



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

**Events: General Meeting,
Monday, November 13, 2023, at
the Ronald H. Roberts Temecula
Library, Room B, 30600 Pauba
Rd, and/or ZOOM, at 6:00 PM.**

- IFI & Gallery by Clark Williams
- Deep Space Optical Communications (DSOC) – A Proof of Concept by Mark Baker
- Refreshments by TBA
- Star Parties at South Coast Winery every Friday evening in June.
- For upcoming school Star Parties check the Calendar on the [web page](#).

WHAT'S INSIDE THIS MONTH:

Cosmic Comments

by President Mark Baker

Looking Up Redux

compiled by Clark Williams

Random Thought – The Secret Lives of Telescopes – Part One

by Chuck Dyson

Another Look

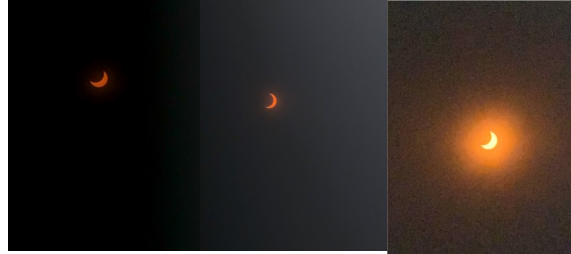
by Dave Phelps

NASA Night Sky Notes

by Liz Kruesi

Send newsletter submissions to Sharon Smith <sas19502000@yahoo.com> by the 20th of the month for the next month's issue.

Taken with my iPhone



General information:

Subscription to the TVA is included in the annual \$25 membership (regular members) donation (\$9 student; \$35 family).

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Cosmic Comments – November 2023

By Mark Baker

November is always a month wherein I stop and ponder the future... TVA has survived 2022 without a set BOD and in spite of the loss of a couple of “anchors” that helped us stay the course!!!

Still, I always have hope for the future, especially for those younglings whose lives we touch and manage to plant “seeds” that will enhance their lives and eventually so many others as well...

So I’m tossing out the gauntlet to the Club as we will have at least three BOD seats to fill for 2024... yes, they require a bit of sacrifice, but the rewards of ensuring TVA maintains its mission in the communities more than make up for it.

I want to publicly express my gratitude to Curtis Croulet for his decades long contributions to the Club, most recently as Treasurer, and to Will Kramer for stepping outside his comfort zone as VP and making great things happen... and lastly to my rock and foundation, Deborah C. Baker, who unofficially was of great help in regards to things Outreach. She could step away from the office but she can’t remove Outreach from her soul!!!

I hope many of you will consider taking on a greater roll in TVA... you’ll be glad you did!!! As the TV commercial stated... Try It, You’ll Like It!!! Your chance comes at the next BOD election on 11/13/23...

This November will again bring change, but it will also serve to reinforce the constant that TVA abides... and its contributions are ever increasing, ever improving, and ever inspiring thanks to you.

Clear, Dark Skies



Looking Up Redux – November 2023

Compiled by Clark Williams

from these sources:

SeaSky.org

Wikipedia.com

in-the-sky.org

The American Meteor Society, Ltd.

cometwatch.co.uk

NASA.gov

StarParty App (1.0.14)

FullAndNewMoon App (2.0)

Starry Night Pro Plus 8 (8.1.1.2078)

SkySafari 6 Pro (6.8.2)

Stellarium (23.1)

timeanddate.com/astronomy

<https://www.fourmilab.ch/earthview/pacalc.html>



ALL TIMES ARE LOCAL PACIFIC TIME (PST / PDT) UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)

hh:mm:ss or hhmmss

hhmm+ (time of the next day)

hhmm- (time of the previous day)

hhmm (seconds not shown)

yyyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Monday the 27th @0117 FULL in TAURUS

Sunday the 5th @0137 THIRD QTR in CANCER

Monday the 13th @0128 NEW in LIBRA

Monday the 20st @0231 First QTR in AQUARIUS

Perigee comes on 2023-11-21 @ 2121 – 369,823 km (223,68 mi)

Apogee comes on 2023-11-06 @ 0621 – 405,568 km (252,456 mi)

2023 has: (12) new moons, (12) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons

(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2023-Mar-12 : Ends: 2023-Nov-05 (CA does not keep PDT year-round)

Luna: Luna is waning gibbous on the first of the month, headed for 3rd quarter on the 5th, rising on the first at **2003-**, transiting at **0340**, and setting by **1120**. Luna by mid-month is waxing crescent. Rising at **0854** and transiting at **1343** setting at **1832**. By the end of the month, Luna is waning gibbous, 89%



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

illuminated, rising at 1839– transiting at 0218+ and setting by 0954.

Highlights (distilled from: SeaSky.org [Month At a Glance](#) and Clark's planetary Orrey program[s])

- November 3 - Jupiter at Opposition. The giant planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. It will be brighter than any other time of the year and will be visible all night long. This is the best time to view and photograph Jupiter and its moons. A medium-sized telescope should be able to show you some of the details in Jupiter's cloud bands. A good pair of binoculars should allow you to see Jupiter's four largest moons, appearing as bright dots on either side of the planet.
- November 4, 5 - Taurids Meteor Shower. The Taurids is a long-running minor meteor shower producing only about 5-10 meteors per hour. It is unusual in that it consists of two separate streams. The first is produced by dust grains left behind by Asteroid 2004 TG10. The second stream is produced by debris left behind by Comet 2P Encke. The shower runs annually from September 7 to December 10. It peaks this year on the the night of November 4 and the morning of the 5th. The second quarter moon may block most of the dim meteors this year. But if you are patient, you may still be able to catch a few good ones. Best viewing will be just after midnight from a dark location far away from city lights. Meteors will radiate from the constellation Taurus, but can appear anywhere in the sky.
- November 13 - New Moon. The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 09:28 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.
- November 13 - Uranus at Opposition. The blue-green planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. It will be brighter than any other time of the year and will be visible all night long. This is the best time to view Uranus. Due to its distance, it will only appear as a tiny blue-green dot in all but the most powerful telescopes.
- November 17, 18 - Leonids Meteor Shower. The Leonids is an average shower, producing up to 15 meteors per hour at its peak. This shower is unique in that it has a cyclonic peak about every 33 years where hundreds of meteors per hour can be seen. The last of these occurred in 2001. The Leonids is produced by dust grains left behind by comet Tempel-Tuttle, which was discovered in 1865. The shower runs annually from November 6-30. It peaks this year on the night of the 17th and morning of the 18th. The crescent moon will set before midnight leaving dark skies for what should be a great early morning show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Leo, but can appear anywhere in the sky.
- November 27 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 09:17 UTC. This full moon was known by early Native American tribes as the Beaver Moon because this was the time of year to set the beaver traps before the swamps and rivers froze. It has also been known as the Frosty Moon and the Dark Moon.



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

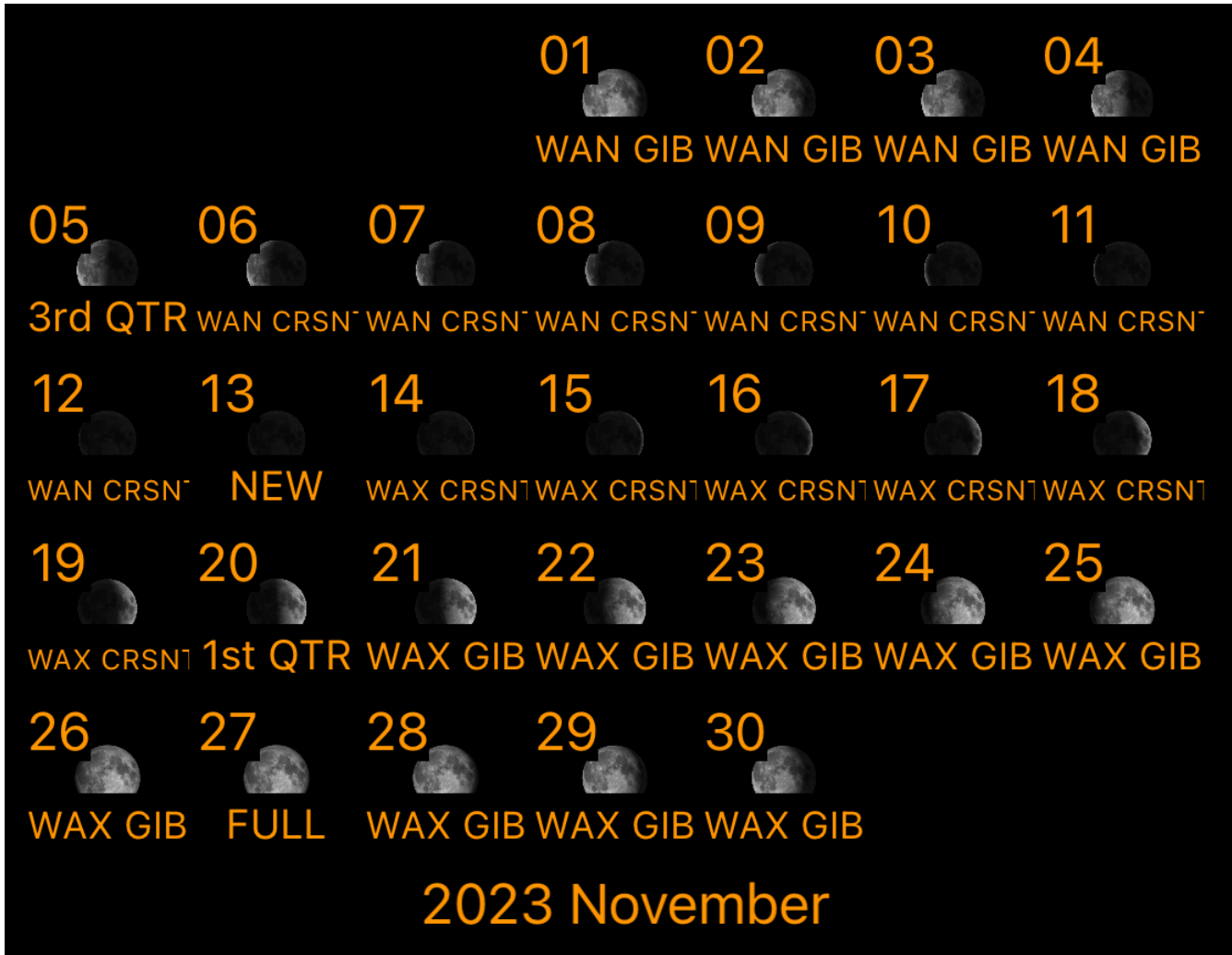
Algol minima: (All times Pacific Time)

11/01/2023	1912
11/04/2023	1601
11/07/2023	1250
11/10/2023	0939
11/13/2023	0628
11/16/2023	0317
11/19/2023	0006
11/21/2023	2055
11/24/2023	1744
11/27/2023	1433
11/30/2023	1122



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023



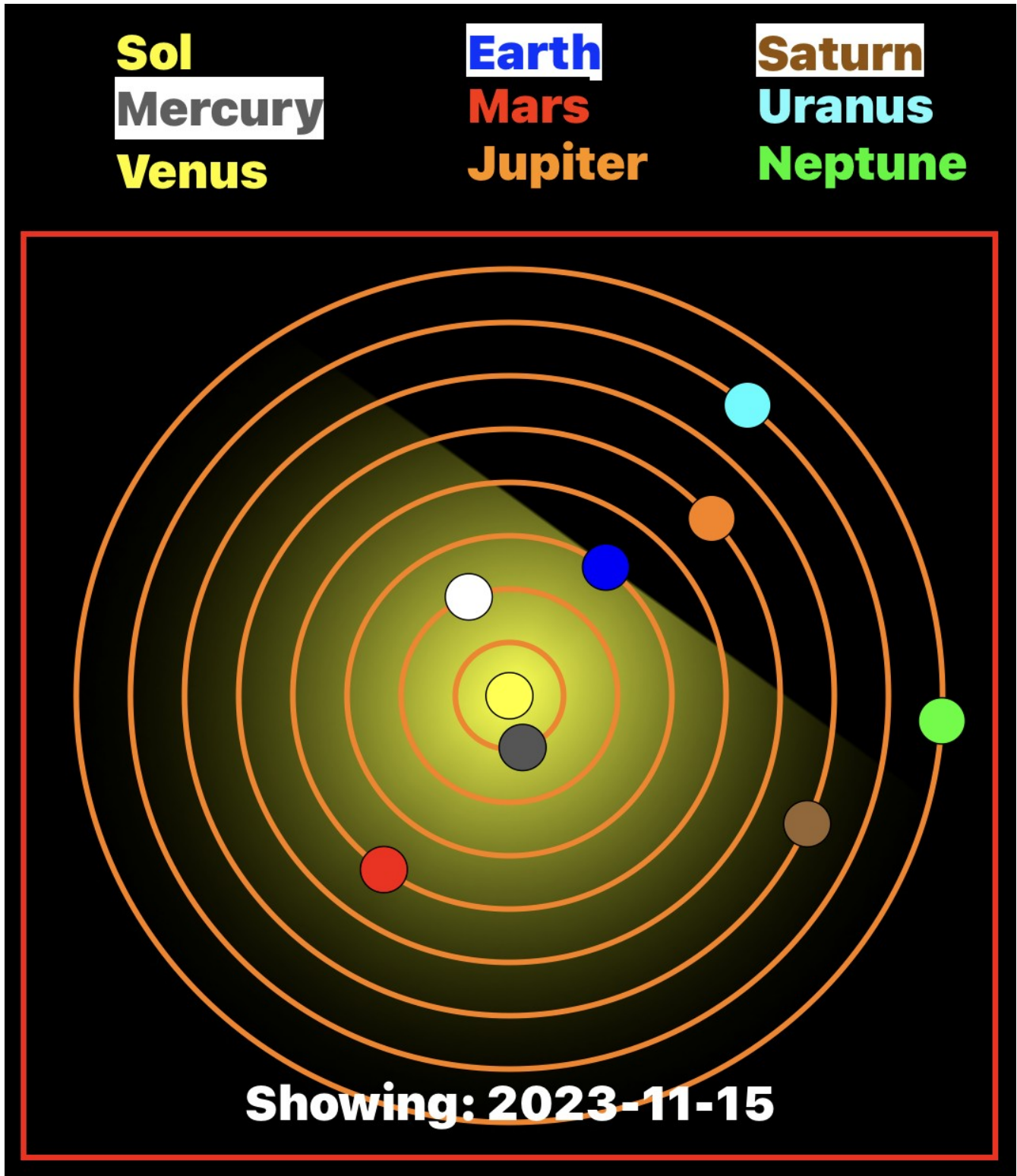


Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

Planets:

Planetary Positions November 2023: (from TVA App iOS version)





Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

- **Mercury:** Mercury in the beginning of the month is an evening object, rising at **0747**, transiting at **1302** and setting by **1817**. Mercury by mid-month is further from the Sun but still an evening object. Mercury rises at **0739**, transits at **1235** and sets by **1731**. By the end of the month, Mercury is still an evening object. Mercury rises at **0819**, transits at **1307** and sets at **1755**.
- **Venus:** Is the Morning Star on the first of the month. Venus rises at **0328**, transits at **0940** and sets at **1552**. Venus is 55% illuminated and has an apparent magnitude of -4.32. By mid-month Venus remains the Morning Star rising at **0244**, transiting at **0842** and setting by **1441**. By end of month the Morning Star rises at **0306**, transits at **0848** and sets at **1430**.
- **Mars:** Mars is an evening object on the first of the month. Mars rises at **0733**, transits at **1252** and sets by **1810**. By mid-month Mars is **lost in the Sun**. End-of-month finds the Warrior a morning object still very close to the Sun, rising at **0618** transiting at **1121** and setting at **1624**.
- **Jupiter:** Jupiter is an evening object on the first of the month. Jupiter rises at **1759**, transits at **0038+** and sets at **0717+**. By mid-month Jove as an evening object rises at **1558**, transits at **2236** and sets at **0513+**. Come the end-of-month Jupiter rises at **1454**, transits at **2130** and sets at **0406+**.
- **Saturn:** Saturn is an evening object on the first of the month rising at **1450**, transiting at **2017** and setting at **0144+**. Saturn by mid month rises by **1255**, transiting at **1822** and setting at **2349**. By the end-of-the-month Saturn rises by **1157**, transits at **1725** and set at **2253**.
- **Uranus:** On the first of the month Uranus is an evening object rising at **1829**, transiting at **0120+** and setting at **0811+**. By the ides Uranus is rising at **1632**, transiting at **2322** and setting by **0613+**. End-of-month finds Uranus as a morning object rising at **1535-**, transiting at **2225-** and setting at **0515**.
- **Neptune:** Neptune in the beginning of the month is a morning object. Neptune rises at **1558-**, transits at **2152-** and sets by **0346**. By the 15th Neptune rise at **1702**, transits at **2256** and sets by **0450+**. By the end of the month Neptune is rising at **1304-**, transiting at **1857-** and sets by **0050**.
- **Pluto:** Pluto on the first of the month is an evening object rising at **1311**, transiting at **0807**, and setting at **2303**. By mid-month Pluto is rising by **1117**, transiting by **1613** and sets by **2109**. By the-end-of-the-month, Pluto is rising at **1019** transits at **1515** and sets at **2011**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2023 with a reasonable magnitude; say less than or equal to +10 in November there is nothing except the regulars: Juno, Vesta, Hebe, Eros and Herculina. So consult your local planetarium software or try: <https://www.asteroids.near.com/year?year=2023>

Meteors:

- (see Highlights above).

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
 - Halley Type: The Halley Types are believed to come from the Kuiper Belt and have periods in excess of 20-years.
 - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
 - Short period comets November have a near circular orbit or an elliptical orbit. The latter being far more common.
- 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

Rising in the East on the 15th of the month (extremely low on the horizon) is C2017 K2 PANSTARRS. This is a Mag 10.5 comet right now It rises at **2053** and sets at **0821**. It should its maximum altitude off the horizon sometime in early April of 2024.

Low in the West-Southwest is the 10.9 Mag comet C2023 H2 Lemmon comet rising at 1116 and setting at 2206. Its apparent orbital path makes its path in our sky almost flat heading toward the southwest.

The other known comets are all at or above Magnitude 11.0

Deep Sky:

Notes:

L/Z abbreviation for ALT/AZ

R/D abbreviation for Right Ascension/Declination

α is right ascension

δ is declination

In each case, unless otherwise noted, you should look for the following on or about the 15th Day of November 2023 at 2100 PDT and you will have about 20 minutes of viewing time total.

Lets take a look at some favorite objects:

- M31:





Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

M31, as a galaxy, is 100 years old as of October 4th last month. There was a running debate at the time as to whether fuzzy patches in the night sky were nebulae or “island universes”. If they were nebulae then they should have been simple diffuse gas and dust clouds. But Hubble (Edwin, not the Space Telescope) found a star he thought was a nova within M31. Over the next few days he found it was a variable star. He calculated the distance to the “nebula” and proved it was way too far away to be a part of the Milky Way. There's a wonderful book by Marcia Bartusiak called: *The Day We Found the Universe* (ISBN-10: 0307276600- ISBN-13: 978-0307276605); Vintage; Illustrated edition (March 9, 2010). Also available on Audible. Here's what Wikipedia has to say about M31.

The Andromeda Galaxy is a barred spiral galaxy and is the nearest major galaxy to the Milky Way. It was originally named the Andromeda Nebula and is cataloged as Messier 31, M31, and NGC 224. Andromeda has a diameter of about 46.56 kiloparsecs (152,000 light-years) and is approximately 765 kpc (2.5 million light-years) from Earth. The galaxy's name stems from the area of Earth's sky in which it appears, the constellation of Andromeda, which itself is named after the princess who was the wife of Perseus in Greek mythology. The virial mass of the Andromeda Galaxy is of the same order of magnitude as that of the Milky Way, at 1 trillion solar masses (2.0×10^{42} kilograms). The mass of either galaxy is difficult to estimate with any accuracy, but it was long thought that the Andromeda Galaxy was more massive than the Milky Way by a margin of some 25% to 50%. This has been called into question by early 21st-century studies indicating a possibly lower mass for the Andromeda Galaxy and a higher mass for the Milky Way. The Andromeda Galaxy has a diameter of about 46.56 kpc (152,000 ly), making it the largest member of the Local Group of galaxies in terms of extension. The Milky Way and Andromeda galaxies are expected to collide in around 4–5 billion years, merging to potentially form a giant elliptical galaxy or a large lenticular galaxy. With an apparent magnitude of 3.4, the Andromeda Galaxy is among the brightest of the Messier objects, and is visible to the naked eye from Earth on moonless nights, even when viewed from areas with moderate light pollution. (Wikipedia).

November is great for both viewing and imaging. Spend some time outside with your scope. Autumn is here!

For now – Keep looking up.



RANDOM THOUGHT November 2023

By Chuck Dyson

THE SECRET LIVES OF TELESCOPES PART ONE

In The Canterbury Tales author Geoffery Chaucer takes us on a pilgrimage with some travelers and all of them have a tale to tell us. As humans seem to have a penchant for wandering around our planet this is an understandable setting for a book. What is not so understandable is some telescopes, even though they lack legs, seem to have been bitten by the travel bug as well and we will look at the histories of some of those scopes.

As I have mentioned Chaucer it would be appropriate for our pilgrimage to start in the United Kingdom (England) and then proceed to all five of America's astronomy shrines, along with some lesser known astronomy shrines.

Andrew A. Common, the co-owner of a trash collection company, had a lifelong passion for astronomy and was always pursuing new technology to improve his astronomy experience. In 1876 he moved to the small town of Ealing about 8 1/2 miles from London to get to darker skies, today Ealing has been swallowed by London city,. In 1879 Common buys a 36-inch mirror to get even better astro photos and in 1883 takes a picture of M42 that shows more detail in the nebula and more stars around the nebula than can be seen by the eye looking through the telescope. This photo points the way of astronomy in the future. In 1884 Common is awarded the Gold Medal of the Royal Astronomical Society for his Astro photos. In 1885 Common, wanting to improve on his photographic results, sells his 36-inch reflector to another amateur astronomer, Edward Crossley of Halifax Yorkshire, and buys a new 60-inch reflector with two mirrors for himself.

In 1890 Common is observing from a platform at the 60-inch reflector eyepiece and almost falls off the platform. Common then decides that viewing from a Newtonian location on the scope is not for him and spends the next two years trying to convert the scope into a Cassegrain focus with no luck. From frustration and business issues the scope falls into disuse until Common's death in 1903. His estate puts the scope up for sale and E.C. Pickering of Harvard, knowing a good deal when he sees one, buys both mirrors, the mount, and everything else. The scope is shipped to Harvard where it becomes the pride of the Harvard College Observatory. One would think that a telescope having worked on two different continents would have had enough of travel, not this scope. In 1933 the Common scope has the mirror re-figured, recoated, and given an updated mount. The scope was then set up as the "60-inch Rockefeller" at Boyden Observatory in South Africa.



As for our friend Edward Crossley after trying for ten years to do productive observing in 1895 he writes a letter to the Lick Observatory (Lick is the first observatory to be built on a mountain top above the haze that infests coastal cities and away from city lights) in which he complains “The English countryside is too dust, light, and cloud polluted to make good use of a scope” and donates the 36-inch scope to the observatory. The 36-inch Crossley scope is used for research at Lick until 2010 when it is retired from service.

As -long-as we are at the Lick Observatory let’s look at how the 36-inch refractor got there.

James Lick, a lifelong bachelor, was a piano builder and real estate investor who in 1821 moves to Argentina to build pianos for the rich and famous. After some turbulent times and relocating first to Chile and then Lima, Peru, Lick acquires a taste for chocolate and hears of the California gold rush that has produced a lot of nouveau riche, just the type of people who love to buy his pianos. Lick packs up his piano factory and as an aside packs up 600 pounds of chocolate. The piano business does well and Lick invests heavily in San Francisco real estate and becomes rich beyond his wildest dreams. As for the chocolate, the locals go crazy over it and Lick writes his chocolate producing friend one Domingo Ghirardelli and suggest that he move his business to San Francisco and the rest, as they say, is history. Being rich, unmarried, no one to inherit his money, and ageing Lick thought of building a massive monument to his memory; however, several of his friends convinced him that rather to build a useless monument he should build a world class observatory at a mountain location, Mt. Hamelton, as his monument, Lick agreed. Or rather Lick agreed with four stipulations. First, as he was in failing health and losing his mobility the proposed observatory must be visible from his hotel window on 111 Sutter street and it was. Second, after the observatory was complete he, Lick, was to be interred at the base of the great refractor, and he was. Third, there were always to be fresh flowers by his memorial plaque, and there is. Fourth and most surprising, there were always to be viewing events for the public so that they might enjoy and appreciate his gift to the state. Today there are four to six hour tours and viewing sessions on Thursday and Sunday evenings at the observatory.

At the time of its completion in 1888 the 36-inch Lick refractor was the largest in the world and was the first telescope located at a place, high in the mountains above the low level fog and increasing city lights, suited for the telescope and not at a place convenient for the astronomer. The Lick refractor would have been ready for service at least two years earlier except the two lenses had been cast in France and then shipped, carefully, to Alvan Clark & Sons in Cambridgeport, Massachusetts. After grinding and polishing the lenses were carefully crated and shipped to San Francisco where they were checked and then, carefully,



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

re-crated and taken by mule-drawn wagons to the Mt. Hamelton location. One got there unbroken the other not so much. It took over two years and 18 attempts to produce a replacement blank for the Lick telescope. The replacement lens was VERY carefully packed and shipped this time especially for its ride up the mountain.

The telescope that the Lick replaced as the largest telescope was the U.S. Naval Observatory's (USNO) 26-inch refractor and their stories couldn't be more different. As a part of the Navy the USNO was funded by Congress and Congress was loathe to spend monies on just about anything. Even though the job of the UNSO was to produce accurate navigation maps and, by timing the exact time stars were at the zenith, setting ships chronometers to the universal time. Finally in 1870 Congress freed up funds for a new refractor, the 26-inch one, but wanted to see where the money was going. The telescope was located in the Foggy Bottom area of Washington, D.C. As it turns out, Foggy Bottom is not just a cute name but is an accurate description of the usual weather condition. The complete Foggy Bottom package included the Washington, D.C. sewage settling ponds to the east and the Potomac River swamp to the west (It is noted in several reports that the entire staff and many of their family members had malaria.). The situation finally came to a head when the senior officer of the observatory wrote a letter to congress explaining that because of weather conditions the observatory was not functional 300 nights out of the year. In 1893, after 20 years of suffering, the observatory was moved to the hills of Georgetown, not ideal but way better, where the observatory is still functional today working mostly on double star measurements. The moral of this story is never let Congress choose your observatories site.

Thanks to Andrew A. Common who showed us that building an observatory next to a bright city was not a good idea, then Edward Crossly who showed us that building an observatory under factory smoke stacks was even a worse idea, and finally the United States Congress showing us that building an observatory anyplace with the words foggy or bottom in the name is an absolute disaster of an idea; we finally got an observatory on a mountain away from lights, smoke, and fog that really worked well. One would think, as we rumble into the 20th century that all astronomers would be happy knowing that they have a formula for successful observatories, but no they are not.

East Coast Ivy League university astronomers are recognized as America's preeminent educators and scientists and with their telescopes located on campus the have a very comfortable lifestyle; both of these things are being threatened by upstart universities on the West Coast.



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

In Chicago there is a young astronomer who is determined to be on the cutting edge of all phases of astronomy and is willing to do whatever it takes and go wherever he needs to go to be at the forefront.

In Los Angeles prominent civic leaders and the president of USC are determined to make Los Angeles the leading city of California instead of San Francisco. Despite the fact that in 1890 the population of Los Angeles is 50,395 and the population of San Francisco is 296,997 (The Chihuahua is going to show the Rottweiler who is BOSS).

In part two we will see how these forces shape 20th century astronomy.

CHEERS

CHUCK

Another Look November 2023

By Dave Phelps

Cassiopeia

The new moon In November is on 11/13 at 0127 PST.
The full moon is on 11/27 at 0116 PST.

November is the Full Beaver Moon. Other Native American names include the Deer Rutting Moon, the Digging/Scratching Moon, the Freezing Moon and the Whitefish Moon.

We also have the First Snow Moon, the Little Winter Moon and in Great Briton, the Moon before Yule.

There are two lunar occultations this month. Neither of which is visible In the US. Venus will be occulted on 11/09 beginning at 0058 PST. Its totality extends from Greenland through Europe, so we should get a nice close approach. On 11/28 is a daytime eclipse of β Tauri beginning at 0840 PST. Totality is in the South Pacific and Chili.

In French Its Pleine Lune de Novembre, In German, November Vollmond, in Spanish its Noviembre Luna Llena and in Greece its Νοέμβριος Πανσέληνος, Νοέμvrios Pansélinos

Cassiopeia

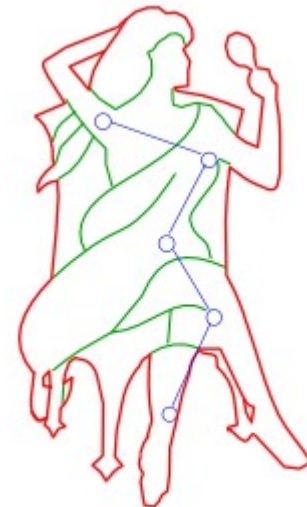
That starr'd AETHiop Queen that strove
To set her beauty's praise above
The Sea-nymph
Milton "Il Peneros

Over the next months, a family of related constellations will arc across the night sky. There is Cassiopeia, the Queen, Cepheus, the King, Andromeda, the Princess, Perseus, the Hero, Pegasus, the Flying Steed and Cetus, the Sea Monster, all part of the same family of legends. Cassiopeia is the Queen of Aethiopia, a generalized term for inhabitants of that part of Africa above the great desert and along the Red Sea, the beginning of the end of the known world at that time. Beautiful and vain, she is typically shown seated on a throne, legs crossed, holding her long hair in her right hand and a sheaf of wheat in her left; although through



Cassiopeia by Helvius

Cassiopeia by Helvius

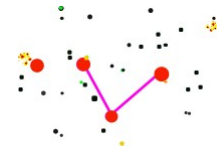


time and artist, the images vary. She claimed she was more beautiful than the sea nymphs and even compared her beauty to the goddess Juno. Well, you can just imagine how they took that. So, this guy Nereus has 50 daughters, all nymphs, and they came down on him all at once. Worse, one of those daughters, whose name was Amphitrite, was married to the sea-god Poseidon. Wonder what that wedding cost and he had another 49 to go? Poseidon agrees to wack this kingdom to appease his wife and sisters-in-law. He sends a sea monster, Cetus, to ravage the coast of Aethiopia and eat the populace. The legends then begin to blend. Cassiopeia and Cepheus, following the advice of an Oracle, chain their daughter, Andromeda, to a rock as an appetizer for Cetus to appease the gods and Nereides. Perseus, the hero, flies to save her, killing Cetus and winning Andromeda for his bride.

Centuries earlier, Greece saw the asterism as the “Laconian Key”:

*Not many are the stars nor thickly set
That, ranged in line, mark her whole figure out.
But like a key that forces back the bolts
Which kept the double door secured within
So shaped her stars you singly trace along.* Aratos

The Eskimos imagine that α , β , and γ Cassiopeiae, three stars forming an isosceles triangle, represent the three stones supporting a celestial stone lamp. They call the constellation "Ibrosi"..



In other countries, the Arabians called Cassiopeia, “Al Dhat al Kursiyy”, the Lady in the Chair, but earlier had one of her hands tattooed with henna. Other Arab designations includes two dogs or a deer made out the stars of Cassiopeia and Cepheus. To the Celts and the early Brits, she was the house of Don, the king of the fairies and to the Chinese, a Charioteer.

That one
White stain of light, that single glimmering yonder,
Is from Cassiopeia, and therein
Is Jupiter—

In Persia, she was drawn as a queen holding a staff with a crescent moon in her right hand, wearing a crown, accompanied by a kneeling dromedary. In India, she is a princess and her story is also of a beautiful victim and a hero to rescue her.

In ancient Egypt. The W asterism, which has through history depicted a chair, may have been seen as the throne of Osiris and, also, in the Egyptian “Book of the Dead”, it was called the “Leg”:

“Hail, leg of the northern sky in the large visible basin.”

One school of thought claims the original story of a queen is from Phoenicia, holding a sheaf of wheat, from at least 3500 years ago; or the Assyrian Lady of the Corn, 4000 years ago, and still others have her sharing responsibly with Virgo for the seed, the grain and the harvest.

There is a lot of great stuff in Cassiopeia. Burnham lists 74 variable stars and 151 double and multiple stars. He also lists 26 open clusters, 6 diffuse nebula, 2 planetary nebula and 3 galaxies. Cassiopeia also has 199 stars 7th magnitude and brighter, 20 of which are brighter than 5th magnitude. She has over 200 binocular and deep sky objects and several of her planetaries are in the 14+ range.

Cassiopeia is an ideal constellation to get your feet wet in observational astronomy. It is a great constellation to



use to gain some experience with our 4.25 and 6 inch reflectors, 3 inch refractor's and 7×50 binoculars. With these optics, we can reach 11th or 12th magnitude.

The two Messier's in Cassiopeia are M52, the right hand image and M103, the left hand image. They are both open clusters, both bright at 6th and 7th magnitudes, though on opposite sides of the W. In the same field as M103 is NGC 7635, the Bubble Nebula. It is 10th magnitude, so it will be visible in your scope.

If you have, or if you can borrow a "UHC" that is an Ultra High Contrast filter, the Bubble will be more visible. The Bubble and M103 are also great targets of your Equinox type telescope/camera.

There are six Caldwell objects in Cassiopeia. Caldwell objects were compiled by a British gentleman named Patrick Moore who thought he would put together a list to place beside Messier; additional bright objects easy for the amateur to spot. In Cassiopeia, he



listed 3 open clusters, 2 “dwarf spherical galaxies” and C11, which you have already met next to M103.

Caldwell 8 and 10 are a little fainter open clusters along the line between delta δ and epsilon ϵ , the flat arm of the W. Learn your Greek alphabet, it will make your life easier. C8 is the right hand image, about 9th magnitude and C10 is the left image, magnitude 7. C13 is quite pretty, easy to find and bright at 6th magnitude.

C13 by <https://ocastronomers.org/wp-content/uploads/2018/12/NGC457-m25-15x340s-011s.jpg>

M52&103 by <https://ocastronomers.org/wp-content/uploads/2018/12/Bubble-Nebula-and-M-52-LRGB.jpg>

and M103oc <https://ocastronomers.org/wp-content/uploads/2019/01/m103.jpg>

C8, NGC 559 by William Maxwell [https://www.astrobin.com/vm6jg7/?q=ngc 559](https://www.astrobin.com/vm6jg7/?q=ngc%20559)

C10, NGC 663 by Dr. Dimitrii Paniukov [https://www.astrobin.com/nnv1vb/?q=ngc 663](https://www.astrobin.com/nnv1vb/?q=ngc%20663)



C17 and C18 are completely different animals. Known as NGC 147 and NGC 185, left to right in the image, they are dwarf galaxies, members of the Andromeda galaxy family, but should be objects you can find.

Dwarf galaxies are cool, usually close to us, usually a little weird and odd shaped and usually with low surface brightness. That

means that a 9th magnitude galaxy is spread across your field of view. Looking out of the corner of your eye, we call that averted vision, will help the image pop into view.

Additionally, these two galaxies are only 10 minutes of arc apart, you might be able to pick both out in the same field, like this great astrophotograph by [Hannes Bachleitner @ https://www.astrobin.com/oc4oj7/?q=ngc 185](https://www.astrobin.com/oc4oj7/?q=ngc%20185).



While in that area, close to C17 and 18 is NGC 278, also a satellite galaxy of M31, the Andromeda galaxy. NGC 278 is 11th magnitude, maybe at the limit of your scopes ability, but, a full face on spiral with sort of fluffy spiral arms.

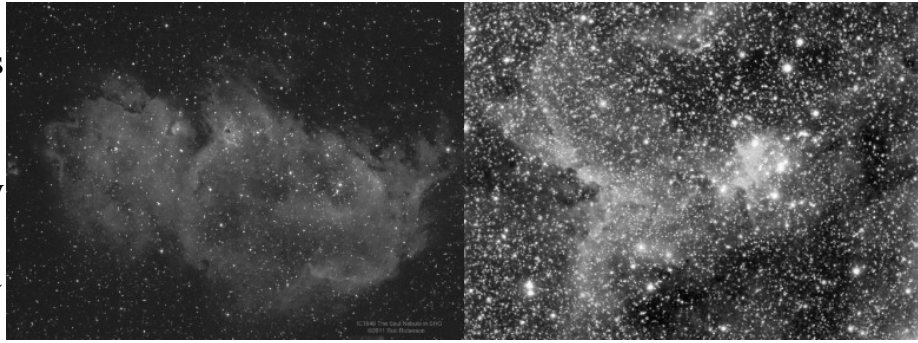
<https://www.astrobin.com/52t9o0/E/?nc=all>




Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers November 2023

This month, Cassiopeia is between us and the north pole, meaning if you stand looking north, the Milky Way runs left to right, we see Cygnus and Lyra to the west and Cassiopeia



is in her lopsided  **M** shape. The bottom right hand star as we see it is epsilon ϵ , whose name is Segin. Segin is a nice whitish 3rd magnitude star that I want you to use as a placeholder. A couple of telescope fields to the right (east) of Segin are two beautiful nebula/cluster objects called the Heart and Soul nebula. They are 6th magnitude, so you will find them with ease. If you still have that UHC filter, be sure to use it.

Check out APOD for February 14, 2023; IC's 1848 & 1805 are the featured image. Challenge yourself a little and try to pick out a few of the objects associated with these two nebula. Clustered around the Heart Is Markanian 6, IC 1795, the Fish Head, IC 896 and IC 1027. Around the Soul are IC 1871 and



Collinder's 33 & 34. Use your star chart as a guide. If you would like a good one, free, you can download Deep Space Hunter Atlas at: <https://www.deepskywatch.com/deep-sky-hunter-atlas.html>. Good Hunting

<https://ocastronomers.org/wp-content/uploads/2018/12/Final-IC1848-The-Soul-Nebula-in-SHO-Narrowband-1200.jpg> / https://ocastronomers.org/wp-content/uploads/2018/12/IC-1805-R_195m_G_143m_B_88m.jpg

There are many fine books out there for the novice and even the expert astronomer. Look for *Deep-Sky Wonders* by Walter Scott Houston. You can find a PDF version online. Scotty had a lot of recommendations for the middle of November, many of which are already listed. Study the chart and look for a stream of open clusters flowing away from β , named Caph, on the other side of the **M**. These OC's are 7790, 7788 Frolov 1, Berk 58, Harvard 21 King 12 and King 21. All together they are quite a sight.

Then look for open clusters around β , γ , and κ . NGC's 129, 133, 225 and 146. Above the center of the **M**, near Caldwell 13 is a partner cluster, NGC 436. Caldwell 13's IAU name is NGC 437. The top star on the **M** is α and very close is another nice open cluster nick-named the "Pacman". Over by ρ (rho) is "Caroline's Rose", NGC 7789. Named after the great Caroline Herschel, the Rose is a very rich open cluster, with lanes and spirals visually but resembling in astrophotos a loose globular.

<https://www.astrobin.com/134259/?q=ngc 7789>

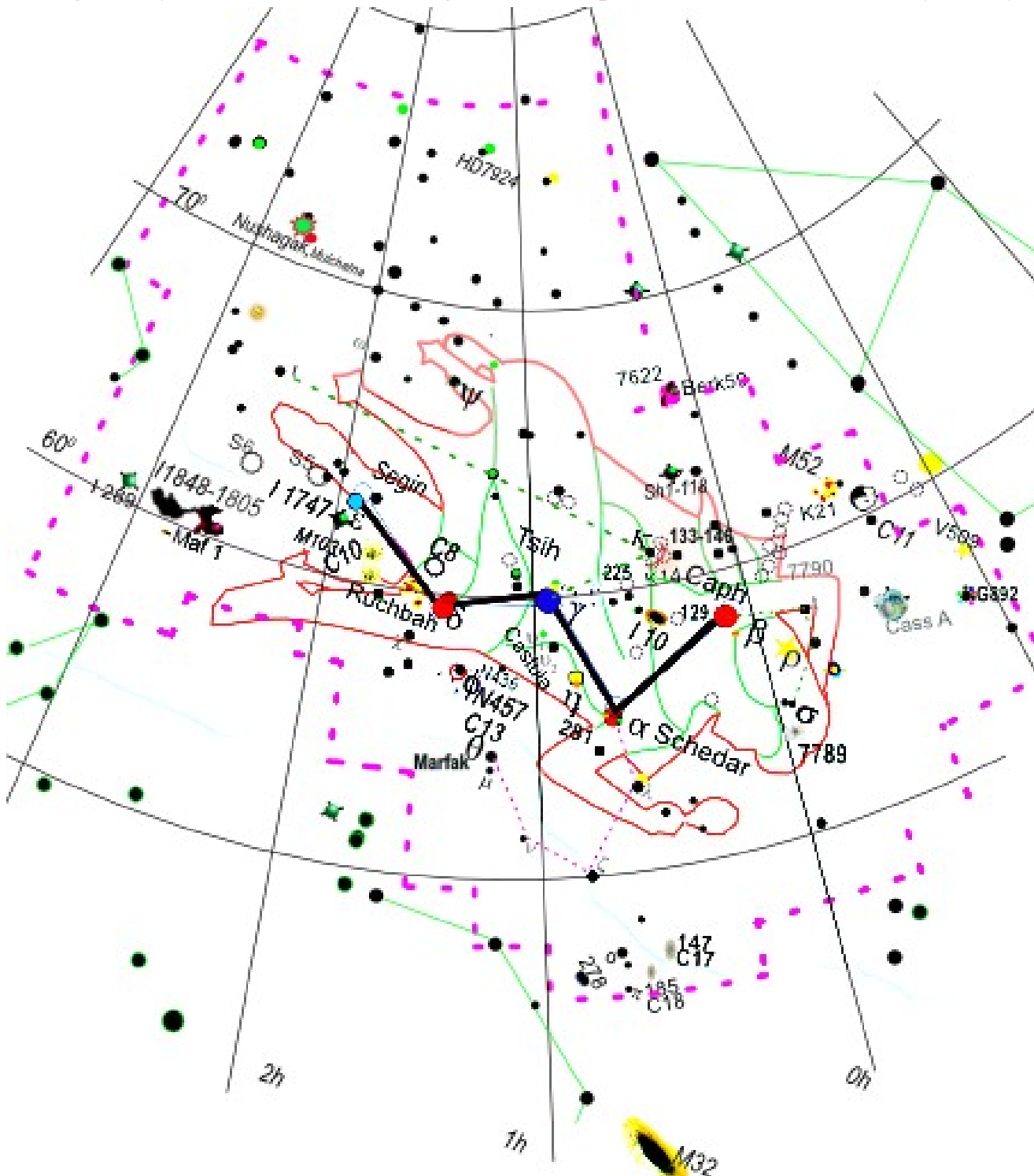




Temecula Valley Astronomer

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Going across the top of the **M** from right to left the names of the stars are Segin, Ruchbah, Gamma, sometimes called Navi, Schedar and Caph. Gamma γ is very interesting. It has 3 companions, only one of which can be seen, but **D**, the third of the companions has 3 companion of its own. In China, gamma's name is Tsih, the Whip. North in Cassiopeia is Nushagak. Nushagak is an Alaskan name for an 8th magnitude star with a very large planet named Muchatna. Nushagak is a river in Alaska and Mulchatna is one of its tributaries. A little further north in Cassiopeia is a star named HD 7924. It is kind of orangish and has three planets, all in the habitable zone. BASA has a lot of interesting things to say about HD 7924b, a huge extrasolar planet. You will find it a very satisfying if





Temecula Valley Astronomer

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you decide to search for the supernova remnant Cassiopeia A. It is quite famous and should be visible in your 6 inch with really dark sky's.

Sky and Telescope magazine published one astronomer's search for Cass A. at

<https://skyandtelescope.org/observing/cas-a-supernova-remnant/>

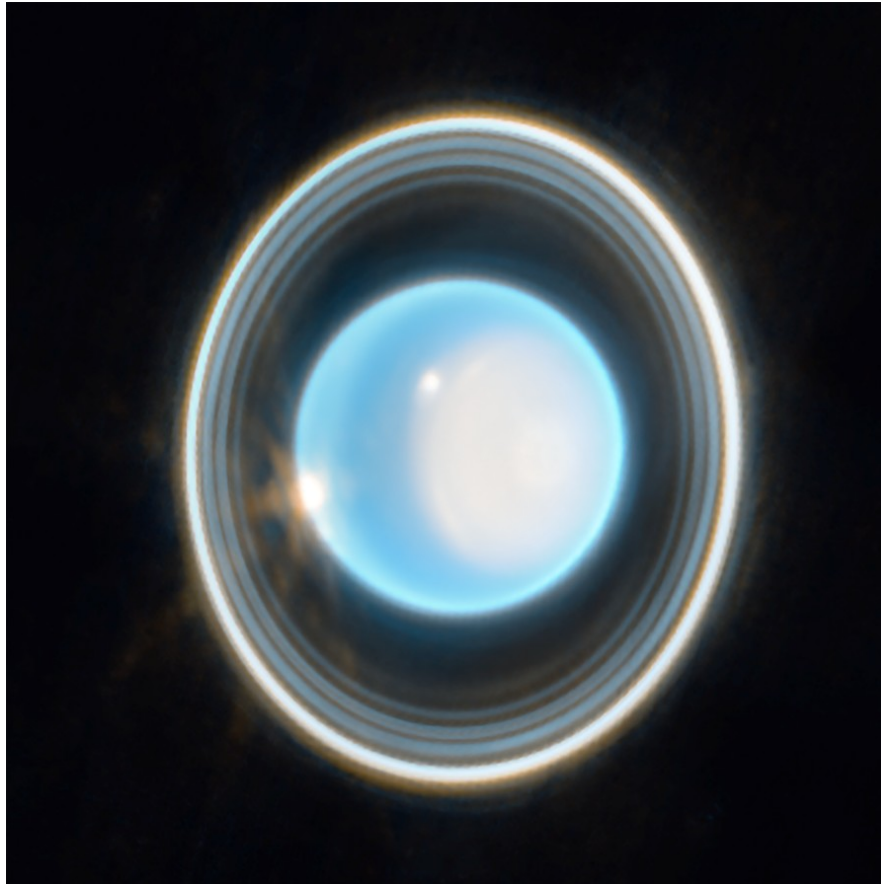
Last month, on October 14, the National Park Service held the annual Night Sky star party at Sky's the Limit in Joshua Tree. 500 people were registered and it seems like most of them peeked through my little 60mm refractor at Jupiter and the Pleiades. We had astronomers from Riverside, San Diego, Temecula, Los Angeles, Orange County, Tucson and one even flew in from Singapore. Visitors came from all over the US, and, a fine time was had by all. I just want to say thank you and

Dark Skys Dave



This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Spy the Seventh Planet, Uranus By Liz Kruesi



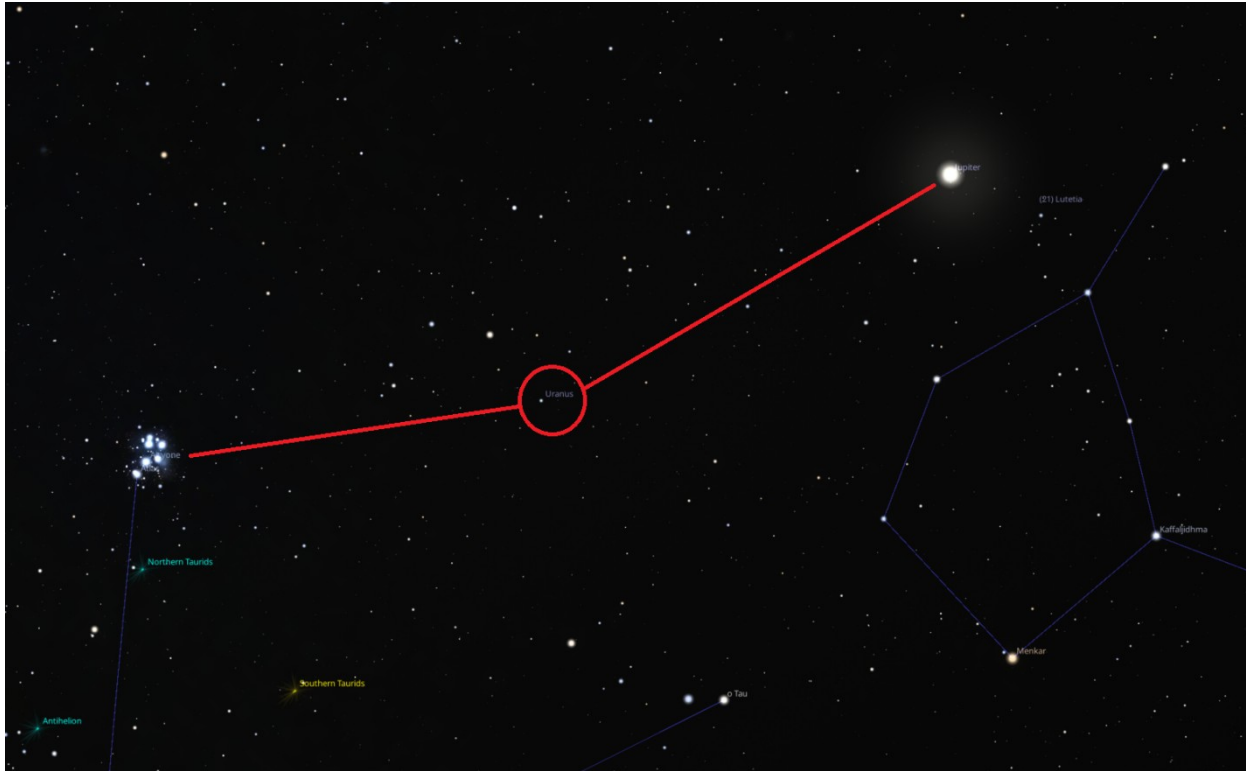
You might be familiar with Saturn as the solar system's ringed planet, with its enormous amount of dust and ice bits circling the giant planet. But Uranus, the next planet out from the Sun, hosts an impressive ring system as well. The seventh planet was the first discovered telescopically instead of with unaided eyes, and it was astronomer extraordinaire William Herschel who discovered Uranus March 13, 1781. Nearly two centuries passed before an infrared telescope aboard a military cargo aircraft revealed the planet had rings in 1977.¹

Since that discovery, multiple observatories have revealed more details of Uranus and its ring system. Most recently, the NASA-led JWST space observatory captured the planet and its rings in detail. This recent image combines just 12 minutes of exposure in two filters to reveal 11 of the planet's 13 rings. Even some of the planet's atmospheric features are visible in this image. Even with advanced imaging like that from JWST, much of Uranus remains a mystery, including why it orbits the Sun on its side. This is because only one spacecraft has ever visited this planet: NASA's Voyager 2, which flew by the distant planet in the mid-1980s.²

¹ For more about the infrared scope, <https://web.archive.org/web/20230429120852/https://www.nasa.gov/vision/universe/watchtheskies/kuiper.html>

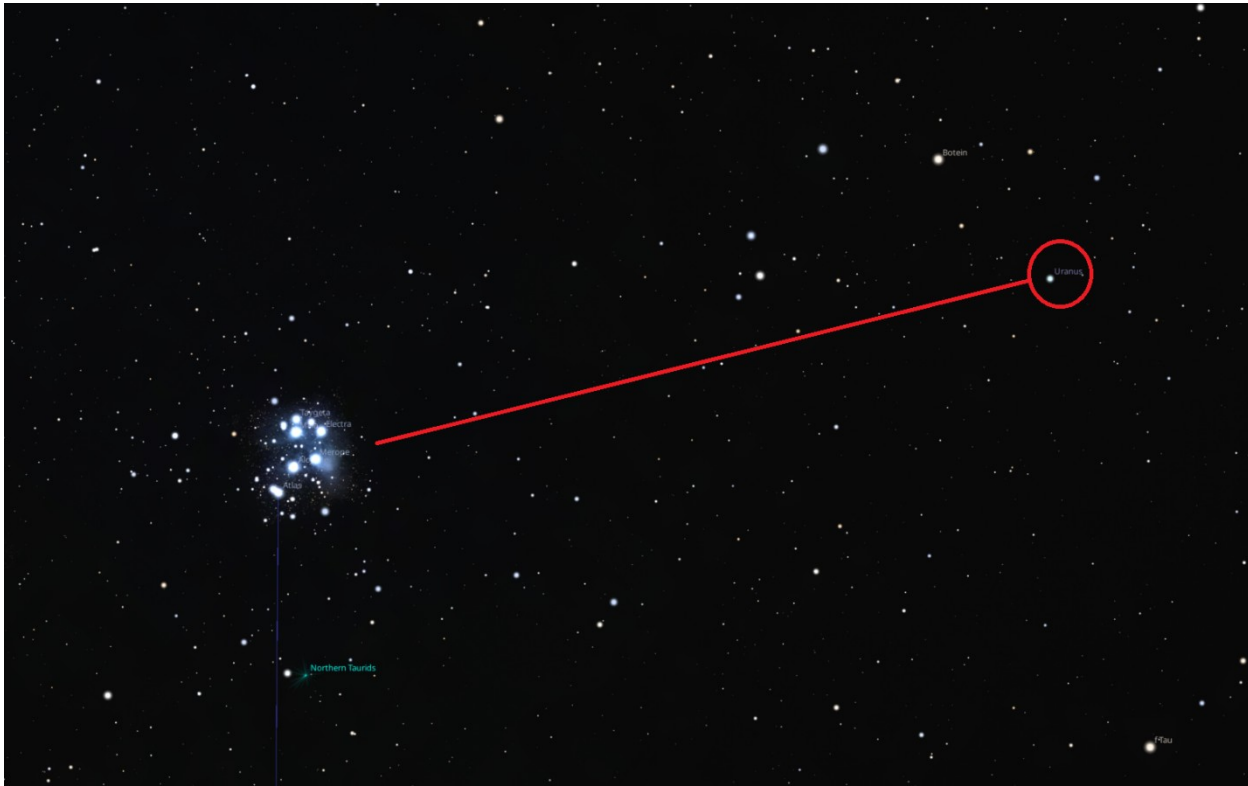
² See more about the flyby at <https://www.nasa.gov/history/35-years-ago-voyager-2-explores-uranus/>

Planetary scientists are hoping to change that soon, though. Scientists recommended in a [report](#) released last year from the National Academies of Sciences, Engineering, and Medicine that Uranus be the focus on the next big planetary science spacecraft mission. Such a large-scale mission would gain insight into this icy giant planet and the similar solar system planet, Neptune.



Sky map picturing M45, Uranus and Jupiter, Stellarium

If you want to catch a view of Uranus with your own eyes, now is prime time to view it. This ice giant planet lies perfectly positioned in mid-November, at so-called “opposition,” when its position in its orbit places it on the other side of the Sun from Earth. That location means our star’s light reflects off Uranus’ icy atmosphere, and the planet appears as its brightest.



Sky map picturing M45 and Uranus, Stellarium

To find it, look overhead just after midnight on November 13. Uranus will lie about halfway between the brilliant planet Jupiter and the diffuse glow of the Pleiades star cluster (M45). While Uranus may look like a bright blinking star in the night sky, its blue-green hue gives away its identity. Binoculars or a telescope will improve the view.

For more about this oddball planet, visit NASA's [Uranus page](#).

Image 1:

Uranus hosts 13 faint rings, 11 of which are visible in this JWST image. The planet was 19.67 times the Earth-Sun distance from our planet (1.83 billion miles) when JWST captured exposures through two near-Infrared filters on February 6, 2023. The white region in the right side of Uranus is one of the planet's polar caps. This icy world orbits the Sun differently from the rest of the solar system's planets – Uranus rolls along on its side.

[NASA, ESA, CSA, STScI; Image Processing: Joseph DePasquale (STScI)]



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