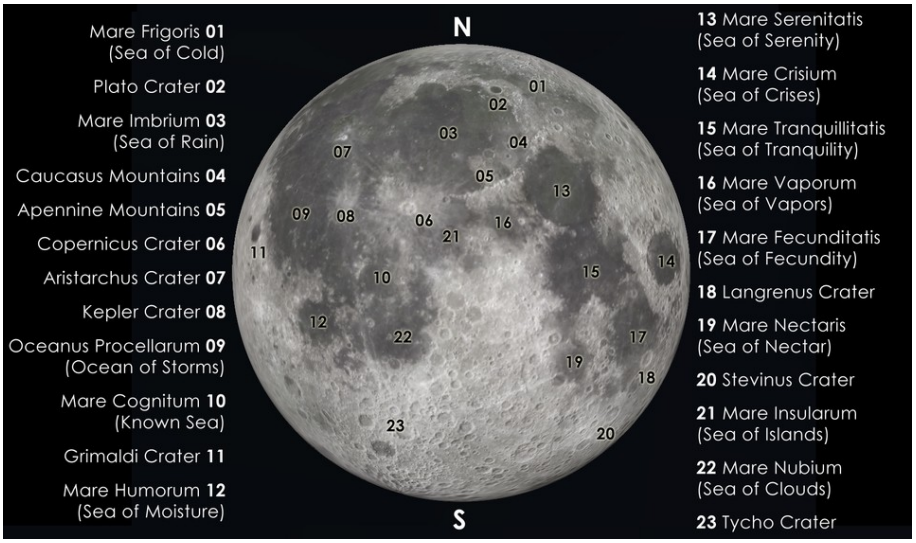
Organizer	Location	Event	Date	Time	Contact Info
Adirondack Public Observatory	Tupper Lake	1st Friday Observing	Jan. 5	7:00 PM	email, website
Adirondack Public Observatory	Tupper Lake	3rd Friday Observing	Jan. 19	7:00 PM	email, website
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	AAAA Meeting	Jan. 18	7:30 - 9:00 PM	email, website
Astronomy Section, Rochester Academy of Science	Rochester	Member Meeting	Jan. 5	7:30 - 9:30 PM	email, website
Baltimore Woods	Marcellus	Finest Winter Skies	Jan. 19	7:00 - 9:00 PM	email, website
Kopernik Observatory & Science Center	Vestal	KAS Monthly Meeting	Jan. 3	7:00 - 9:00 PM	email, website
Kopernik Observatory & Science Center	Vestal	Friday Night Observing	Jan. 5	7:00 - 9:00 PM	email, website
Kopernik Observatory & Science Center	Vestal	Friday Night Observing	Jan. 12	7:00 - 9:00 PM	email, website
Kopernik Observatory & Science Center	Vestal	Winter Skies Tour	Jan. 19	7:00 - 11:00 PM	email, website
Kopernik Observatory & Science Center	Vestal	Friday Night Observing	Jan. 26	7:00 - 9:00 PM	email, website
Mohawk Valley Astronomical Society	Waterville	Meeting	Jan. 10	7:30 - 9:00 PM	email, website
Mohawk Valley Astronomical Society	Waterville	Public Star Gazing	Jan. 20	7:30 - 10:00 PM	email, website
Syracuse Astronomical Society	Syracuse	Lecture @ OCC & Observing	Jan. 12	7:00 - 9:00 PM	email, website

Lunar Phases

Full Moon	Third Quarter	New Moon	First Quarter	Full Moon
Jan. 1, 9:24 pm	Jan. 8, 5:25 pm	Jan. 16, 9:17 pm	Jan. 24, 5:20 pm	Jan. 31, 8:26 am

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. The labeled image identifies features easily found with low-power binoculars.



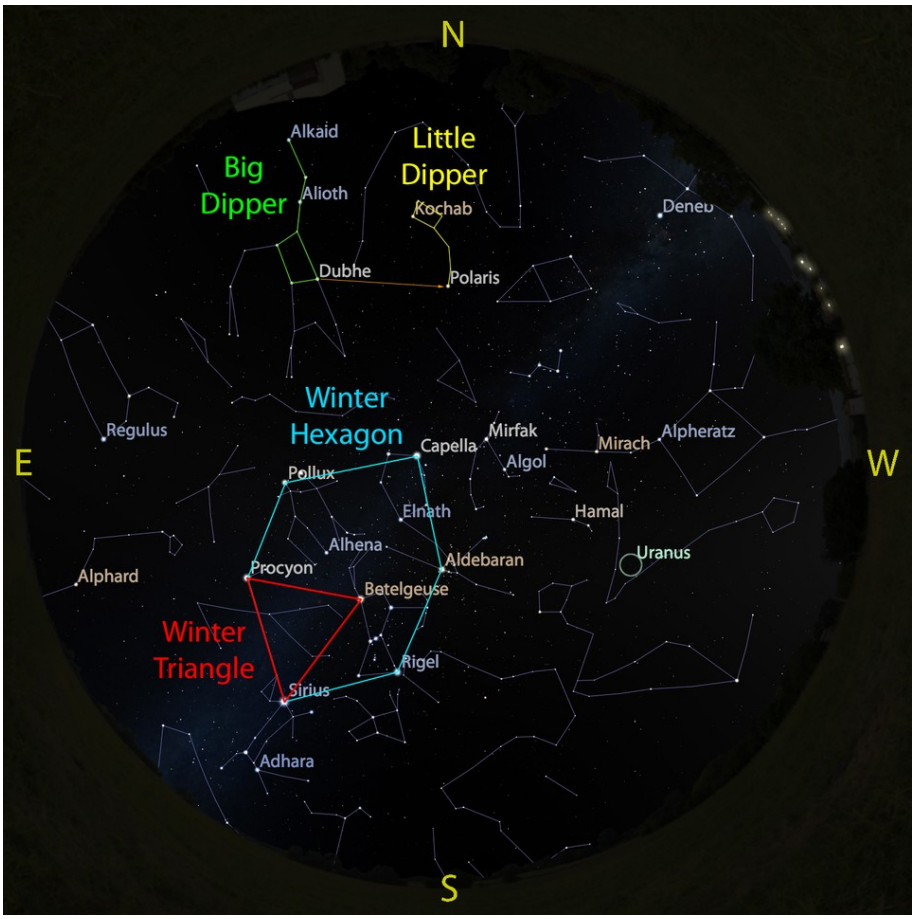
Lunar features prominent in low-power binoculars.

January begins and ends with a Full Moon. The first will likely ruin the Quadrantid meteor shower, but will also be the largest of the "supermoons" this year. The second Full Moon to occur in a given month is known as a "Blue Moon." The January Blue Moon will also qualify as a 2018 supermoon. While the descriptor "supermoon" meets with varying degrees of annoyance within the astronomical community, the closer-than-usual proximity of the Moon to the Earth on these occasions is interesting - and anyone with a camera and tripod can capture each Full Moon of the year and see these small differences in apparent size for themselves. You will also see reports of the first lunar eclipse of the year occurring on Jan. 31. For NY observers, this will begin near 6 a.m.

Sadly, the eclipse for us ends too soon - Hawaii and much of Asia will see the total lunar eclipse, while those of us on the other side of the planet are instead treated to sunrise and a 7 a.m. moonset.

Observing Guides

Items and events listed below assume you're outside and observing most anywhere in New York. 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.



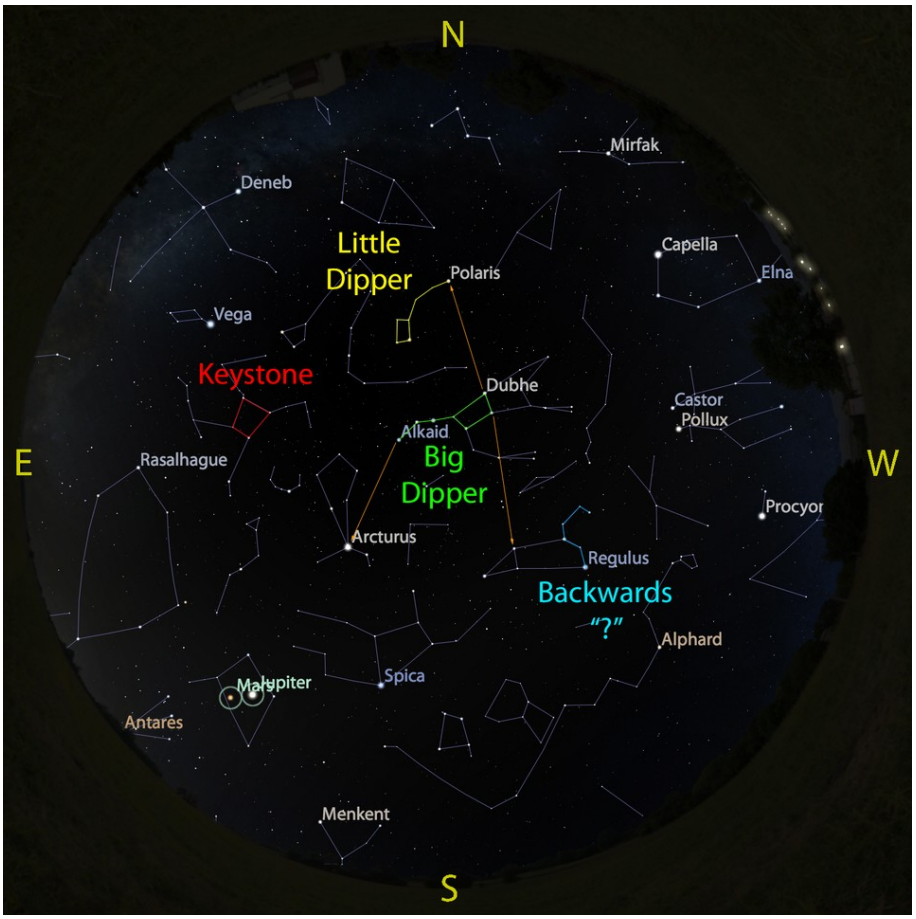
The sky at 9 p.m. on Jan. 15, accurate all month except for the changing Moon position.

Evening Skies: It took until December, but the Summer Triangle is finally no more in our pre-midnight sky. Early morning observers now see Vega and Deneb rising after 3 a.m. this month. The Winter Triangle - Sirius in Canis Major, Procyon in Canis Minor, and Betelgeuse in Orion - shares an edge with the much larger Winter Hexagon - Sirius, Procyon, Pollux in Gemini, Capella in Auriga, Aldebaran in Taurus, and Rigel in Orion.

With Orion and its cohort all above the horizon before midnight, learning eight constellations at once is as easy as following some lines within Orion's bowtie asterism.

Orion can guide you around its neighborhood. Red = belt stars to Sirius and Canis Major; Orange = Rigel and belt center to Castor and Pollux in Gemini; Yellow = Bellatrix and Betelgeuse to Canis Major; Green = Belt stars to Aldebaran and Taurus; Blue = Saiph and Orion's head to Capella in Auriga. Click for a larger view.

Morning Skies: There are no massive asterisms on the scale of the Winter Hexagon in the morning skies right now, but prominent and familiar shapes do abound. Moving from the Little Dipper to the Big Dipper, continue nearly the same distance to reach the hind end of Leo the Lion - look to the west for the backwards question mark that is its mane. In the same neck of the woods as the two Dippers is the Keystone asterism, marking the torso of the constellation Hercules.



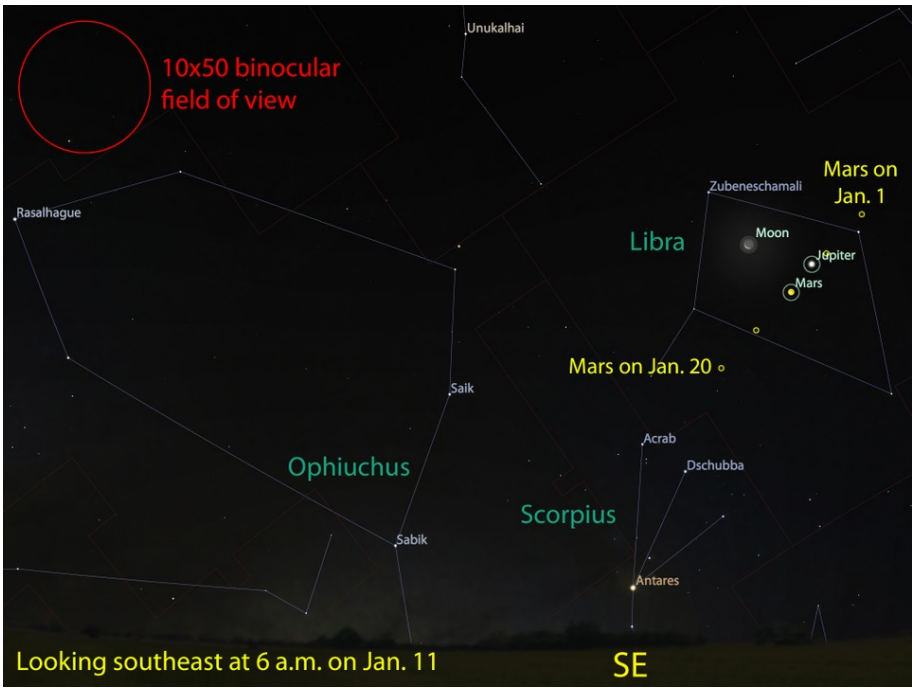
The sky at 5 a.m. on Jan. 15, accurate all month except for the changing Moon position.

Planetary Viewing

Mercury: Mercury was easiest to see on Dec. 28th and is now rising a few minutes later each morning. Your best chances to see it are close to 6:30 a.m., very low on the southeast horizon, during the first two weeks of January. It will next be visible after sunset in early March, when it makes for an excellent pairing with Venus.

Venus: Venus is not easily, nor safely, observable until February, when it returns as an observing target soon after sunset.

Mars and Jupiter: Mars and Jupiter come as an unmissable pair in the early morning skies this month. Mars rises before Jupiter in Libra the Scales from the 1st to the 6th around 3:30 a.m., after which it slides past Jupiter and becomes the later arrival. Mars will move swiftly through Libra this month, just grazing the Libra/Scorpius border on Jan. 31. Jupiter and Mars will make for an excellent close pairing on the 6th and 7th, followed by a close grouping with the Moon on the 11th.



Mars and Jupiter this month, with the Moon position shown on the 11th.

Those with even poor-quality binoculars are able to see the four bright satellites of Jupiter - known as the "Galilean Moons" for their first observer - and the appearance of Jupiter as a disc of light instead of a

simple pinpoint like all stars. Many websites, including the Jupiter's Moons webapp at Sky & Telescope, can provide you with the real-time and future positions of the fast-moving moons for any viewing opportunity you get this and every month.

When the weather doesn't cooperate, the NASA Juno mission (tw,fb) continues to impress with hard science and beautiful images.

Saturn: Saturn rises earlier each morning this month, making for an excellent observing target for morning observers with Mars and Jupiter after 6 a.m. after the 20th. Saturn will continue to rise earlier each morning and be visible at some point in the nighttime sky until October.

ISS And Other Bright Satellites

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 and six current occupants can be predicted to within several seconds and take several minutes to complete.

The ISS is up in the morning before many of us until the 17th, when it disappears for a week before becoming an evening target on the 24th through the end of the month. There are six chances to see the ISS twice before starting your day, although you will have to start extra early all six times to catch these morning pairings.

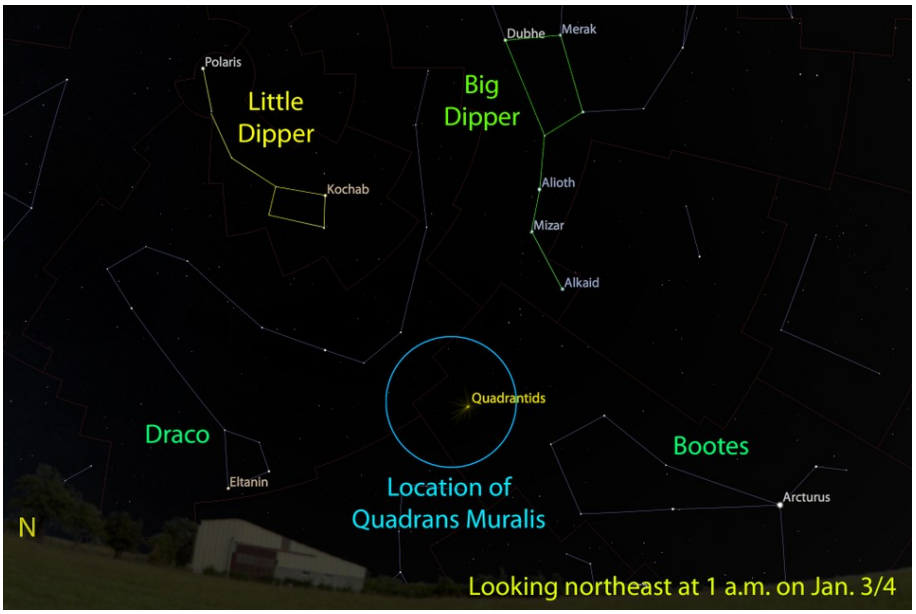
ISS Flyovers

Date	Brightness	Approx. Start	Start Direct.	Approx. End	End Direct.
1/1	somewhat	4:59 AM	E/NE	5:00 AM	E/NE
1/1	very	6:32 AM	W/NW	6:36 AM	NE
1/2	very	5:42 AM	N/NE	5:44 AM	NE
1/3	very	6:24 AM	NW	6:28 AM	NE
1/4	moderately	5:34 AM	N/NE	5:35 AM	NE
1/5	moderately	6:16 AM	N/NW	6:19 AM	NE
1/6	moderately	5:26 AM	N/NE	5:27 AM	NE
1/6	very	6:59 AM	NW	7:04 AM	E/NE
1/7	moderately	6:08 AM	NNW	6:11 AM	NE
1/8	moderately	5:18 AM	N/NE	5:19 AM	NE
1/8	very	6:51 AM	NW	6:57 AM	E
1/9	very	6:00 AM	N	6:04 AM	E/NE
1/10	moderately	5:10 AM	NE	5:11 AM	E/NE
1/10	exceptionally	6:42 AM	NW	6:48 AM	E/SE
1/11	very	5:52 AM	N	5:56 AM	E
1/12	moderately	5:02 AM	E/NE	5:03 AM	E/NE
1/12	exceptionally	6:34 AM	W/NW	6:40 AM	SE
1/13	exceptionally	5:44 AM	N	5:47 AM	E/SE
1/14	somewhat	4:54 AM	E	4:55 AM	E
1/14	very	6:26 AM	W	6:31 AM	S/SE
1/15	exceptionally	5:36 AM	S	5:39 AM	SE

Predictions courtesy of heavens-above.com. Times later in the month are subject to shifts - for accurate daily predictions, visit spotthestation.nasa.gov.

Meteor Showers: Quadrantids, From Dec. 28 to Jan. 12, Peaking Jan. 3

Meteor showers are the result of the Earth passing through the debris field of a comet or asteroid. As these objects approach the warming sun in their orbits, they leave tiny bits behind, usually no larger than grains of sand. The Earth plows through the swarm of these tiny particles at up-to 12 miles-per-second. High in the upper atmosphere, these particles burn up due to friction and ionize the air around them, producing the long light trails we see. We can predict the peak observing nights for a meteor shower because we know when and where in Earth's orbit we'll pass through these debris fields - this yearly periodicity is what let us identify and name meteor showers well before we ever had evidence of what caused them.



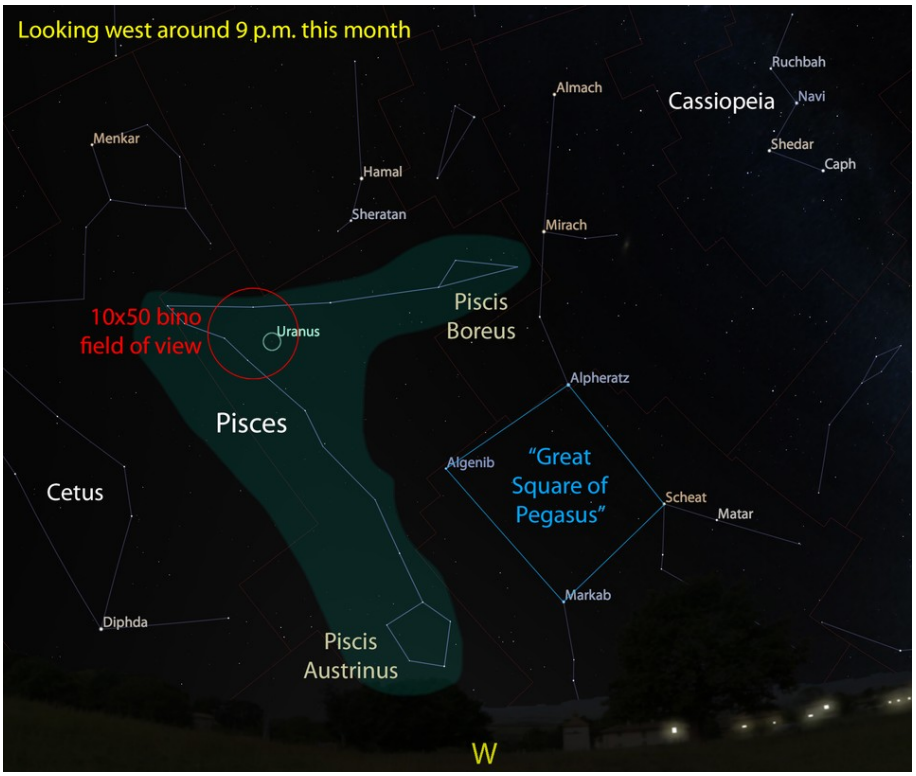
The Quadrantids radiant near the Big and Little Dippers, with the location of Quadrans Muralis marked out as well. Click for a larger view.

The name of each meteor shower is based on the constellation from which the shooting stars appear to radiate - a position in the sky we call the radiant. The Quadrantids are one of the few meteor showers named after a constellation that is no longer recognized by the professional astronomical community. Quadrans Muralis, the quadrant, was an addition to the nighttime sky by French astronomer Jerome Lalande back in 1795. While the quadrant, a wall-mounted instrument for measuring the angles of celestial objects, was a vital tool to astronomers of the day, the constellation never made it past the final vote at the 1922 Convention of the International Astronomical Union. For those who have never explored the history and politics of the constellations, let the quadrantids serve as a yearly reminder.

How to observe: Sadly, the Quadrantid peak this year will be washed out by the near-full Moon, making this otherwise reasonably active meteor shower a difficult one to enjoy. If you insist on braving the cold, lie as flat as possible with your feet pointed towards the radiant and your head elevated - meteors will then appear to fly right over and around you.

Those interested in seeing a full list should check out the American Meteor Society meteor shower calendar.

Learn A Constellation: Pisces



Pisces, with the Great Square of Pegasus marked to its side, and Uranus within a binocular field of view.

Those keeping track of the planetary descriptions in this series will note that, with the very rarest of exceptions, the planets you can see without any equipment are always within one of the twelve Zodiacal Constellations. This is not a coincidence!

If the Solar System were a dinner plate on a table, the eight planets would all be variously-sized morsels - peas, olives, meatballs - orbiting around a massive grapefruit at the center. As we moved once around the plate and scan the rest of the dining room, we might see a chair directly opposite the grapefruit, then a picture hanging on the wall, then an archway into the kitchen, then

another chair, then other prominent objects in the distance until we'd made one complete revolution around the grapefruit - after which we'd see the same objects in the same positions during our second and future trips around the plate. Because we're all on the same plate, all of the other planetary morsels will appear between ourselves and the prominent objects we identified in our trip around the grapefruit, changing which prominent object they appear to be in front of based on how fast they - and we - are moving around the plate.

In keeping with the festive season and the foodie theme, we begin a survey of the Zodiacal Constellations at the western horizon this month with one of several Zodiac signs easily paired with wine. The prominent stars of Pisces the Fishes have been parts of constellations since Babylonian days, but were not solidly recorded in the Western astronomy tradition as fish until about 1,000 B.C.E. Its shape is roughly that of two fish tied together by a rope. Piscis Boreus, the Northern Fish, is the triangle close to the nearby Aries. Piscis Austrinus, the Southern Fish, is a pentagon of stars that share a border with Aquarius. Depending on your light pollution, neither shape may be very prominent in your sky - the Great Square of Pegasus, close to the horizon in the early evening this month, may serve as a brighter guide.

We start with Pisces this month for a very good reason. If Pisces were a clam instead of a fish, binocular observers with steady hands and good optics are treated to a greenish-blue pearl close to the hinge of the clamshell. The distant planet Uranus, the fourth largest, seventh farthest from the Sun, and bitterly cold gas giant planet, was discovered in 1781 by William Herschel. This discovery is important for two reasons. First, Uranus can only been seen without binoculars or telescope under the absolute best of observing conditions - and some amateur astronomers would even say "that's nuts." For all of human history, only Mercury-to-Saturn were known as planets to astronomers, astrologers, and anyone else until Herschel's discovery. Second, Herschel knew where to limit his observations thanks to Isaac Newton, whose revolutionary physics of the time explained why the Solar System is a flat disc of planets - and why one would only reasonably expect to find planets in the same region of the sky as the known planets - that region defined by the stars of the Zodiac.

Uranus may serve to be a difficult catch even under good conditions, but seeing this planet with your own eyes is a great way to start your observing for 2018.

Dr. Damian Allis is the director of CNY Observers and a NASA Solar System Ambassador. If you know of any NY astronomy clubs or events to promote, please contact the author.