

WHAT'S UP IN JANUARY

By Bernie Reim

The month of January is named after the Roman god Janus, who faces both forward and backwards at the same time. Janus is the god of transitions, passages, doorways, gates, and the god of all beginnings. Let us resolve to make this a better year than 2023 by learning from the past while at the same time creating a better future for all of us and living closer to our potentials.

The days are already getting longer, although not by much until towards the end of this first month of the New Year. The nights are still getting colder and they will still be quite long all of this month. There are several great highlights this month that will make it well worth your effort to bundle up, search for, and enjoy some or all of these interesting events that will enable you to gain a deeper appreciation of where we really are in space and to get a better sense of our 8,000 mile in diameter earth as it constantly moves through this space around our life-giving sun at 18.6 miles per second or 67,000 mph.

They include the long-awaited return of Mars to the morning sky around the middle of the month. Mars will then perform a celestial dance with Venus and Mercury in the southeastern morning sky including a very close conjunction of Mars and Mercury on the 27th. Saturn and Jupiter remain as the evening planets and they are both back to their normal direct, eastward motion again with respect to the fixed background of stars. Then we will be treated to nice conjunctions of the moon with Saturn around the middle of the month and then Jupiter a few days later. The second in a 5-year-long series of occultation of Antares by the moon that doesn't end until August 27 of 2028. Then there are not one, but two comets that will be visible with binoculars or a small telescope. These are Comet 12P/Pons-Brooks in Cygnus the Swan and Comet 62P/Tsuchinshan in Virgo. The second brightest asteroid, Vesta, will pass through Taurus near Orion and the best highlight of all of them will be a favorable display of the Quadrantid meteor shower during the morning of the 4th with a last quarter moon setting around midnight.

Mars is finally making its reappearance in the morning sky this month after a long absence when it was too close to the sun and as far away from earth as it will get in its 26 month time span between oppositions when it is at its best and brightest and closest to Earth. That will not happen again until January of 2025. Look for the red planet very low in the southeastern sky 30 minutes before sunrise right below Venus and Mercury in the constellation of Scorpius.

The slender waning crescent moon will nicely point out Venus on the 8th, as it will also occult Antares that morning for the western part of this country. Then the moon will be 12 degrees farther east the next morning and can be seen right below Mercury on the 9th. Mars is a little lower than that and you may need binoculars to see it. After that Mars keeps rising higher and Mercury keeps getting lower. The two will meet on the morning of January 27 when they will be just a quarter of a degree apart, which is half the width of the full moon. You will need binoculars to see this very close conjunction well enough to appreciate it.

Venus still rises around 4 am and is moving into Scorpius now, the next constellation to the east of Libra where it was last month. It shines at minus 4th magnitude and is still getting smaller but more illuminated by the sun as it gets farther ahead of Earth in its orbit around the sun. Watch how these 3 planets, Mercury, Venus, and Mars, our three nearest neighbors in the solar system, dance around each other in the morning sky this month.

Jupiter just ended its retrograde motion on the last day of last year and is now back to its normal eastward or direct motion in Aries the Ram, heading towards Taurus once again. It is still quite high and brighter than usual, but it is getting slightly less bright each night. Shining at minus 2.5 magnitude, the king of the planets is about 4 times brighter than Saturn at first magnitude. Venus is 100 times brighter than Saturn. Every five magnitudes equal 100 times difference in brightness.

Saturn is still in Aquarius, where it will spend just over 2 years as it always does in each of the 12 zodiac constellations since it takes Saturn 29 years to orbit the sun once. The ringed planet now sets by 9pm and we will lose it into the western sky late next month. Look for a bright star named Fomalhaut in Pisces Austrinus 20 degrees to Saturn's south-southeast, which is just slightly fainter than Saturn. The Hubble Space telescope discovered a giant planet orbiting this star in 2008 with about twice the mass of Jupiter creating a dust ring around Fomalhaut, which simply means the mouth of the fish in Arabic. It is quite close at 25 light years away, about the distance to Vega in Lyra in the summer triangle. Watch as a waxing crescent moon passes close to Saturn on the 13th and 14th.

The second occultation of Antares by the moon in a whole series of such occultations ending on August 27 of 2028 will happen on Monday morning, January 8. The first one was on August 24 of 2023. It will only be visible west of here in this country and in parts of Canada and Mexico.

Antares is a red supergiant star 550 light years away with a diameter of about 700 times that of our sun. If you could place Antares where our sun is in our sky, not only the earth, but also Mars and the asteroid belt would be orbiting inside Antares, which reaches almost all the way to Jupiter which is 500 million miles away. Our sun is 864,000 miles in diameter. That distance and size is similar to Betelgeuse in Orion, but Betelgeuse has an added feature of possibly having exploded as a supernova already since it has run out of hydrogen to fuse into helium.

To make up for that added feature of Betelgeuse, Antares is a double star with a 5.4 magnitude star, Antares B, just 2.7 arc seconds below it. It is usually obscured by Antares A, but you would be able to see Antares B during this occultation because it will reappear first from behind the limb of the waning crescent moon a split second before Antares A reappears. Any occultation of a star by the moon is a great event to watch to give you a real sense of how fast the moon is always orbiting the earth. That averages about 2,000 miles per hour, or about half a mile per second. I experienced this incredible speed and power of our seemingly static moon when its shadow raced over me for a few seconds on its way across our entire country from Oregon to South Carolina, truly "from sea to shining sea", in just 90 minutes. I was at 6,000 feet in Driggs, eastern Idaho, with a view of a few of the peaks of the Grand Tetons visible to my east.

The comets starring this month are 62P/Tsuchinshan and Comet 12P/Pons-Brooks. 62P/Tsuchinshan will be traveling through the sky just below Leo and into Virgo right through the Virgo cluster of 2,000 galaxies this month. It should reach its brightest of 7th magnitude, just two and a half times fainter than anything you could see without optical aid, early this month. It went through perihelion, closest to the sun, on Christmas Day. The best time to look for it this month will be during the moonless stretch of the 5th to the 22nd. It is moving eastward at about half a degree per day. It was discovered back on January 1 of 1965 at the Purple Mountain Observatory in Nanjing, China. Its name means "Purple Mountain" in Mandarin. Usually comets

are named for the people or telescopes that discovered them, not the place where they were discovered.

Comet 12P/Pons-Brooks only returns every 71 years. It was first discovered by Jean-Louis Pons in 1812 and then lost and rediscovered by William Brooks in 1883. It will only reach about 10th magnitude, so you would need a telescope to spot it. It is passing through Cygnus this month just above the Veil nebula, a supernova remnant 2100 light years away that covers over 100 light years of the sky from a massive star that ran out of fuel and exploded about 10,000 years ago. This colorful and wispy nebula, made of dust and heated and ionized oxygen, sulfur, and hydrogen gas embodies everything mysterious and wonderful about how these huge stars, many times the size of our average sun, perform the ultimate sacrifice in galactic recycling and provide the heavier elements that make planets, plants, animals, and people possible.

The second largest asteroid, Vesta, is easy to spot now at 7th magnitude passing from Orion into Taurus to the left of Jupiter. It will pass just below the Crab Nebula, M1, from the 11 to the 13th of January. The Crab nebula is another supernova explosion, but a much more recent one that just happened on July 4 of the year 1054.

The best highlight of this first month of the year, if it is clear, will be the annual Quadrantid meteor shower which has a very narrow peak of 4 a.m. on the morning of Thursday the 4th. You could expect between 30 and 40 meteors per hour all originating from its radiant near the Big Dipper and Draco the Dragon. Caused by an asteroid named 2003 EH1, discovered by Brian Skiff at the Lowell Observatory 2003 and also partly by a comet named 96P/Machholz, this shower is named for an extinct constellation Quadrans Muralis. The last quarter moon will set around midnight, so it will not wash out any of these meteors.

Jan.1. On this day in 1801 Giuseppe Piazzi discovered the largest asteroid, Ceres, which is 600 miles in diameter, or about the size of Texas. Mercury is stationary.

Jan. 2. Earth is at perihelion, or closest to the sun for the year at 8 p.m. EST at 91.4 million miles.

Jan.3. Last quarter moon is at 10:30 p.m.

Jan.4. The Quadrantid meteor shower peaks this morning.

Jan. 5. The moon is near Spica in Virgo this morning.

Jan.6. Venus passes 6 degrees north of Antares this morning.

Jan.7. On this day in 1610 Galileo discovered Callisto, Europa, and Io. He would discover Ganymede, the largest moon in our solar system at 3200 miles in diameter, 6 days later.

Jan.8. Stephen Hawking was born on this day in 1942. The moon occults Antares in parts of this country west of us and it will pass less than one degree north of Antares for us in the east.

Jan.9. The moon, Venus, and Mercury will form in the east before sunrise this morning.

Jan.10. The moon passes 4 degrees south of Mars this morning.

Jan.11. New moon is at 6:57 a.m.

Jan.14. The moon passes near Saturn this evening. On this day in 2005 the Huygens probe landed on the shore of a liquid methane lake on Titan, the largest moon of Saturn.

Jan.17. First quarter moon is at 10:53 p.m.

Jan.19. On this day in 2006 the New Horizons mission was launched to Pluto, the same year that Pluto was reclassified as an icy dwarf planet. It arrived there on July 14 of 2015 to discover many new and amazing things including huge plains of ever-shifting nitrogen ice, a thin atmosphere, and ice volcanoes on this lonely outpost of our solar system 4 billion miles away, or nearly 6 hours at the speed of light.

Jan.25. Full moon is at 12:54 p.m. This is also known as the Old or Wolf Moon. Joseph-Louis LaGrange was born on this day in 1736 in Turin, Italy. The LaGrange points in space where the gravity of 3 bodies cancel out are named after him.

Jan.27. Mercury and Mars are only a quarter degree apart very low in the eastern morning sky in Sagittarius 45 minutes before sunrise.