Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers December 2022

Events: General Meeting, Monday, December 5, 2022, at the Ronald H. Roberts Temecula Library, Room B, 30600 Pauba Rd, and/or ZOOM, at 6:00 PM.

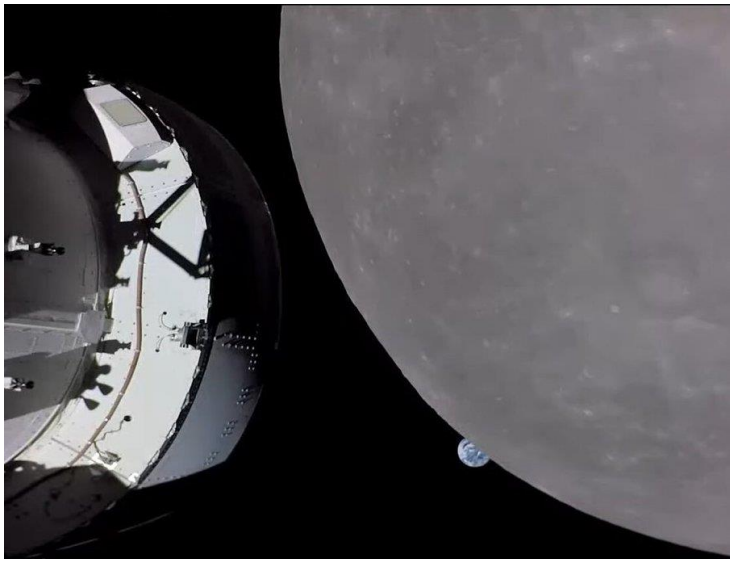
- **End of Year Banquet!**

- **State of TVA**
- **Looping Image Gallery by Clark Williams**
- **Refreshments by TVA**
- **Star Parties at South Coast Winery 12/2, 12/9, and 12/16/2022**
- **For upcoming school Star Parties check the Calendar on the web page.**

WHAT'S INSIDE THIS MONTH:

Send newsletter submissions to Paul Kreitz <pkreitz@sbcglobal.net> by the 20th of the month for the next month's issue.

As the Artemis 1 mission's uncrewed spacecraft flew past the far side of the Moon, Orion's orbital maneuvering system engine fired for 2 minutes and 30 seconds to successfully put the capsule into the desired orbit for the mission, called a distant retrograde orbit around the Moon.



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 – December 2022

By Mark Baker

I am known to be harshly critical of the NASA SLS program as it is the same type of "boondoggle" that killed off human space exploration programs in the 1970's… one and done launch systems, very expensive!!! However, I fully support the concept behind Artemis, but feel humanity will be better served with a different launch program…

That being said, this "rocket boy" admits to being thrilled by the launch when it finally did happen – WOW - and frequently track Artemis 1 as it approaches the Moon as of this writing… I cannot believe it's been FIFTY years, but so glad we are baaaaaaack!!! And even more glad that it is via international cooperation… it makes it a human success!!!

But where do we go from here?? I'm a proponent of giving "the ball" to the private companies making so much headway in this arena… and give kudos to NASA for realizing that it's much, much cheaper to use someone else's "ride" rather than develop and build your own. The next few years promise to be so very exciting as we once again pursue putting "boots on the ground"… and not just on the Moon, but asteroids of interest, Mars, and even beyond!! It's not merely a whim for humanity to become extra-planetary, it's a necessity for survival of the species…

Regardless of robotic or human presence elsewhere in the Solar System, TVA plays an important role in inspiring those that will eventually take us there… it all starts with Looking Up!!! Thanks to all involved, and be proud of your influence, great or small…

Clear, Dark Skies my Friends

Looking Up Redux – December 2022

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
TVA App (2.0.1296)
FullAndNewMoon App (2.0)
Starry Night Pro Plus 7 (7.6.3.1373)
SkySafari 6 Pro (6.1.1)
Stellarium (0.18.2)
timeanddate.com/astronomy
https://www.fourmilab.ch/earthview/pacalc.html

ALL TIMES ARE LOCAL PACIFIC TIME (PDT / PST) 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:

Wednesday	**the 7th**	**@2009 FULL in TAURUS**
Friday	**the 16th**	**@0057 THIRD QTR in VIRO**
Friday	**the 23rd**	**@0218 NEW in SAGETARIUS**
Thursday	**the 29th**	**@1721 First QTR in CETUS**

Apogee comes on 2022-12-17 @ **0322 – 404,329 km (251,239 mi)**
Perigee comes on 2022-12-04 @ **1002 – 369,334 km (229,494 mi)**
Perigee comes on 2022-12-29 @ **0749 – 368,287 km (228,843 mi)**

2022 has: (13) new moons, (13) 1st Qtr moons, (12) Full moons, (12) 3rd Qtr moons
(0) Blue moon and (2) Black moons

Daylight Savings: Starts: 2022-Mar-13 : Ends: 2022-Nov-06

Luna: Luna is waxing gibbous on the first of the month, headed for Full on the 7th rising at **1309**, transiting at **1910** and setting by **0114+**. Luna by mid-month is again waxing gibbous at 57% illumination. Rising at 2237- and transiting at **0519** setting at **1157**. By the-end-of-the-month

Luna is Waxing gibbous, rising at **1236** transiting at **1921** and setting by **0212+**.

Highlights: (distilled from**: SeaSky.org** and **Clark's planetary Orrey** program[s]**)**

December 7 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at 0409+ UTC. This full moon was known by early Native American tribes as the Cold Moon because this is the time of year when the cold winter air settles in and the nights become long and dark. This moon has also been known as the Long Nights Moon and the Moon Before Yule.

December 8 - Mars at Opposition. The red 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 Mars. A medium-sized telescope will allow you to see some of the dark details on the planet's orange surface.

December 13, 14 - Geminids Meteor Shower. The Geminids is the king of the meteor showers. It is considered by many to be the best shower in the heavens, producing up to 120 multicolored meteors per hour at its peak. It is produced by debris left behind by an asteroid known as 3200 Phaethon, which was discovered in 1982. The shower runs annually from December 7-17. It peaks this year on the night of the 13th and morning of the 14th. The waning gibbous moon will block many of the fainter meteors this year. But the Geminids are so numerous and bright that this should still be a good show. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Gemini, but can appear anywhere in the sky.

December 21 - December Solstice. The December solstice occurs at 2140 UTC. The South Pole of the earth will be tilted toward the Sun, which will have reached its southernmost position in the sky and will be directly over the Tropic of Capricorn at 23.44 degrees south latitude. This is the first day of winter (winter solstice) in the Northern Hemisphere and the first day of summer (summer solstice) in the Southern Hemisphere.

December 21 - Mercury at Greatest Eastern Elongation. The planet Mercury reaches greatest eastern elongation of 20.1 degrees from the Sun. This is the best time to view Mercury since it will be at its highest point above the horizon in the evening sky. Look for the planet low in the western sky just after sunset.

December 21, 22 - Ursids Meteor Shower. The Ursids is a minor meteor shower producing about 5-10 meteors per hour. It is produced by dust grains left behind by comet Tuttle, which was first discovered in 1790. The shower runs annually from December 17-25. It peaks this year on the night of the 21st and morning of the 22nd. This year, the nearly new moon will leave dark skies for what should be a really good show. Best viewing will be just after midnight from a dark location far away from city lights. Meteors will radiate from the constellation Ursa Minor, but can appear anywhere in the sky.

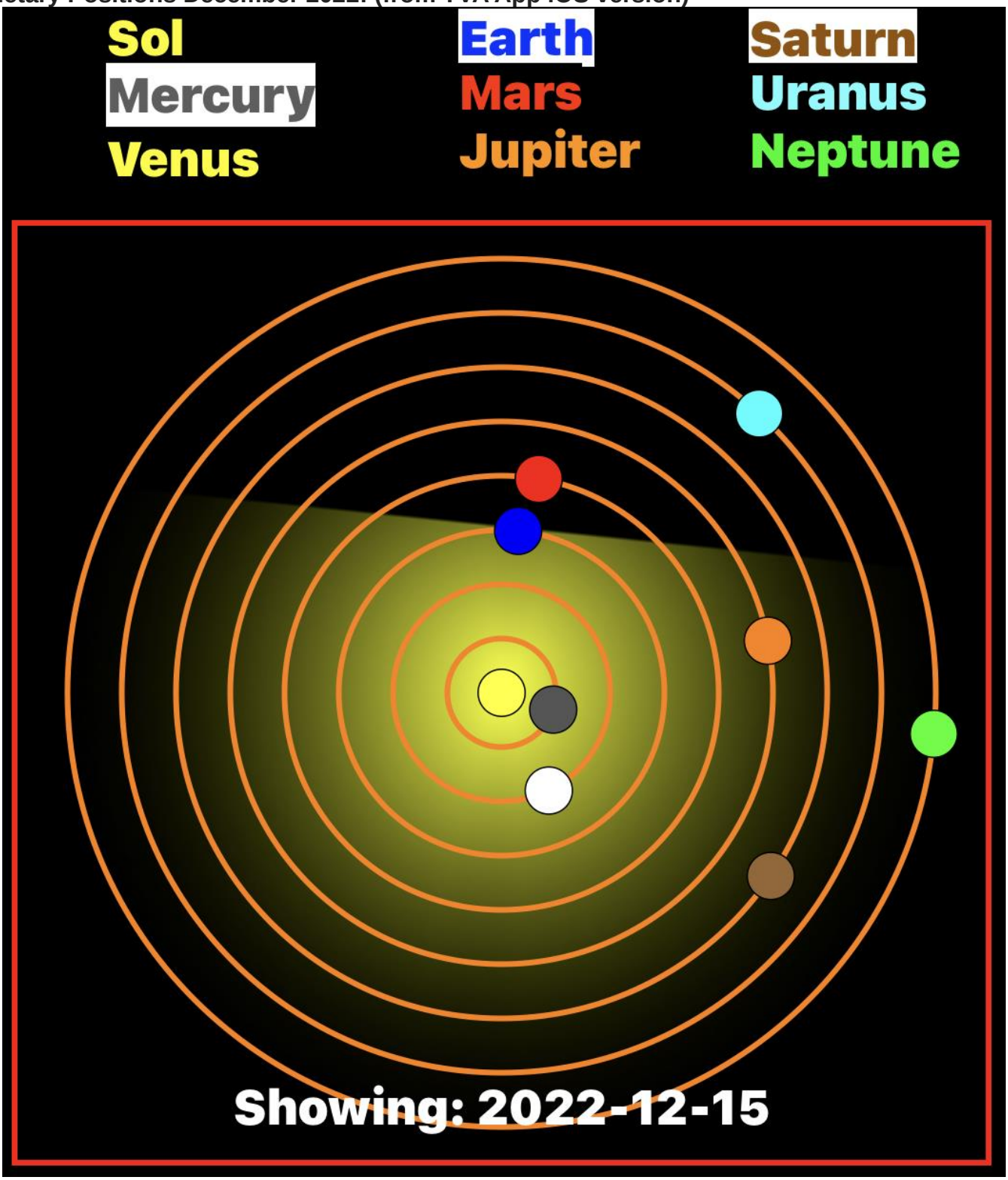
December 23 - New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 1017 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

Algol minima: (All times Pacific Time)

12/02/2022	**0331**
12/05/2022	**1220**
12/08/2022	**0909**
12/11/2022	**0558**
12/14/2022	**0247**
12/16/2022	**2336**
12/19/2022	**2025**
12/22/2022	**1714**
12/25/2022	**1403**
12/28/2022	**1052**

Planets:

Planetary Positions December 2022: (from TVA App iOS version)



- **Mercury:** Mercury is an evening object in the beginning of the month. It is illuminated at 93% and -0.58 apparent magnitude. Mercury sets at **1724** with the sun preceding at **1642**. This is a risky viewing of Mercury and you may want to wait for a better time to view this elusive planet. Mercury by mid-month is in a much better position for viewing. Mercury is still an evening object setting at **1800** with the .Sun setting at **1643**. By the 31st Mercury has "fallen" in toward the Sun again making it riskier to view. The Sun sets at **1652** and Mercury sets at **1755**.
- **Venus:** Is the Evening Star on the first of the month, setting by **0718**, with sunset at **1642**. Venus is pacing the sun and closer to the Sun than Mercury in its apparent view from Earth. Venus is 98% illuminated and has an apparent magnitude of -3.91 By mid-month Venus is setting at **1738.** Sunset is at **1643**. By end of month Venus is higher in the sky than Mercury and sets at **1808**. Sunset is at **1652**. All during this month Venus and Mercury are close to each other.
- **Mars:** Mars is back in the sky and growing brighter as an evening object. On the first of the month Mars is rising at **1657**, transits at **0013+** and it is high in the sky at 81° 20' at transit! Perfect for imaging and viewing. By mid-month Mars is transiting over an hour earlier giving you even more time to image or view the Warrior. Mars rises at **1539**, transits at **2254** and doesn't set until **0610+**. End-of-month finds the Warrior rising at **1419** transiting at **2133** and setting at 0448**+**. All month long Mars is in a good position to view or image.
- **Jupiter:** Jupiter is an evening object on the first of the month rising at **1304**, transiting at **1903**. and setting at **0102**+. Jupiter can be found just 2° 45' above the waxing gibbous Moon at transit. By mid-month Jove is rising at **1211**, transiting at **1811** and setting at **0010+**. Jupiter will be unencumbered by the late rising last quarter Moon. Come the end-of-month Jupiter is transiting near sunset. Still visible in the early evening sky but hardly good imaging or viewing material. Jupiter is peaking above the horizon by **1112**, transiting at **1713** and setting at 2315. Jupiter is also being chased by a waxing gibbous Moon 71% illuminated.
- **Saturn:** Saturn is an evening object on the first of the month rising at **1117**, transiting at **1636** and setting at **2156**. Saturn is competing with a waxing gibbous Moon all night. Saturn by mid-month rises at **1025** and transits at **1545** and sets at **2106**. Saturn is well visible by **1745** but is getting low on the horizon. By the end-of-the-month Saturn is easily visible by **1745**. Saturn sets at **2010**. Saturn is slipping behind the Sun from our point of view and won't reappear until early morning March.
- **Uranus:** On the first of the month Uranus is an evening object rising at **1511**, transiting at **2159** and not setting until **0447+**. Uranus is chasing a 67% illuminated waxing gibbous Moon. By the ides Uranus is rising at **1414**, transiting at **2102** and setting at **0350+**. Uranus' apparent magnitude is 5.66 and with dark skies should be a naked eye visible object. End-of-month finds Uranus rising at 1310. and transiting at **1957** and setting at **0245**+. Uranus competes all night with a 71% illuminated waxing gibbous Moon only 9° 38' to the west.
- **Neptune:** Neptune is lost to the Moon in the beginning of the month. By the 15th Neptune should be visible and very near Jupiter. This might make a nice wide-field DSLR image. Neptune rises at **1152**, transits at **1745** and sets at **2337**. By the end of the month Neptune is battling a 70% illuminated Moon but it is located very near Jupiter, just about 8° to the west. Neptune transits at **1643** and doesn't set until **2235**.
- **Pluto:** Pluto on the first of the month won't be truly visible until about **1800** and by then it will be too low on the horizon. The waxing gibbous Moon will interfere with viewing as well. By mid-month nothing has changed, and Pluto is virtually invisible. By the 31st Pluto is very difficult to see but it is less than a degree to the east of Venus, low on the horizon and maybe visible at around 1750 thru 1810 (but unlikely).

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2022 with a reasonable magnitude; say less than or equal to +10 in December there is nothing except the regulars: Juno, Vesta. Hebe, Eros and Herculina. So consult your local planetarium software or try: **https://www.asteroidsnear.com/year?year=2022**

Meteors:

- Geminids Meteor Shower. (see Highlights above)
- Ursids Meteor Shower. (see Highlights above)

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
  - Halley Type: The Halley Types are believe 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 December 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.

No comets of interest this month at time of writing.

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 December 2022 at 2100 PDT and you will have about 20 minutes of viewing time total.

Lets take a look at some favorite objects (at least for me):

- NGC 1435**:**

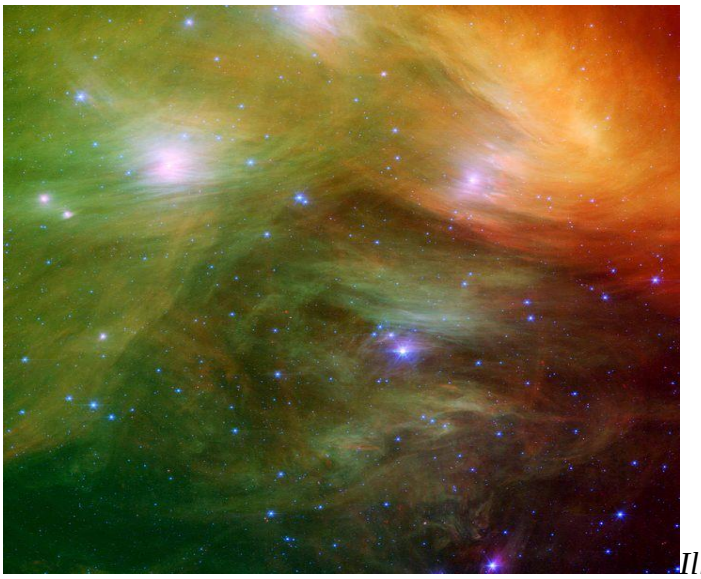


Illustration 1: By John Stauffer (Spitzer Science Center, Caltech)credits: Credit: NASA/JPL-Caltech/J. Stauffer (SSC/Caltech)

The Merope Nebula (also known as Tempel's Nebula and NGC 1435) is a diffuse reflection nebula in the Pleiades star cluster, surrounding the 4th magnitude star Merope. It was discovered on October 19, 1859 by the German astronomer Wilhelm Tempel. The discovery was made using a 10.5cm refractor. John Herschel included it as 768 in his General Catalogue of Nebulae and Clusters of Stars but never observed it himself.
The Merope Nebula has an apparent magnitude starting at 13 and quickly dimming by a factor of about 15, making most of the nebula dimmer than magnitude 16. It is illuminated entirely by the star Merope, which is embedded in the nebula. It contains a bright knot, IC 349, about half an arcminute wide near Merope, which was discovered by Edward Emerson Barnard in November 1890. It is naturally very bright but is almost hidden in the radiance of Merope. It appears blue in photographs because of the fine carbon dust spread throughout the cloud. Though it was once thought the Pleiades formed from this and surrounding nebulae, it is now known that the Pleiades nebulosity is caused by a chance encounter with the cloud.. (Wikipedia)

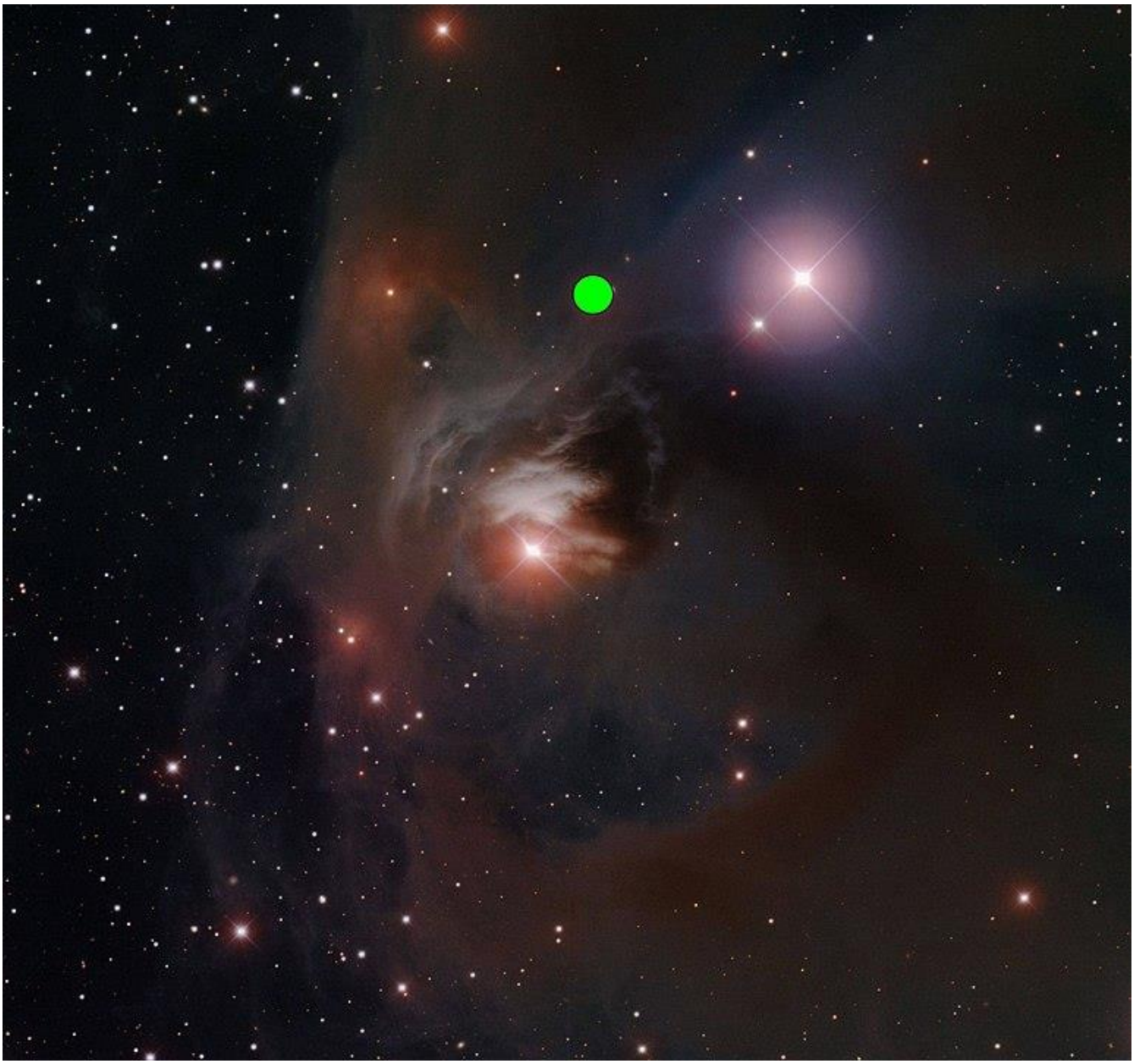


Illustration 2: By Wolfmanwolf45 - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=54858480

- **NGC 1554:**

  NGC 1554, Struve's Lost Nebula, is a list entry in the New General Catalogue of Nebulae compiled by John L. E. Dreyer. The nebula was discovered by the German-Russian astronomer Otto Wilhelm von Struve and confirmed by Heinrich Louis d'Arrest.

Reported location of NGC 1554 by Otto Wilhelm von Struve relative to NGC 1555

Dreyer describes it as

!!! var, S, R, Nn = *13

which in NGC's encoding is expanded to:

a magnificent or otherwise interesting object, variable, small, round, nucleus north of a star of the 13th magnitude

The identification is uncertain; many sources think it is related to NGC 1555, Hind's Variable Nebula, but at NGC 1554's coordinates, (epoch J2000) 04h 22m 00.0s +19° 36′ 00″ there is no nebula. However, there is a 14th magnitude star, 4' west-southwest of T Tauri, so there is a possibility that the nebula Struve discovered was surrounding a variable star and it only flares up every now and then (perhaps even on a centuries long cycle). Alternatively it may have been an error caused by a pair of faint stars. (Wikipedia)

December is great for both viewing and imaging. Spend some time outside with your scope. Winter is coming.

For now – Keep looking up.

RANDOM THOUGHT
By Chuck Dyson

BINOCULARS
THE DOGS OF ASTRONOMY

Before you go thinking that I am trashing binoculars you should know that I am a dog lover and have spent many happy times with my dogs hunting and star gazing. My puppies didn't care if I picked up my hunting gear or my observing gear, they only knew that we were off to the fields where they could sniff out small animals and terrorize them. Smallish puppies quickly realize that they cannot terrorize large animals but rather large animals terrorize them; therefore, we tend to focus on animals that are easy to bully.

My binoculars are like my dogs in that some are always taken on road trips with me and, just like the different breeds of dogs, they come in a bewildering range of sizes. Over the years I have owned binoculars both big and small. The smallest being a pair of 10X25 plastic bodied binoculars from Walmart. I bought this binocular so I could get as close as possible to the viewing experience that Galileo had when he first turned his telescope on the night skies in 1609 {Note: Galileo's first telescope is variously described as having an objective lens of 50 to 37mm diameter but an operating diameter of 24 to 15mm and a magnification 10 to 14X so it is impossible to get an exact replication of his first experience. Plus the worst glass lens that you can get today is far superior to any early Galileo lens. Views of the Moon, Jupiter, and Venus were surprising. My biggest binoculars are 22X85's by Garrett optical (a company long out of business). They are heavy and require a really sturdy tripod to mount them on; however, this binocular is without parallel when it comes to finding comets or providing spectacular views of Andromeda under dark skies. If my travel plans include air travel the 22X85's and their mighty tripod stay home and my 15X70's and a tripod that fits into my suitcase goes with me along with a pair of hand held 12X56 binoculars.

The history of binoculars is as long as the history of telescopes, but because of the difficulties in producing an optical device that works well with two eyes compared to one that "only" works with one eye, binoculars have a three hundred year development path as compared to a one hundred year period for the telescope. The first patent application for a telescope was in 1608 in Holland by a Hans Lipperhay. Within a week the Dutch authorities replied that because we have two eyes Lipperhay should develop a telescope for two eyes and rumor has it that Lipperhay did produce a sort of two tubed telescope. Of interesting note is the fact that within two to three months of the Lipperhay patent submission several other people in Holland and other countries in Europe also filed, along with our friend Galileo hearing about it too and within a year he had produced his own telescope, looked at the sky, and published his results. In science good news and financial opportunity travels fast even in the early 1600's. It soon became clear that the two tubed telescope was, as we say today, a nonstarter; however, the single tubed telescope was a science entrepreneurs dream.

While the single tube telescope became the object of attention of 99% of all researchers there was still that 1% that saw value in using both eyes to view things. The first major hurdle was getting four glass globs that had the same physical properties. The second major hurdle was grinding both the objective and eye lenses to the same focal length. The third major hurdle was early lenses required focal lengths of f26 to over f200 to get decent images, binoculars with tubes over six feet in length are not terribly practical. The fourth major hurdle was optical tubes were made of wrapped paper or wood with a leather cover (not conducive to being attached to a second tube) and lenses were set in the tubes for a fixed focus; no adjustments possible. The fifth major hurdle was the inability to produce even small amounts of optical glass, glass with very few impurities, air bubbles, and color streaks. The six and final hurdle was the fact that it was recognized early on that you could correct many of the image problems with different types of lenses but each lens reduced the amount of transmitted light by about 8%; so, you could have a sharper but dimmer image or a brighter but blurred image.

The first big step in solving all of these came in 1750's with the ability to make brass tubes. With brass tubes one could easily attach the two tubes together with a brass plate. There was no hinge in early binoculars to adjust the intraocular distance; the fixed intraocular distance either worked for you or it didn't. In 1823 the first commercial binoculars were produced using the Galilean lens system. In the Galilean lens system the objective lens is convex, bulges outward, and the eye lens is concave, bulges inward. The advantage of the Galilean system is that it produces an image where up is up and right is right. The disadvantage of this system is it produces clear images only at low magnification. Binoculars of this original design are still being produced today and are called opera glasses. If you want to look at the stars through a 3X or 4X magnification binoculars buy yourself a pair of opera glasses.

In the 1700's a six inch diameter piece of good optical glass was a rarity so there was obviously room for improvement in the manufacturing process. Pierre-Louis Guinand made a huge contribution to the production of optical glass by "simply" doing a better job of stirring the glass. Glass is made from powdered rocks, in essence, and getting the mix exactly the same in all areas of the melt is impossible and air is trapped in the melt too. The answer to both of these problems is to stir the glass slowly to make it homogenous and to get the air bubbles to rise up and out of the glass. At this time the glass was being stirred with wooden dowels and as glass melts at 1000C and wood burns at 450C bits of burnt wood were contaminating the glass.

Guinand in 1784 develops a refractory clay, a clay that melts at very high temperatures (1850C to be exact) and is able to stir the glass with no contamination. Closely following Guinand's work Joseph Fraunhofer makes clearer glass. He identified sand with low iron content and iron gives glass a green tint Then by looking at how different glasses bend different wavelengths of light he is able to make the first practical crown and flint objective lens. I say practical because in the 1750's a John Dolland actually produces the first achromatic telescope lenses, but because the glass of the day was of such low quality the lenses never worked well. The last person in the development of glass is the German chemist Friedrich Otto Schott. Schott, from the 1880's to the 1920's, developed formulas for several types of optical glass most notably the borosilicate glass that is still used today. The Schott glass company is still producing optical glass today and its founder Fredrich Schott is often called "The father of modern optical glass".

Even though we have good glass and greatly improved lens fabrication techniques we still have two really long tubes making up our binoculars, and that is just plain awkward. In 1854 Ignatio Porro comes to the rescue by using prisms to fold the long light path inside the binoculars, think of the zig zag ride lines at Disneyland. The binocular is now a compact double telescope that is user adaptable with a hinged bridge to accommodate different intra ocular distances and eye lens assembly that can be focused to your eyes and optics that produce sharp images with controlled chromatic aberration; and yet the image keeps getting dimmer and dimmer with each improvement. What gives?

Note: As soon as the Porro prism comes out every physicist who is even remotely connected with optic research comes out with their “better” prism arrangement. One of the more interesting prism stories is the Abbe prism, a common prism design used in roof prism binoculars, developed by Ernst Abbe & Carl Zeiss in 1894. The thing that makes this event interesting is although the design was finalized in 1894 Zeiss had died in 1888; so, it appears that Abbe was communicating with Zeiss in the spirit world for at least six years.

All optical systems had dimming problems because each uncoated glass surface reflects about 4% of the light instead of transmitting it. For each lens 4% is lost entering and leaving. In a standard telescope with a Kellner eyepiece there are ten optical surfaces and that means 40% of incident light is lost; but for binoculars with prisms there are four extra glass surfaces resulting in a total of 56% of the incident light is being lost. In 1886 Lord Rayleigh notes and documents that an old telescope lens that is “tarnished” by chemical deposits actually transmits more light than a new lens without the “tarnish”. This Rayleigh guy notes and tests everything and that is probably why he got the 1904 Nobel prize in physics. By chance in 1904 Harold Dennis Taylor produces the first chemical coating for optical lenses; although he had probably been working on this project for years. The Taylor coating reduces the light loss from 4% to 1.5% for a total light loss of 21% in our standard binocular, things are looking brighter already. In 1935 a Ukrainian, Olexander Smakula, working for the Carl Zeiss Optical company develops a process for multiple chemical coatings. The process was declared a military secret and its existence was only discovered when American officers reported that captured German binoculars, although smaller than American binoculars, gave much brighter images. Today, with improved multi coatings, binoculars transmit 90 to 95% of all incident light.

To borrow from Mr. Lincoln’s Gettysburg address, for about two score years now I have been using binoculars for astronomy. The binocular’s ease of use and travel practicality make it a must on trips and for casual observing at home when you just want to bounce around the sky looking at different objects the binocular beats repointing the telescope every time. But my choice of binoculars for observing has changed over time because: Forty years ago my pupils opened up to 7 millimeters, today it’s 5 millimeters. Forty years ago I had a large back yard and traveled to a dark site two times a month, today I have a small back yard and I rarely go to dark sites. Forty years ago I had two organic eye lenses, today I have two plastic lenses.

Today with most of my viewing from a small and, thanks to my close neighbor’s outdoor lights, well-lit yard and with eyes than really need a 5 millimeter, or smaller, light cone I no longer want any binocular that gives me a 7 millimeter light cone. I do have a pair of Orion 9X63 Mini Giant, great oxymoron that, purchased over decades ago. Today the image I get from these binoculars

has dimmed and they live in my garage storage cabinet. My new favorite binoculars are a pair of 12 X 56 hand held and a 15 X 70 on a tripod swing mount. My reason for choosing these two binoculars is as follows. The 56 millimeter objective lens gets 25% more light in than a standard 50 millimeter lens. This is a good thing in the light polluted city. The 70 millimeter binocular gets 56% more light than the 56 millimeter but is light enough to be on a light weight tripod and swing arm. Although 80 millimeter binoculars would give me double the light collected by the 56 millimeter binoculars the mounting requirements are much greater and that makes them much less mobile. As for my 85 millimeter binoculars TV studio strength tripods and heads only, not really a grab and go binocular.

Know your eyes, your viewing locations, and your favorite targets but whatever you do get a pair of binoculars and look up.

CHEERS, CHUCK

Another Look December, 2022

By Dave Phelps

The winter solstice or the first day of winter is on December 21, 1348 PST. For those readers in Brisbane, this time will mark the first day of Summer. (Note APOD October 21, 2022)
December 8 full moon
November 25 and December 23 are December's new moons

Moon Names : Cold Moon, Snow Moon for the Cherokee, the Chinese, Bitter Moon, the Old English had the Oak Moon and the Christmas Moon in early America.

Striding across the cold winter sky, stars cracking in the wind and burning down through the air, he brandishes his club and holding his lions pelt shield up, Gilamesh or maybe Uruanna or even Tammuz shines for us as he has for 30,000 years. Over 4000 years ago he marked the rise of Sirius and the inundation of the Nile. He has, as Tammuz, risen in June for the Assyrians. He wears his belt and sword and is dressed in (maybe) a lions skin. He is a son of Poseidian who gifted him with the ability to walk on or (maybe) in water.

For the Greeks, the constellation now known as Orion, marked the new year when he rose with the sun. Orion is followed by his dogs Canis Major and Minor. Canis Major's brightest star Sirius was the star the Egyptians used to calibrate their year by the rising of the Nile.

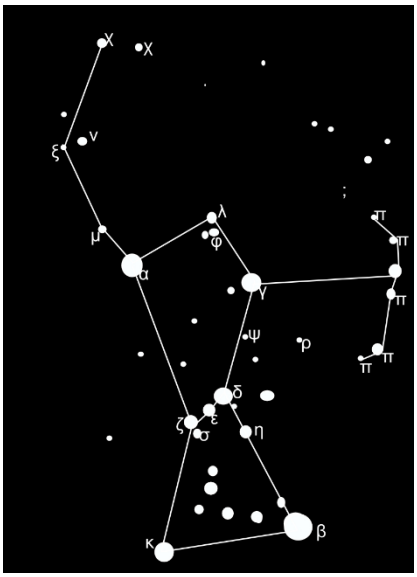
Not much remains of the oldest stories of Orion except his various names and his importance as a seasonal marker.

More imaginative, and through centuries of oral and some written tradition, the Greeks had him falling in love with the Plead Merope, chasing her across the heavens, being blinded by Merope's father, Oenopion, regaining his sight by the light on the sun and becoming the favorite hunting companion of the goddess Artemis

- ***.https://commons.wikimedia.org/wiki/File:Sidney_Hall_-_Urania%27s_Mirror_-_Orion_(best_currently_available_version_-_2014).jpg***

- Phew, when did guy stop to eat?

The easternmost (left) star in the belt is zeta ζ Orionis, a beautiful triple star system but you will probably only see two, the third is very close to ζ.



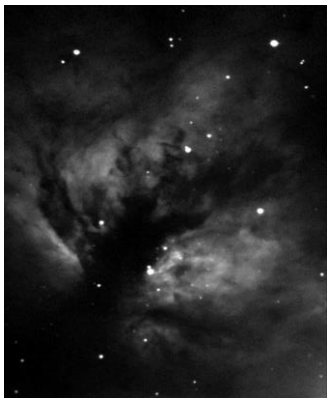
https://www.adamblockphotos.com/ngc2024.html

Zeta's ζ common name is Alnitak, meaning girdle, and it is associated with several very famous astronomical objects.

Right next to Alnitak is the Flame Nebula, NGC 2024. One of the objects that actually look something like its name. Its big and will fill the field in your medium power eyepiece. Close to the Flame is the Horsehead, long thought to be a mystical and difficult object to view. The Horsehead is Number 33 on Barnard's list of dark nebula and the reason I make sure to study each constellation for its own dark nebula.

Horsehead and Flame – Rick Gonzalez, TVA

From my backyard venues I never found it with my 3" refractor. In my 8", my light polluted backyard also made everything in that area pale and faint. But when I put the 17 on it at a dark sky site, Wow! IC 434 was large and bright and the black cloud of B33 was huge. Actually, Alnitak is embedded in IC 433's nebulosity. Look for Sigma σ Orionis. Sigma's bright light illuminates IC 434. On the other side of the Horse, between it and the Flame is NGC 2023, full of Hydrogen clouds. All I remember seeing is the star, an 8th magnitude Herbig star embedded in NGC 2023. Its star is designated 37903 in the Henry Draper catalog.



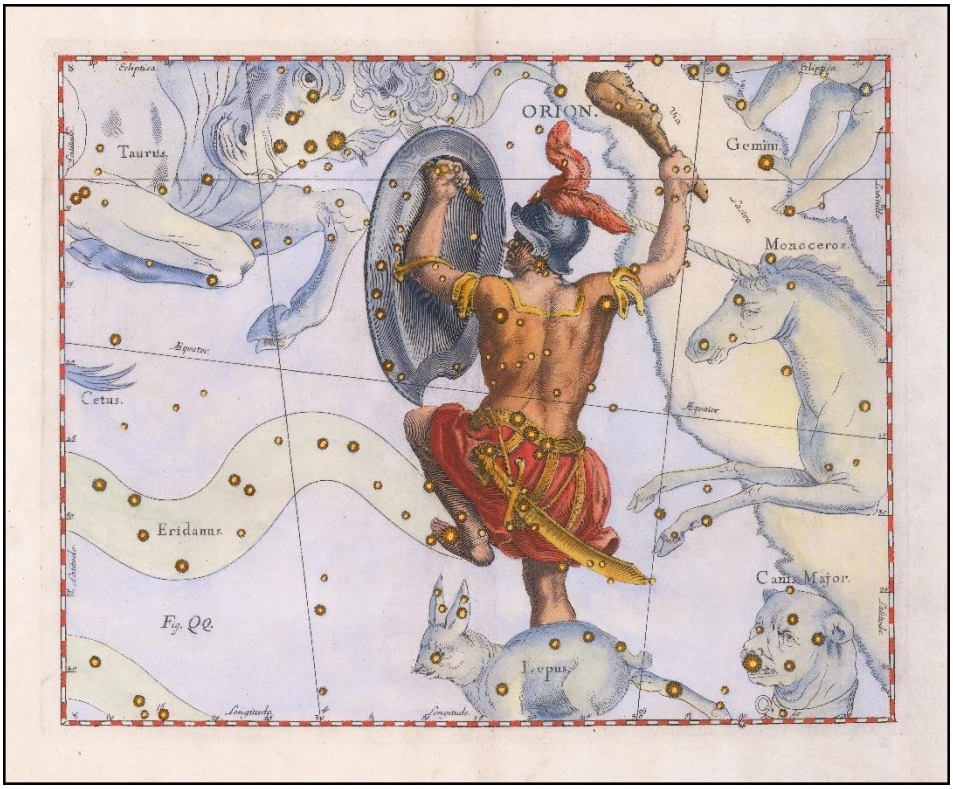
A little further down from the belt is Orion's sword,
Part of the huge Orion molecular cloud and maybe the closest star forming regions to our solar system. The Orion nebula, M42, has been recognized for thousands of years and is one of our favorite deep sky targets

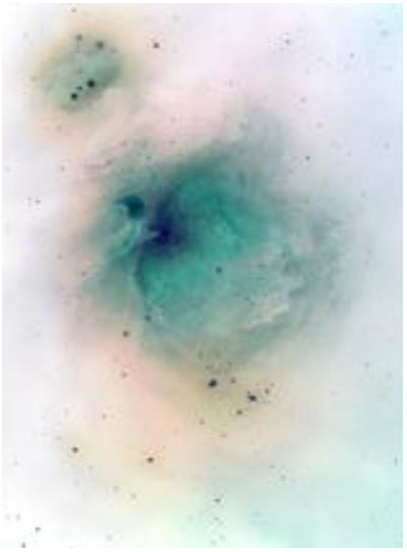
The Orion Nebula has been visible for 30,000 years. Who can say what those early tool makers thought of that little fuzzy star and what

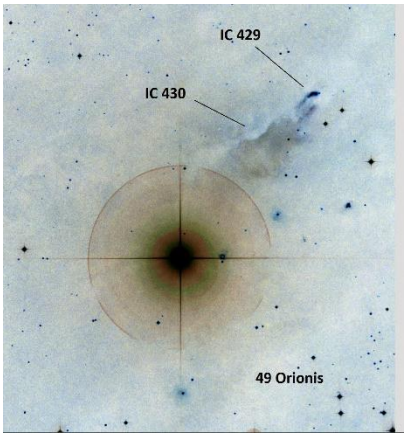
significance they gave it. There is an Aurignacian mammoth ivory carving dated between 32,000 to 38,000 years old that was found in Germany depicting the nebula. Even just 50 years ago all we really knew was that it was big and composed of gas. Our spectroscopes told us there was hydrogen and we were pretty sure it was a stellar nursery, but we had no idea just how big I it was. ***OCAstronomers.org Unattributed***

When I turned my 3" on it in the early 1960's I saw the great cloud, but what was front and center was the Trapezium. Now, that was sumptin'. I could split it with my 3, but my buddy's brother only saw three in his 60mm Tasco. Not bad, the first observations of the Trapezeium were done by none other than Galileo, and he also saw only three. You will be able to pick out six if your seeing allows and it would be interesting to see what some big long focus instruments in our amateur's hands can accomplish.

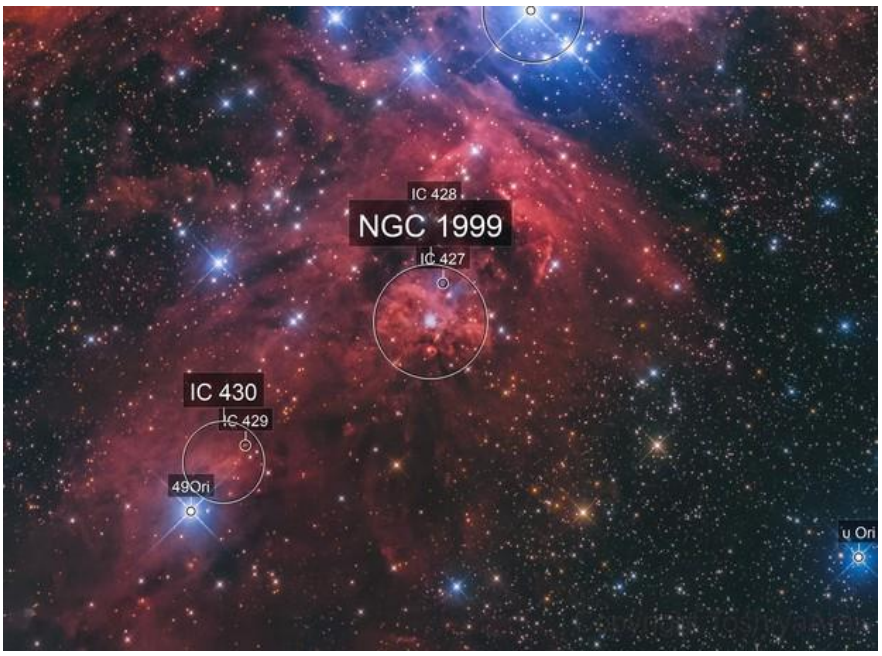
The main piece of the image we see here is composed of M42 and M43. The bluish nebula closer to the corner is NGC 1977.
https://www.temeculavalleyastronomers.com/photo-gallery.html ***Curtis Croulet TVA 0311***
I have searched diligently for the classification of the dark lane separating M42 and M43, but could not find it. Current professional images often show a significant gap between 42 and 43, others not so much.
https://commons.wikimedia.org/wikiFile:Orion_constellation_Hevelius.jpg







Below the nebula and fading off into the greater Orion molecular cloud are several bits of nebulosity I found. As amateurs, we tend to look for the glorious objects like M42 and tough objects like the Running Man. I inverted Curtis's image to bring out NGC 1980 and the nebulosity south of M42. There are two more clusters of nebulosity running south, the area around NGC 1999 and around IC 430. The Inverted image around 49 Orionis is IC 429 and IC 430. You can find an image of the hole in NGC 1999 at APOD on March 7, 2018 and on the OCA website.



The original image can be found at https://commons.wikimedia.org/wiki/File:49_Ori_-_IC_430_-_IC_429_-_DSS2_labbeled.png.
The colored image will take you from NGC 1999 down to 49 Orionis.
https://www.hansonastronomy.com/ngc-1999

Under Orion's feet, mark too the Hare,
Perpetually pursued .
Behind him Sirius Drives as in chase,
hard pressing when he rises ,
And when he sinks as hotly pressing still .
Frothingham's Aratos

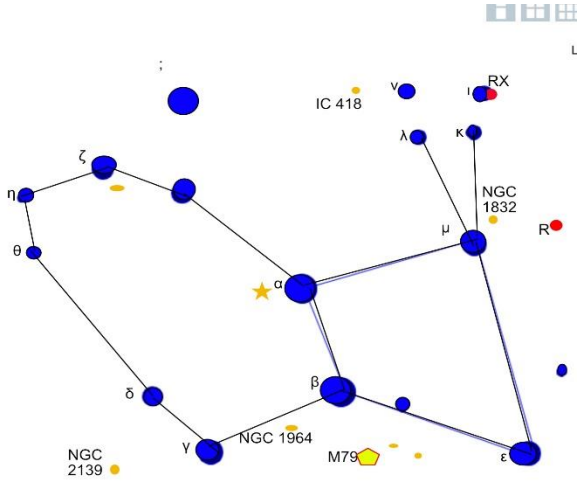
While Orion fights Taurus in an effort to reach Merope and the Pleiades, His dogs, the big guy and the pup are chasing a rabbit across the sky. The rabbit's name is Lepus, meaning the Hare, and I suppose he is running for the shore of Eridanus, probably to hide in the rushes that grow deep on the river's shore. Lepus is another ancient constellation, showing up on cuniform tablets, coins and seals from the Euphrates Valley, Chinese artwork, Indian astronomy and even into the oral legends of Australia and the islands nearby. The mythology put Lepus at odds with Corvus. The one rises, soon after the other sets. In addition, Lepus is hunted by Aquila, the Eagle. They are opposite and one rises as the other begins to set.

There are two red variable stars and one exciting multiple star in Lepus to find. The first is the famous Hind's Crimson Star, R Lepors. A red variable changing in magnitude from 5th to 12th.
"R" is found 3.5 degrees from Mu μ Leporis. The top right star of Orion's stool. RX Leporis is also 3.5 degree from Mu μ but almost due north and right next to Iota ι Leporis. RX is a pulsating variable of only about one-half a degree of magnitude from 5 to 5.5. Although not physically related to Iota they make a terrific Blue/Red image in your eyepiece, only one degree difference in magnitude. To add to the excitement, Iota is also a double star with a 10th magnitude companion.

https://www.sciencephoto.com/media/331140/view/variable-star-rx-lep

Another interesting star(s) is NGC 2017, but first observed by John Herschel as a sextuple star and given the designation h3780, though Burham lists only 4 companions. Its only 6' west of Alpha α leporis. ***https://commons.wikimedia.org/wiki/Category:NGC_2017#/media/File:NGC_2017_PanS.jpg***

Staying with the colorful theme for the present, shift your telescope 4 degrees (about 15' of Arc) west to NGC 418. It's pretty small, 12", but is 9th magnitude with a 10th magnitude central star and lots of nebulosity. Hubble did an incredibly colorful one back in 1999. You can find it on hubblesite.org.
https://www.nasa.gov/feature/goddard/2017/messier-79



https://ocastronomers.org/wp-content/uploads/2019/01/m079.jpg

On the other side of Lepus, south of Beta β,is another one of Messier's globulars. It's M79 and it's big and at 8th magnitude somewhat resolvable in your 8". NASA did an outstanding piece of darkroom work and came up with a really great image. Hubble's image of M79 is also on hubblesite.org. The image was done by a local member of the Orange County Astronomers and can be found at https://ocastronomers.org/wp-content/uploads/2019/01/m079.jpg

We have two "bright enough" galaxies near M79 that we want to see. NGC 1964 is 11th magnitude and NGC 2139 is 10th. All you will see with N2139 is its nucleus. It gets bright real fast as the arms fade. N1964 is a different animal. It's tilted sharply and at a steep position angle. Look it up at:
https://en.wikipedia.org/wiki/NGC_1964#/media/File:NGC_1964_-_Potw1739a.tif

Dark Skys
Dave Phelps

Binoculars: A Great First Telescope
by David Prosper (NASA/JPL)

Do you want to peer deeper into the night sky? Are you feeling the urge to buy a telescope? There are so many options for budding astronomers that choosing one can be overwhelming. A first telescope should be easy to use and provide good quality views while being affordable. As it turns out, those requirements make the first telescope of choice for many stargazers something unexpected: a good pair of binoculars!

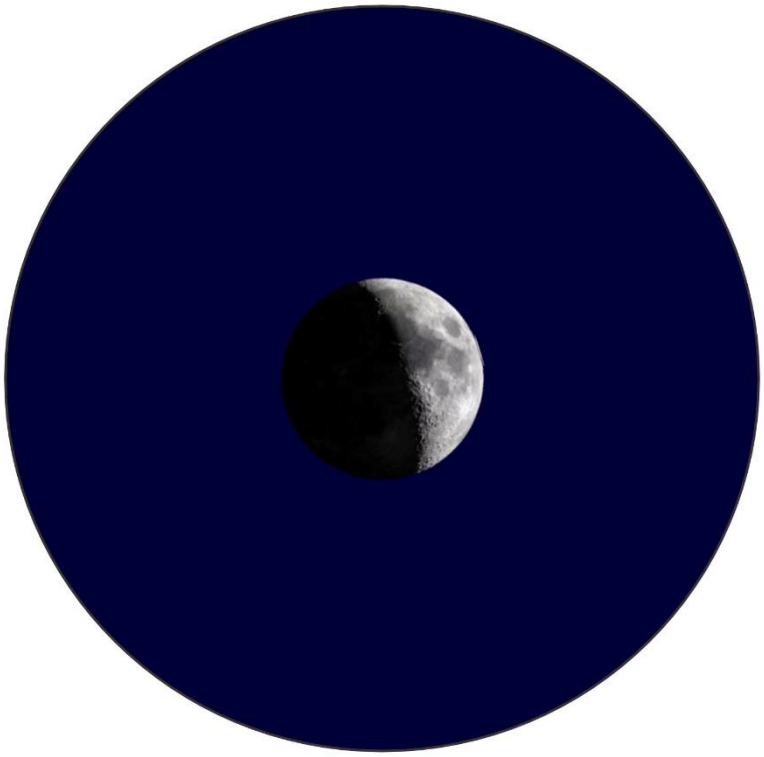
Binoculars are an excellent first instrument because they are generally easy to use and more versatile than most telescopes. Binoculars can be used for activities like stargazing and birdwatching, and work great in the field, at a star party, along the hiking trail, and anywhere else where you can see the sky. Binoculars also travel well, since they easily fit into carry-on luggage – a difficult feat for most telescopes! A good pair of binoculars, ranging in specifications from 7x35 to 10x50, will give you great views of the Moon, large open star clusters like the Pleiades (M45), and, from dark skies, larger bright galaxies like the Andromeda Galaxy (M31) and large nebulae like the Orion Nebula (M42). While you likely won't be able to see Saturn's rings, as you practice your observing skills you may be able to spot Jupiter's moons, along with some globular clusters and fainter nebulae from dark sites, too.

What do the numbers on those binocular specs actually mean? The first number is the magnification, while the second number is the size in millimeters (mm) of the lenses. So, a 7x35 pair of binoculars means that they will magnify 7 times using lenses 35 mm in diameter. It can be tempting to get the biggest binoculars you can find, but try not to get anything much more powerful than a 10x50 pair at first. Larger binoculars with more power often have narrower fields of vision and are heavier; while technically more powerful, they are also more difficult to hold steadily in your hands and "jiggle" quite a bit unless you buy much more expensive binoculars with image stabilization, or mount them to a tripod.

Would it surprise you that amazing views of some astronomical objects can be found not just from giant telescopes, but also from seemingly humble binoculars? Binoculars are able to show a much larger field of view of the sky compared to most telescopes. For example, most telescopes are unable to keep the entirety of the Pleiades or Andromeda Galaxy entirely inside the view of most eyepieces. Binoculars are also a great investment for more advanced observing, as later on they are useful for hunting down objects to then observe in more detail with a telescope.

If you are able to do so, real-world advice and experience is still the best for something you will be spending a lot of time with! Going to an in-person star party hosted by a local club is a great way to get familiar with telescopes and binoculars of all kinds – just ask permission before taking a closer look! You can find clubs and star parties near you on the Night Sky Network's Clubs & Events page at bit.ly/nsnclubsandevents, and inspire your binocular stargazing sessions with NASA's latest discoveries at nasa.gov.

The two most popular types of binocular designs are shown here: **roof-prism** binoculars (*left*) and **porro-prism** binoculars (*right*). Roof prisms tend to be more compact, lighter, and a bit more portable, while porro-prisms tend to be heavier but often offer wider views and greater magnification. What should you choose? Many birders and frequent fliers often choose roof-prism models for their portability. Many observers who prefer to observe fainter deep-sky objects or who use a tripod with their observing choose larger porro-prism designs. There is no right answer, so if you can, try out both designs and see which works better for you.



A pair of good binoculars can show craters on the Moon around 6 miles (10 km) across and larger. How large is that? It would take you about two hours to hike across a similar-sized crater on Earth. The “Can You See the Flag On the Moon?” handout showcases the levels of detail that different instruments can typically observe on the Moon, available at bit.ly/flagmoon. *Moon image courtesy Jay Tanner*

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