nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

A fool thinks himself to be wise,
but a wise man knows himself to be a fool.
William Shakespeare

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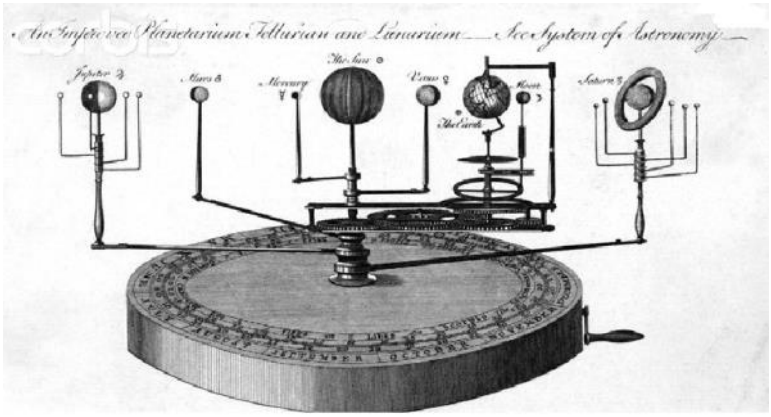
Volume 43 Number 9 ***nightwatch*** **September 2023**

Club Events Calendar

Sep 29 **In Person and Zoom General Meeting –Ken Elchert– "Rings, Resonances, and the Roche Limit"- 7:30pm**

Oct 14 **Star Party – Joshua Tree Night Sky Festival**
Oct 18 **Board Meeting 6:15 PM**
Oct 27 **General Meeting Time TBD**

Nov 8 **Board Meeting 6:15 PM**
Nov 9-12 **Nightfall www.NightfallStarParty.com**
Nov 17 **General Meeting - Time TBD**
Nov 18 **Star Party – GMARS**
Nov 29 **Board Meeting 6:15 PM**
----NOTE THE CHANGE----
Dec 2 **Holiday Party - Casa Jimenez - 6:00 PM**



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Vice President ..	Joe Hillberg	909-949-3650
Secretary	position is currently open	
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Membership / Publicity....	Gary Thompson .	909-935-5509
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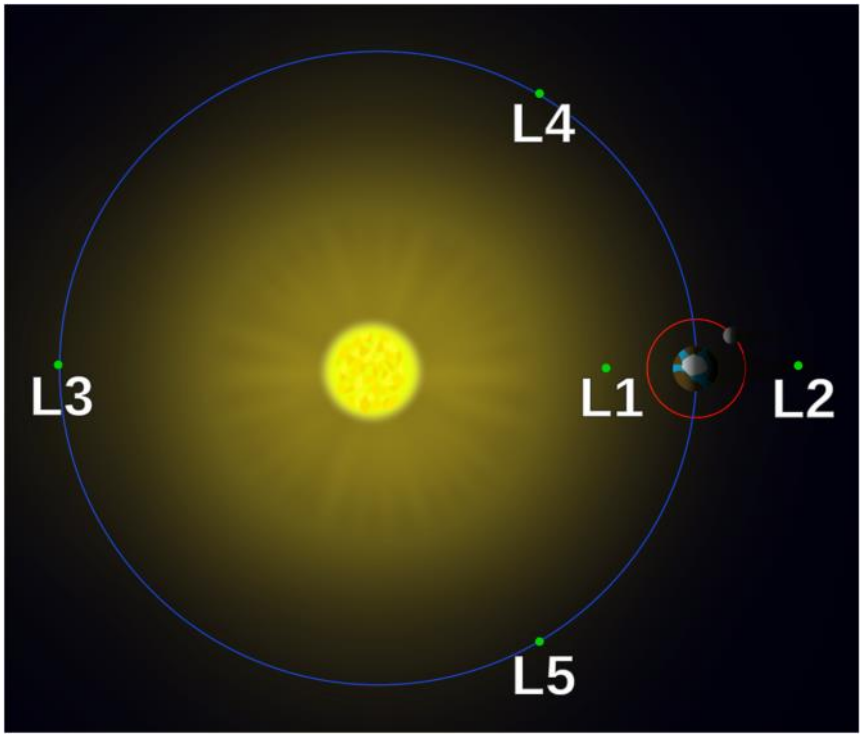
PVAA General Meeting 08-04-2023

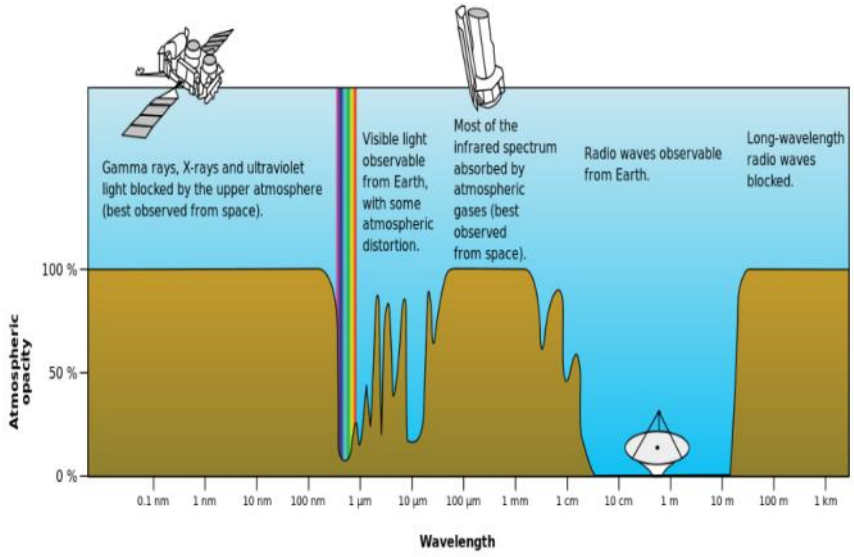
. The August PVAA meeting was our first meeting that we were able to meet in person at the Claremont Colleges since COVID. Tim Thompson was our speaker for the night on the topic of the James Webb Space Telescope (JWST). The first question he brought up was: Why do we need to spend the money, time, and effort to put a telescope in space since we have adaptive optics and larger telescopes on Earth? The answer is that the Earth's atmosphere absorbs many of the light waves, preventing us from seeing distant galaxies, due to velocity induced red shifting of the light waves. Another reason is that they are only observable at night, as the sun prevents us from seeing the heavens during daylight hours. The fact that the Earth itself is 'in the way' and blocks the view. That is why the JWST was launched to the L2 Lagrange point.

Being in space and needing extremely cold temperatures to 'see' the infrared spectrum, JWST has a unique sun/heat shield. This shield unfolded into 5 layers trapping the sun's radiation/ heat and having it dispersed away from the telescope's instruments. So far, the heat shield is working a little better than designed.

JWST is moving around the Sun in sync with the Earth, and it is also orbiting around the L2 point, perpendicular to Earth's orbit. Being at the L2 point area, it has already been hit by an asteroid. While the asteroid was bigger than expected, the damage was not extensive, and can be worked around.



Lagrange points (Not to scale) Wikipedia.



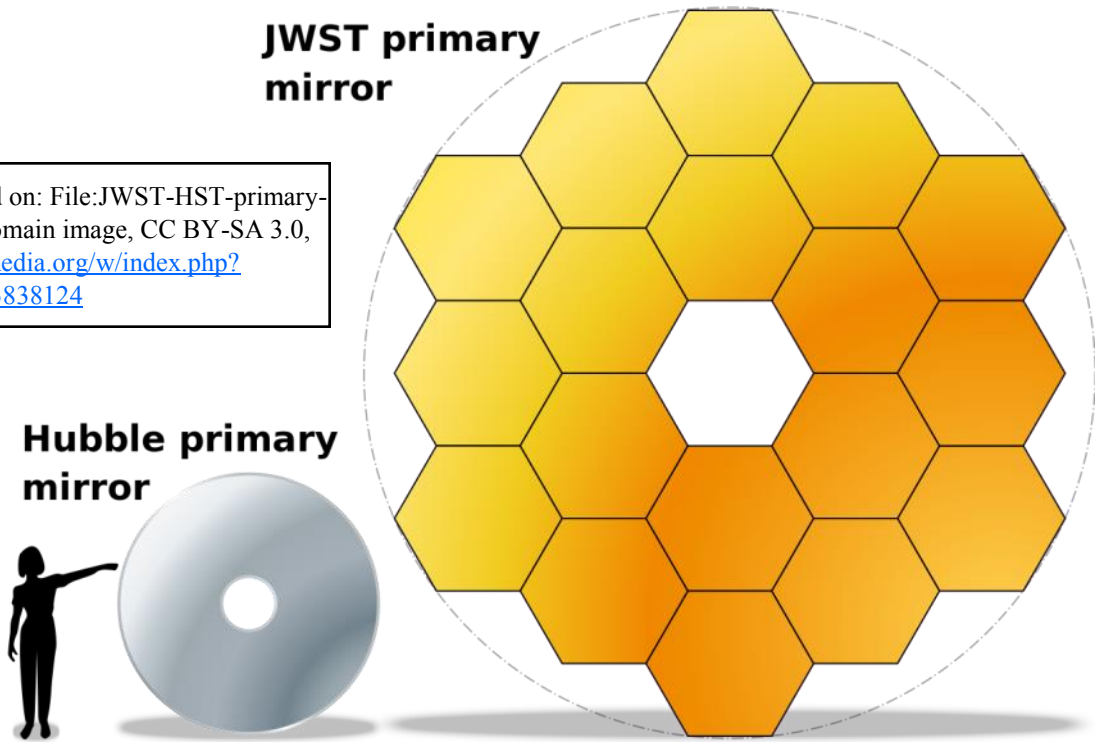
Wikipedia

The redshift-distance relationship discovered at Mount Wilson Observatory is the main reason that JWST was designed to see the redshifted spectrum. JWST has a Near-Infrared Camera (NIRCam), Near-Infrared Spectrometer (NIRSpec), Mid -Infrared Instrument (MIRI), and a Near-Infrared Imager and Slitless Spectrograph/Fine Guidance Sensor (NIRISS/FGS). Tim Thompson then talked about photometric vs spectroscopic redshifts, and then went into gravitational lensing that brings much more distant objects into view.

JWST is also able to directly image exoplanets – usually by blocking out most of the light from its home star. This takes some processing of the image to bring out the planet's image. Along with the image we can get spectrographic and other data on the planet that we weren't able to get before. JWST has observed an Earth-like planet that has methane and CO_2 in its atmosphere. Tim then showed a photo taken by JWST of Jupiter in the infrared, followed by Neptune and Uranus.

JWST is performing much better than expected. Engineers now believe that JWST has enough fuel to last 20 years. JWST is operated by STScI (Space Telescope Science Institute) the same entity that runs the Hubble Space Telescope and the Nancy Grace Roman Space Telescope. STScI is located at John Hopkins University in Baltimore, Maryland. STScI is primarily funded by NASA, ESA & CSA.

Gary Thompson



JWST image of Neptune and its rings.

Lynd's Bright Nebula and Iris Nebula

We spent the weekend before the August new moon at the Julian Starfest. While I don't have a good means to measure the darkness, Julian appears to be darker than our usual dark site. We had a great time there and met up with some friends we made last year, as well as meeting several new friends. As a bonus, Saturday night was the peak of the Perseid meteor shower. We got to see quite a few "streakers" and the reaction from all the people surrounding us made it seem like we were at a sports arena and just made the winning score! It was impressive.

While this is the August issue of my AstroImages, the first image was actually taken in July, over the nights of July 21, 22, and 23-25 from my backyard. And, since it's from the light-polluted skies I live under, it was shot in narrowband. LBN 147 (Lynd's Bright Nebula), or SH2-91, is in Cygnus near the double star Albireo. It reminds me of the Veil Nebula, also in Cygnus, because of the wispy nature of the gases. LBN 147 is the brightest part of a huge, extremely faint supernova remnant about 2,500 light years away, spanning an area of the sky measuring about 3° x 4°. At that distance, the leftovers from the

30,000-year-old explosion are scattered into a region of about 228 light years in diameter. The attached image is in the Hubble palette of SHO. The second image was taken at the Julian Starfest over the nights of August 11 and 12, with a second session at Oak Grove on the night of August 17. We had hoped to stay through the night of August 19, but Hurricane Hilary had other plans, so we headed for home with only one additional night of data. The target was the Iris Nebula, NGC 7023, which I last imaged way back in 2014 through my 8" SCT telescope. While back then I was pleased that I got some of the dust cloud, this effort is a significant improvement over the previous effort. This version is an LRGB image, in contrast to the previous version taken with a one-shot color camera. As hinted at, the Iris Nebula is formed by light from a bright, blue star reflecting off a very large dust cloud in Cepheus. Actually, the designation NGC 7023 refers to the cluster of stars in the reflection nebula, while LBN 487 refers to the reflection nebula itself. Several thick, dense regions of dust can also be seen in the image. The Iris is much closer than the previous image, lying about 1,300 to 1,400 light years away and spanning only about 6 light years across. Now for the details. The LBN 147 image represents the most integration time I've ever acquired on a single image, totaling 20 minutes less than 30 hours. Exposure time for all subframes was 10 minutes, with 59 S-II frames, 61 H-alpha frames, and 58 O-III frames taken in total. The light frames were calibrated with 20 darks, 21 flats, and 97 flat-dark frames.

Photos were taken with an automatic sequence using NINA (image capture software) in which a frame through each filter was taken and then the mount shifted slightly (dithered) to enable easy removal of hot pixels. Additionally, NINA monitored the focus and if it shifted by more than a specified amount, a command to refocus the system was issued. All the frames were processed in PixInsight. The initial SHO image was produced after stacking and then the stars were removed. The nebula and stars were processed separately in order to bring out the details in the nebula without the stars overpowering the image. So, keep that in mind when you look at the "pretty pictures". They are not accurate in terms of how bright the stars are relative to the nebula but are instead manipulated to highlight specific parts of the photo versus other parts.

Similarly, I spent quite a bit more time than usual on the Iris Nebula to be able to highlight the dust in the region. With less integration time, the dust would remain hidden in the background. In Julian, again using NINA, a sequence of 2 luminance frames and 1 frame each of R, G, and B was run before a dither command was issued. At Oak Grove, I adjusted the sequence to take 3 luminance frames for each R, G, and B frame. Total integration time was 21 hours, 42 minutes over three days. Luminance exposures (139 in total) were 3 minutes in length, while the color frames (59 red, 58 green, and 60 blue) were all 5 minutes in length. Light frames were calibrated with 21 dark, flat, and flat-dark frames. Processing was done completely in PixInsight. First the RGB image was produced and a simple screen stretch was applied. No other processing was done. The luminance stack was processed similar to the previous image in that first the stars and nebula were separated into two images. A simple arcsinh stretch was applied to the stars, just enough to allow them to shine through, but not so much as to overwhelm the nebula when recombined. The starless luminance frame was stretched more aggressively using the Generalized Hyperbolic Stretch process iteratively to slowly tease out the faint dust without blowing out the brighter areas. Once I was satisfied with the result, the stars were added back to the starless image before overlaying the luminance image with the RGB image. Saturation was slightly increased in the LRGB image and a small amount of sharpening was added to create the final result.

We won't be heading out to the dark site next month due to the start of college football season falling on the new moon weekend. Instead, I'll be shooting narrowband from the backyard again. I have a target in mind already, but I need to see if it clears the trees early enough in the evening. If not, I'll have to look for something else.

Until next month, clear skies!

Ron Ugolick

https://www.astrobin.com/users/ruccdu/

Another Look - September 2023

September 15 - New Moon. September 29 - Full Moon, Supermoon

Autumnal equinox occurs at 06:43 UTC on September 23. (2343hrs. 9/22/23 west coast time.)

The Harvest Moon is the full moon that occurs closest to the Autumnal equinox each year.

This full moon was known by early Native American tribes as the Corn Moon and the Harvest Moon.

Other Native American names are Autumn Moon, Rutting Moon and Mating Moon (Cree), Child Moon (Tlingit), Falling Leaves Moon (Ojibwe), Leaves Turning Moon (Anishinaabe),Moon of Brown Leaves (Lakota), Moon When the Rice is Laid Up to Dry (Dakota) and Yellow Leaf Moon (Assiniboine)

In French - Pleine Lune de Septembre, in German - Vollmond im September, in Spanish - Luna llena de Septiembre and in Greek - πανσέληνος Σεπτεμβρίου i.e Pansélinos Septembríou

Lunar close approach to Antares this month. An occultation will occur over the western pacific.

I have found no constellation with as much written imagery as Lyra. From Sappho and Pindar at some 500 or 600 BC up through Shakespeare, the Lyre was honored as magical and as the precursor of the stringed instrument, from the original tortoise shell with seven strings representing the Pleiades to our modern day Welsh and Irish Harps.

The Greeks seem to have confused the stories behind the harp, however, we may also be accused of telescoping history or maybe more literately historical myth.

As it begins, the Lyre was invented by Hermes who gifted to his half-brother Apollo. From there, the most famous of those associated with the Lyre is Orpheus, son of a Muse and a prince, or maybe Apollo. Orpheus was gifted the talent of music.

"Everything that heard him play,
Even the billows of the sea,
Hung their heads, and then lay by…"Shakespeare

So Orpheus;
...and when determined to have his wife released from Hades he:
" E'en to the dark dominions of the night
He took his way, through forests void of light,
And dared amid the trembling ghosts to sing.
And stood before the inexorable king.
The infernal troops like passing shadows glide,
And listening, crowd the sweet musician's side;
Men, matrons, children, and the unmarried maid,
r The mighty hero's more majestic shade,
And youth, on funeral piles before their parents laid.
E'en from tlie depths of hell the damn'd advance;
The infernal mansions, nodding, seem to dance;
The gaping three-mouth'd dog forgets to snarl;
The furies hearken, and their snakes uncurl;
Ixion, seems no more his pain to feel,
But leans attentive on his standing wheel.
All dangers past, at length the lonely bride
In safety goes, with her melodious guide." Virgil

Alas, he was only human, he erred and he failed

Orpheus married Eurydice, who depending on the legend, was frolicking with her maids at her wedding or running from a man who wished to do her harm; she stepped on or was bitten by a viper and died.
She went to Hades.

As it aged the Arabs called Lyra "the Swooping Eagle," to distinguish it from Aquila, which was regarded as "the Flying Eagle. The Persian also called it Harp, but later, as national boundaries solidified, we find that the Bohemians called it The Fiddle, Teutons Harapha, and the Anglo-Saxons Hearpe. Britons named it Arthur's Harp, the Egyptians Vulture, then came the Christians.

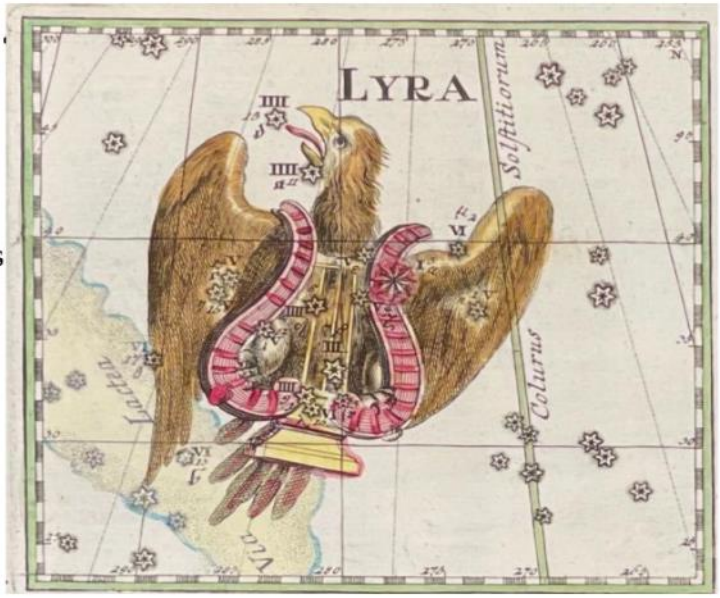
Also, Lyra is the "Stone Eagle of the Desert," which shows the bird with half-closed wings versus the outspread wings of Cygnus and the aforementioned Aquila.

The lyre had multicolored identities to go with its multicultural legacy. It was a Ram, a Mule, a tripod, a bowl and a scroll. Many cultures considered it Avian. Most commonly an Eagle or a Vulture as is shown on some globes. The bird reference is even found in Australia where to the aboriginal, Lyra was called Neilloan and represented a ground dwelling bird. Lyra was known as Urcuchillay by the Incas and was worshiped as an animal deity.

Returning to theinvention of the Lyre by Hermes, the story tells of him finding a dried tortoise shell on the shore of the sea, with its tendons stretched across. This allusion stayed with the Greeks and Arabs who referred to the constellation as Testudo; in Spanish Galapago orTesta.

The symbiosis of the Greek and the Arab is seldom seen better than in the constellation of the Lyre.

An alternate tale records Amphion, a son of Zeus and Antiope, Who built the walls of Thebes with the help of his twin brother Zethus. To move the heavy stone he started singing and playing the Lyre. The stones began to follow him, transported by his voice and the music of the Lyre.



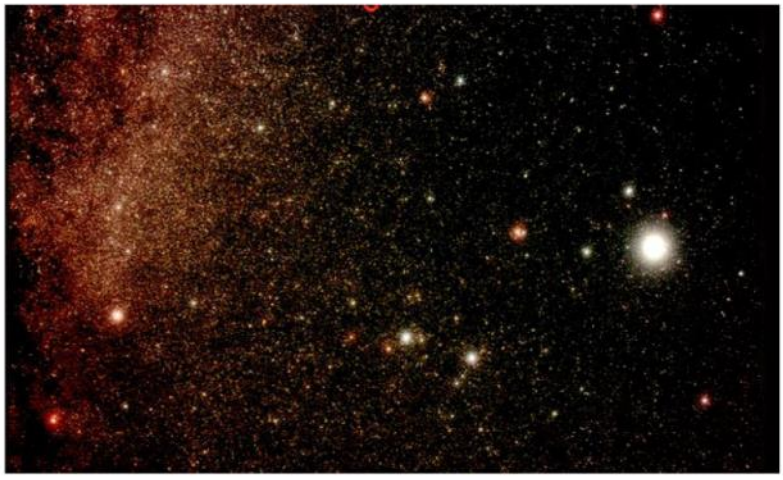
Four and five thousand years ago in the Euphrates valley, a goat and a dog where placed in the sky where Lyra and Hercules are now. These were almost certainly identified as special to the goddess Gula.

Mercurii philosophici firmamentum firmianum Corbinian Thomas

In its history, the asterism has been almost universally described as a bird or a musical instrument.

"For Orpheus' lute was strung with poet's sinews ;
Whose golden touch could soften steel and stone,
Made tigers tame, and huge leviathans
Forsake unsounded deeps to dance on sands."

"I saw with its celestial keys,
Its chords of air, its frets of fire,
The Samian's great iEolian lyre
Rising through all its sevenfold bars
From earth into the fixed stars"
The Occultation of Orion Longfellow

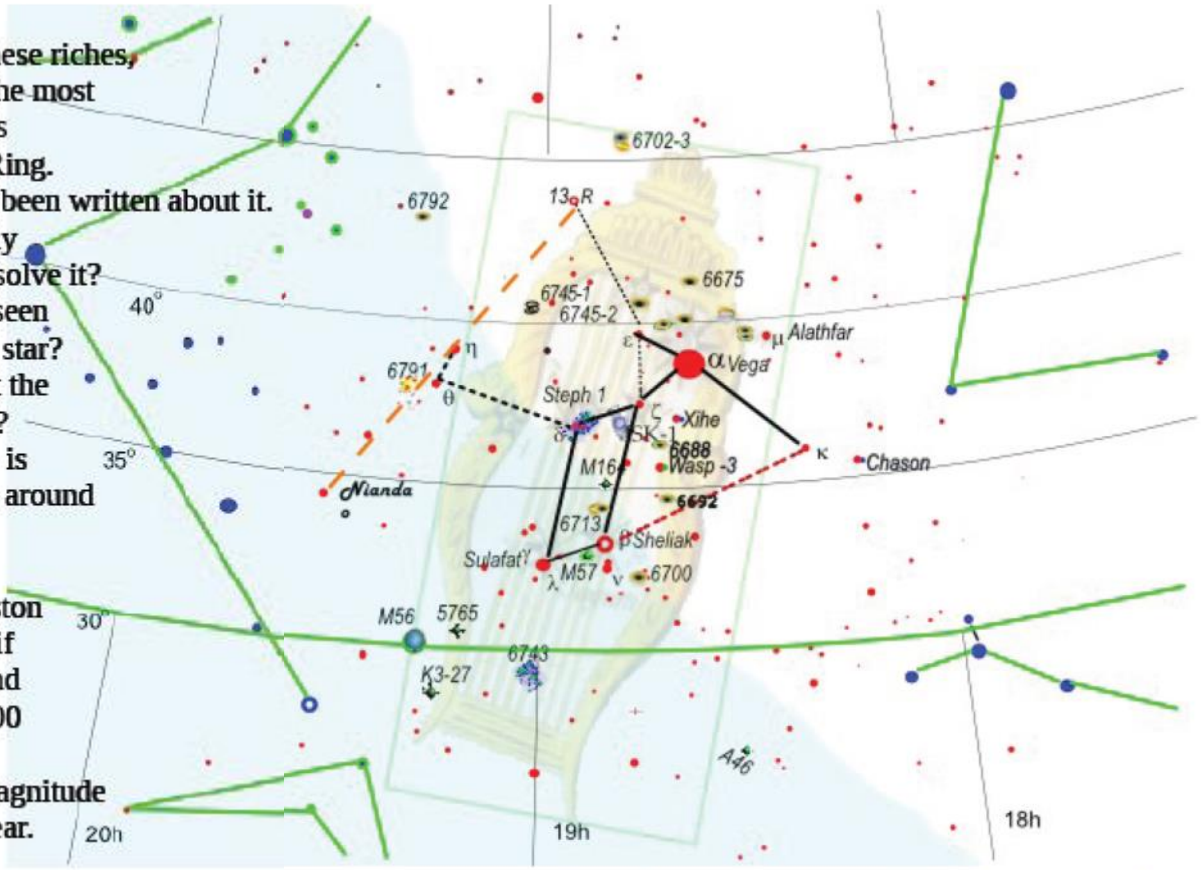


Simon Dawes flickr

The Chinese also have a rich relationship with Lyra. She has lovers, working girls, a bureau of standards and, as I drew on the chart, Niandao, a route the Emperor chose while moving between palaces. **(Ian Ridpath)**

As it is rich in poetry, so is Lyra rich in astronomy. There is, for the amateur, over a hundred variable and multiple star systems. Lyra is rich in galaxies, planetaries, open star clusters, extraterrestrial planets, a corner of the milky way *"The graceful form, amid the lucid stream Of the fair Milky Way"* and a globular cluster.

Of all of these riches, however, the most looked at is M57, the Ring. Plenty has been written about it. How crisply can you resolve it? Have you seen the central star? How about the outer shell? Then there is the region around the ring.



Scott Houston wondered if you can find NGC's 6700 and 6713, two 13th magnitude galaxies near. He also wrote of IC 1296 and if anyone had ever seen it visually. It's a 15th magnitude barred spiral in the same wide field view of your eyepiece. The image by Bruce and Gayelee Waddingtonshows it beautifully.

www.astrobin.com/full/yfu2o9/0/

Equally as difficult will be NGC 6745 a&b. A pair, or triple?, of interacting galaxies with a distinctive bird's head shape. It's small, though, good luck.

Up near the top of Lyra are NGC's 6702 and 6703. Elliptical and Lenticular, they look somewhat alike. N6703 is about a mag. brighter than its cousin at 11th. The eastern side of Lyra is also hunting ground for NGC's 6688 and 6692 interesting galaxies in their own right. I am equally interested in large, sparse

open clusters around Lyra. Steph 1, as opposed to Steph 2 in Scutum, is superimposed over delta δ Lyrae, a multiple star.

I have no information about Dr. Sofik Iskudarian, except that she is an astronomer at Byurakan Astrophysical Observatory in Armenia. She also has an open star cluster Isk 1, named after her near zeta, ζ. Its claim to fame is that its 110' in size. From the obscure to the sublime is N6791 over by theta, θ. 6791 is 10th magnitude and rather rich and a fairly good size. Two more open clusters are ASCC101and N6743, though somewhat sparse as are most OC's. Both clusters will be visible in your finder.

www.coldphotons.com/zen_astro/astro_images/M57_HaLRGB_Final.jpg

https://webda.physics.muni.cz/cgi-bin/ocl_page.cgi?dirname=ascc10

Lyra also has interesting individual stars and planets. Vega is a close double, not related, but the contrast between 1st and 10th magnitude is difficult. Epsilon ε, is the double-double. R lyrae and T lyrae are variable stars. T is a carbon star and very red. Beta β, named Sheliak, is one of the brighter stars in Lyra. It is a six star system. How many can you see?

https://ocastronomers.org/wp-content/uploads/2018/12/M56-OCA.jpg

Named stars with planets are Wasp 3 with one planet, Kepler 37-3 planets, K102 is interesting. It has 5? planets and two red dwarf companions. Can you imagine the sights you'd see standing on one of those planets? K138 is a 13th magnitude red dwarf with three or four planets and HD 173416 is named Xihe. Xihe, a sun goddess, is 6th magnitude and has one planet. Others are Hat-P-5 named Chason. Gliese 758 is a close 6th magnitude star with a "brown dwarf" companion. Gliese 747 is very red and 11th magnitude.

Historically named stars in Lyra are Vega α, relating to the swooping of an eagle. In modern Spain a vega is a large pasture or field. Aladfar η is a talon of that swooping eagle and Sulafat γ returns us to the shell of a tortoise.

https://www.flickr.com/search/?text=ngc 6743

We need not forget Lyra's lone globular, M56. You will need some glass to see it well. It is 9' across, but at 8th magnitude and quite loose and sparse, an "X", per Shapley-Sawyer, it will be a tough find in binoculars from your back yard.

There are a couple of planetary nebula in Lyra bright enough for us to see though none brighter than 13th magnitude. Close to M57, halfway to Vega is 13th magnitude Minkowski 1-64, a small cousin to its brighter neighbor. Then look for N6765, 13th magnitude and half a minute is size, the images show it to have an irregular shape. Kohoutek 3-27 is 15th magnitude and Abell 46 is 13th. Images of these object can be found on Astrobin.

Dark Skys

Dave Phelps

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!

Looking Beyond the Stars

Brian Kruse

Looking up in awe at the night sky, the stars and planets pop out as bright points against a dark background. All of the stars that we see are nearby, within our own Milky Way Galaxy. And while the amount of stars visible from a dark sky location seems immense, the actual number is measurable only in the thousands. But what lies between the stars and why can't we see it? Both the Hubble telescope and the James Webb Space Telescope (Webb) have revealed that what appears as a dark background, even in our backyard telescopes, is populated with as many galaxies as there are stars in the Milky Way.

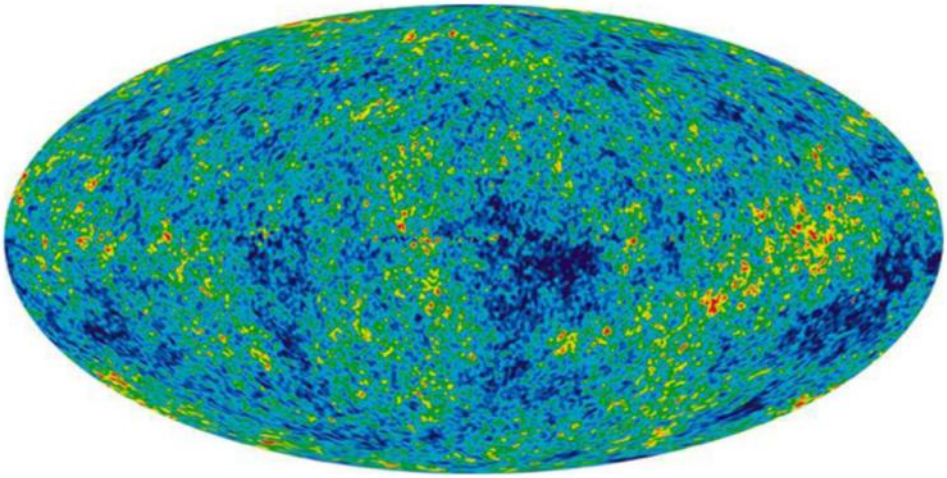
So, why is the night sky dark and not blazing with the light of all those distant galaxies? Much like looking into a dense forest where every line of sight has a tree, every direction we look in the sky has billions of stars with no vacant spots. Many philosophers and astronomers have considered this paradox. However, it has taken the name of Heinrich Wilhelm Olbers, an early 19th century German astronomer. Basically, Olbers Paradox asks why the night sky is dark if the Universe is infinitely old and static – there should be stars everywhere. The observable phenomenon of a dark sky leads us directly into the debate about the very nature of the Universe – is it eternal and static, or is it dynamic and evolving?

It was not until the 1960s with the discovery of the Cosmic Microwave Background that the debate was finally settled, though various lines of evidence for an evolving universe had built up over the previous half century. The equations of Einstein's General Theory of Relativity suggested a dynamic universe, not eternal and unchanging as previously thought. Edwin Hubble used the cosmic distance ladder discovered by Henrietta Swan Leavitt to show that distant galaxies are moving away from us – and the greater the distance, the faster they're moving away. Along with other evidence, this lead to the recognition of an evolving Universe.

The paradox has since been resolved, now that we understand that the Universe has a finite age and size, with the speed of light having a definite value. Here's what's happening – due to the expansion of the Universe, the light from the oldest, most distant galaxies is shifted towards the longer wavelengths of the electromagnetic spectrum. So the farther an object is from us, the redder it appears. The Webb telescope is designed to detect light from distant objects in infrared light, beyond the visible spectrum. Other telescopes detect light at still longer wavelengths, where it is stretched into the radio and microwave portions of the spectrum. The farther back we look, the more things are shifted out of the visible, past the infrared, and all the way into the microwave wavelengths. If our eyes could see microwaves, we would behold a sky blazing with the light of the hot, young Universe – the Cosmic Microwave Background.

The next time you look up at the stars at night, turn your attention to the darkness between the stars, and ponder how you are seeing the result of a dynamic, evolving Universe.

NASA's James Webb Space Telescope has produced the deepest and sharpest infrared image of the distant universe to date. Known as Webb's First Deep Field, this image of galaxy cluster SMACS 0723 is overflowing with detail. This slice of the vast universe is approximately the size of a grain of sand held at arm's length by someone on the ground. (Image Credit: NASA, ESA, CSA, STScI) https://bit.ly/webbdeep



The oldest light in the universe, called the cosmic microwave background, as observed by the Planck space telescope is shown in the oval sky map. An artist's concept of Planck is next to the map. The cosmic microwave background was imprinted on the sky when the universe was just 380,000 years old. It shows tiny temperature fluctuations that correspond to regions of slightly different densities, representing the seeds of all future structure: the stars and galaxies of today. (Image credit: ESA and the Planck Collaboration - D. Ducros) https://go.nasa.gov/3qC4G5q

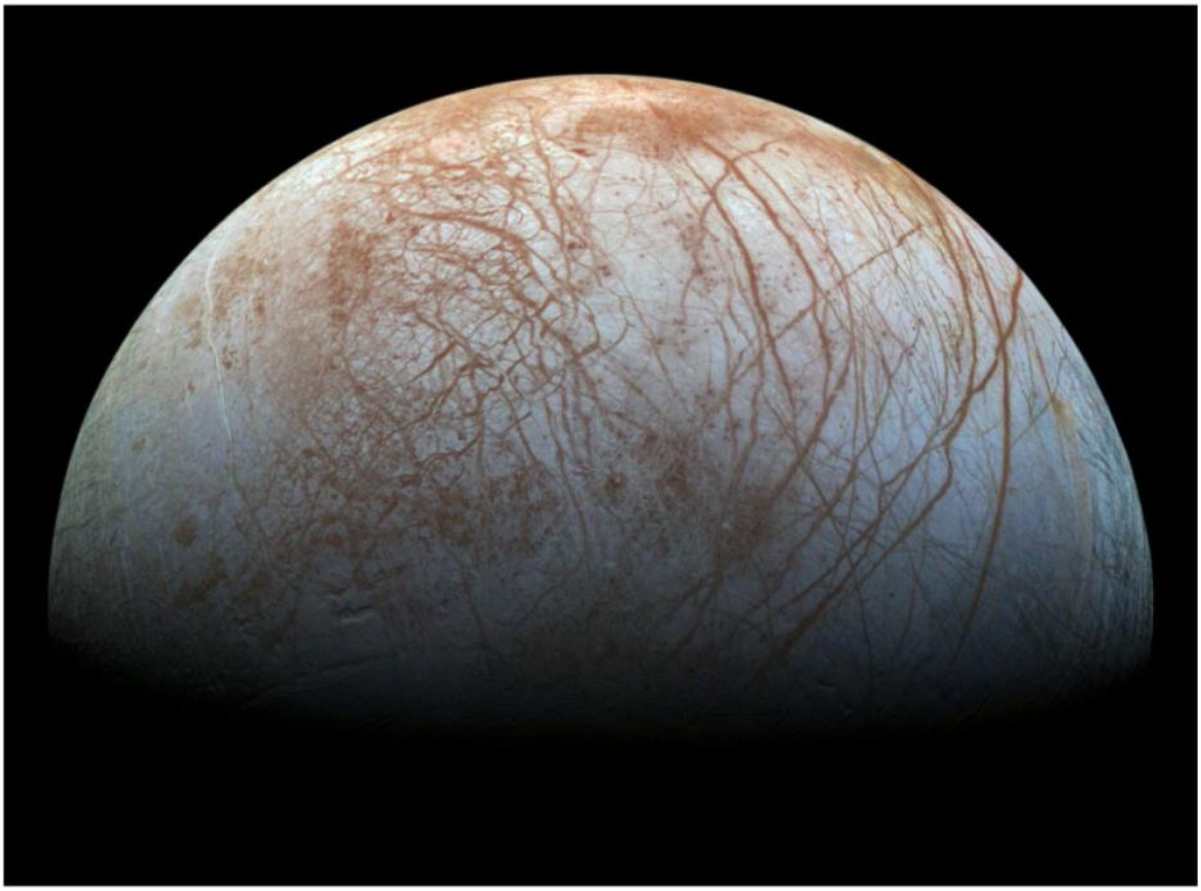
NASA Night Sky Notes October 2023

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!

From Galileo to Clipper, Exploring Jupiter's Moons

By Vivian White

"…We, too, are made of wonders, of great
and ordinary loves, of small invisible worlds,
of a need to call out through the dark."
From *In Praise of Mystery: A Poem for Europa* by Ada Limon



As autumn begins, if you're up late, you may notice a bright point of light rising in the east. Look a bit closer, with a pair of binoculars, and you'll notice it's not a star at all. While stars look point-like no matter how big your backyard telescope, this light appears as a circle under closer examination. Even more curious, you will likely see a line of smaller dots on one or both sides. Congratulations! You've rediscovered the king of the planets - majestic Jupiter - and its four largest moons.

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Ori. * ○ * * Occ.

cidentalior altera min: 10. erant præcisè in eadem recta, & magnitudinis æqualis.

Die quarta hora ſecunda circa Iouem quatuor ſtabant Stellæ, orientales duæ, ac duæ occidentales in

Ori. * * ○ * * Occ.

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Ori. ** ○ * * Occ.

ab orientali viciniori aberat min. 2. ab occidentali verò ſequente min. 4. hæc verò ab occidentaliori diſtabat min. 3. erantque æquales omnes, & in eadem recta ſecundum Eclypticam extenſa.

Die quinta Cœlum fuit nubiloſum.

Die ſexta duæ ſolummodo apparuerunt Stellæ me-

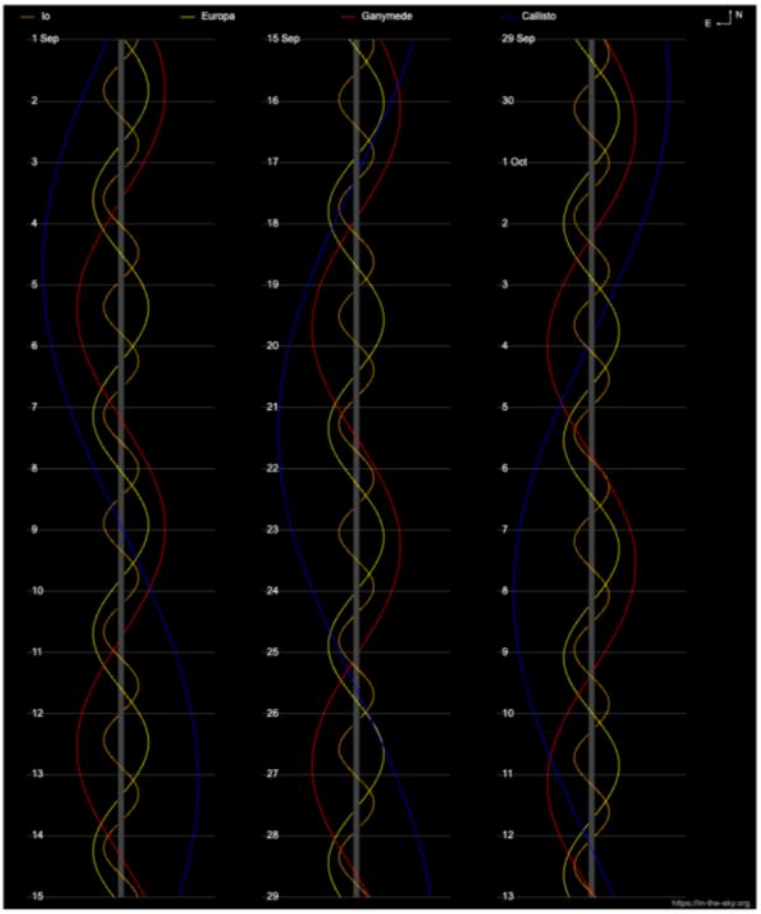
Ori. * ○ * Occ.

dium

Galileo's drawings of Jupiter and its Medicean Stars from Sidereus Nuncius. Image courtesy of the History of Science Collections, University of Oklahoma Libraries.

Galileo famously chronicled the four moving dots near Jupiter and surmised that they were orbiting the distant world. While Jupiter has well over 80 discovered moons as of September 2023, these brightest four are called the "Galilean Moons" - Io, Europa, Ganymede, and Callisto. (Great mnemonics exist to remember these in order of distance from Jupiter, such as "I Eat Green Caterpillars") You can follow these like Galileo did, using stargazing apps or the handy image below. A favorite beginning observing challenge is to track the movement of the Galilean Moons over the course of many nights. Even within a few hours, you will notice them moving in relation to Jupiter, just as Galileo did.

Fast forward 414 years, and NASA will be sending a robotic mission to investigate the surface of one of these distant worlds. The Europa Clipper Mission is launching to the cold, icy moon in 2024, to begin orbiting in 2030. With its salty oceans covered by ice, Europa was chosen as an excellent location to continue the search for life outside of Earth. Clipper will be the largest spacecraft ever sent to another planet, designed to withstand Jupiter's punishing radiation. Once it arrives at Jupiter in 2030, NASA plans to do about 50 flybys of Europa, mapping almost the entire surface of this watery world.



The position of the Galilean Moons of Jupiter in October 2023: https://in-the-sky.org/jupiter.php

What was once only dreamed of in the small telescope of Galileo, or in great works of fiction, NASA is turning our wildest imagination into reality. One of the celebrated quotes from the classic 2010: Odyssey Two warns, "All these worlds are yours, except Europa. Attempt no landing there." Science fiction fans can feel relieved knowing that writer Arthur C. Clarke gave his blessing for the Europa Clipper mission.

Join the Europa Message in a Bottle Campaign to send your name with the spacecraft, hear the rest of the poem by the US Poet Laureate, and learn more about the wonders of space travel with the Clipper Mission: https://europa.nasa.gov/participate

Watch a wonderful Clipper webinar with Dr. Cynthia Phillips, planetary geologist with the mission: https://www.youtube.com/live/RnnLJBLRBCA?feature=shared&t=269