



Newsletter of the Pomona Valley Amateur Astronomers

High up in the sky, over Barren Lands and Arctic Ocean,
the Northern lights reel, twist and swirl,
in their eternal dance of madness.

Captain Thierry Mallet



Volume 43 Number 3

nightwatch

March 2023

Club Events Calendar

Mar 10 Virtual General Meeting 7:30 PM
Matt Wedel -
“The Tanis Site and the Day the Dinosaurs Died”

Mar 25 Star Party – GMARS
Mar 29 Board Meeting 6:15 PM

Apr 7 Virtual General Meeting 7:30 PM
Apr 22 Star Party–GMARS
Apr 26 Board Meeting 6:15 PM

May 5 Virtual General Meeting 7:30 PM
May 20 Star Party – GMARS
May 24 Board Meeting 6:15 PM

Jun 2 Virtual General Meeting 7:30 PM
Jun 17 Star Party – GMARS
Jun 28 Board Meeting 6:15 PM

July 7 Virtual General Meeting 7:30 PM
July 15 Star Party – GMARS
July 26 Board Meeting 6:15 PM

Aug 4 Virtual General Meeting 7:30 PM
Aug 19 Star Party – GMARS

Sep 16 Star Party – GMARS
Sept 20 Board Meeting
Sept 29 Virtual General Meeting 7:30 PM

Oct 14 Star Party – Joshua Tree Night Sky Festival
Oct 18 Board Meeting 6:15 PM
Oct 27 Virtual General Meeting 7:30 PM

Nov 8 Board Meeting 6:15 PM
Nov 17 Virtual General Meeting 7:30 PM
Nov 18 Star Party – GMARS
Nov 29 Board Meeting 6:15 PM

Dec 9 Holiday Party

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Ron Hoekwater (2023)..... 909-706-7453
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Outreach Jeff Schroeder 909-758-1840
Programs Ron Hoekwater 909-391-1943

PVAA General Meeting 02/03/23

We had three speakers for our February meeting. Mike Magras, a member of the Tucson Amateur Astronomy Association, was the first speaker of the night. His topic was the Comet ZTF that was visible in the night sky. The ZTF stands for the Zwicky Transient Facility observatory at Mount Palomar that discovered the comet. You can check out their web site:

<https://www.ztf.caltech.edu/ztf-palomar.html> This is a survey camera/telescope that takes 47 square degree pictures. That

allows the observatory to cover the entire northern hemisphere sky in three nights. It then begins again while computers compare the previous photographs to see if anything has changed. There are 120 survey telescopes around the world. Mike then showed us a 1-second picture of the comet he took using his cell phone and a picture using his Canon DSL camera with a 135mm lens, followed by a great shot using his 14-inch Celestron Richey-Chretien telescope.



Zwicky Transient Facility 48-inch Schmidt-type robotic telescope



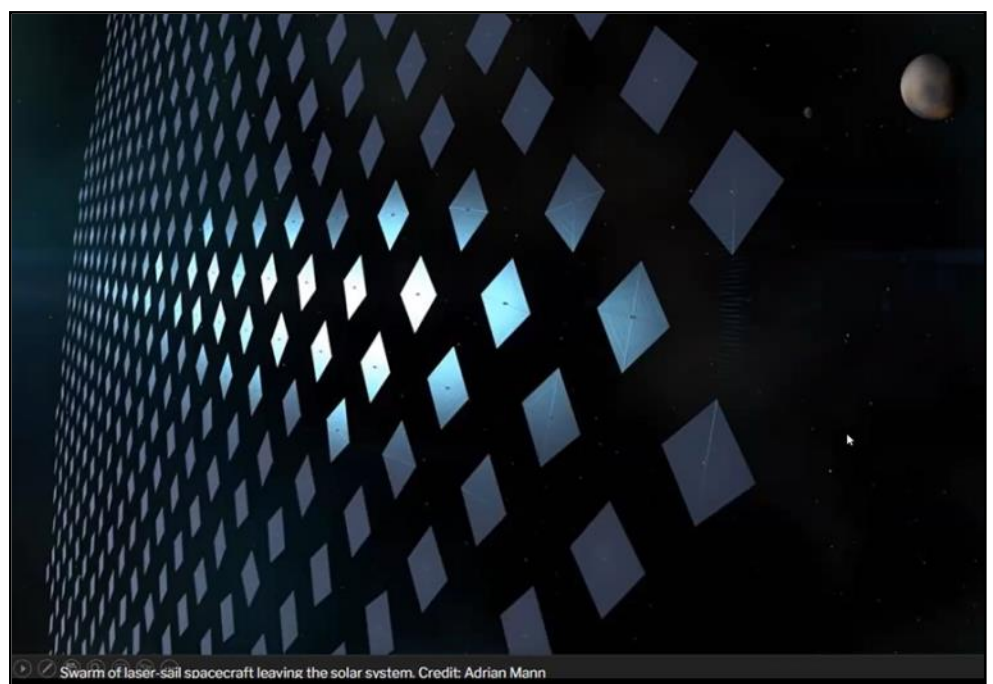
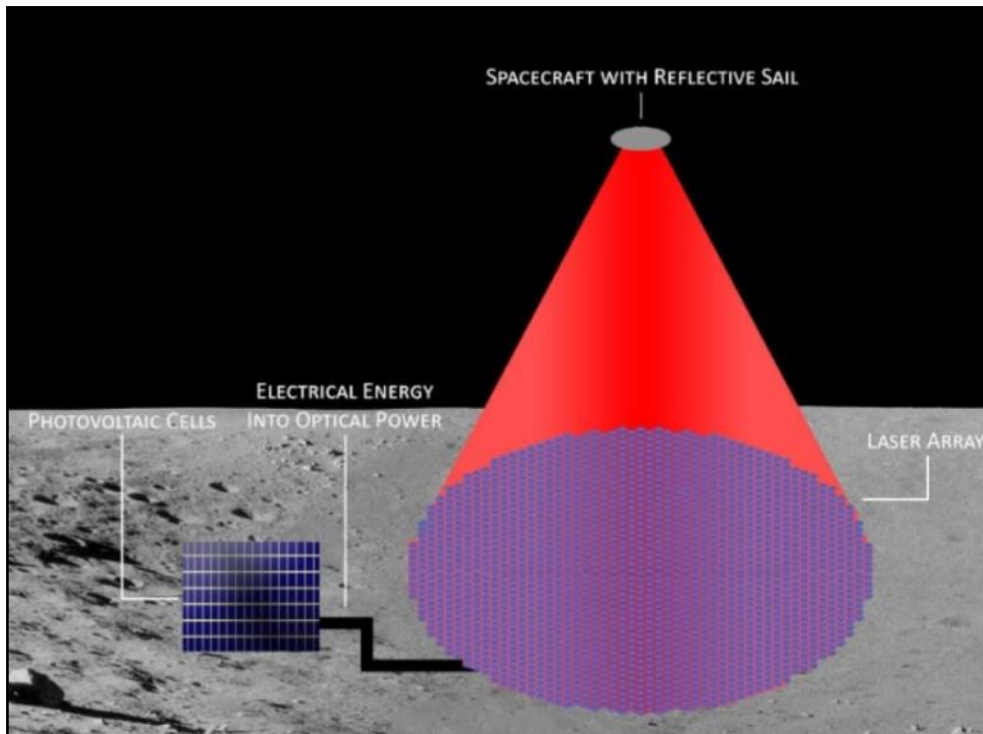
Photo by Michael Magras – 14-inch Celestron using 390 Hyperstar camera: Nine 8-second photos stacked (72 seconds total.)

Our own Steve Sittig was the next speaker of the night. The title of his presentation was 'Directed Energy for Space Propulsion – Lasers and Sails for interplanetary and Interstellar travel.' Photons are energy and carry momentum, despite being massless. University of California – Santa Barbara has been doing leading-edge research on lasers to propel space probes. There are two basic strategies: Photon pressure, and reaction mass: on-board lasers either shooting out electrons (ion-propulsion) or on-board lasers heating up a propellant like hydrogen, and it being expelled out the back. Photon momentum can get up to 26% of the speed of light. The DE-STAR (Directed Energy System for Targeting of Asteroids and ExploRation)

program at UCSB is being developed by 100 students and professors. A wafer-scale spacecraft with a 1-meter sail could reach Mars in 30 minutes, pass Voyager 1 in less than 3 days, and reach Alpha Centauri in about 20 years.

Method two – Indirect Drive mass ejection would be good for the solar system, not for interstellar travel. Earth to Mars in 45 days. Both these methods are still on the drawing board, with no full-scale hardware being built for a trial. The Moon is the best place to put the lasers, and deceleration is still a problem. For more information go to:

<https://www.nextbigfuture.com/2020/05/latest-progress-towards-laser-pushed-solar-sails.html>

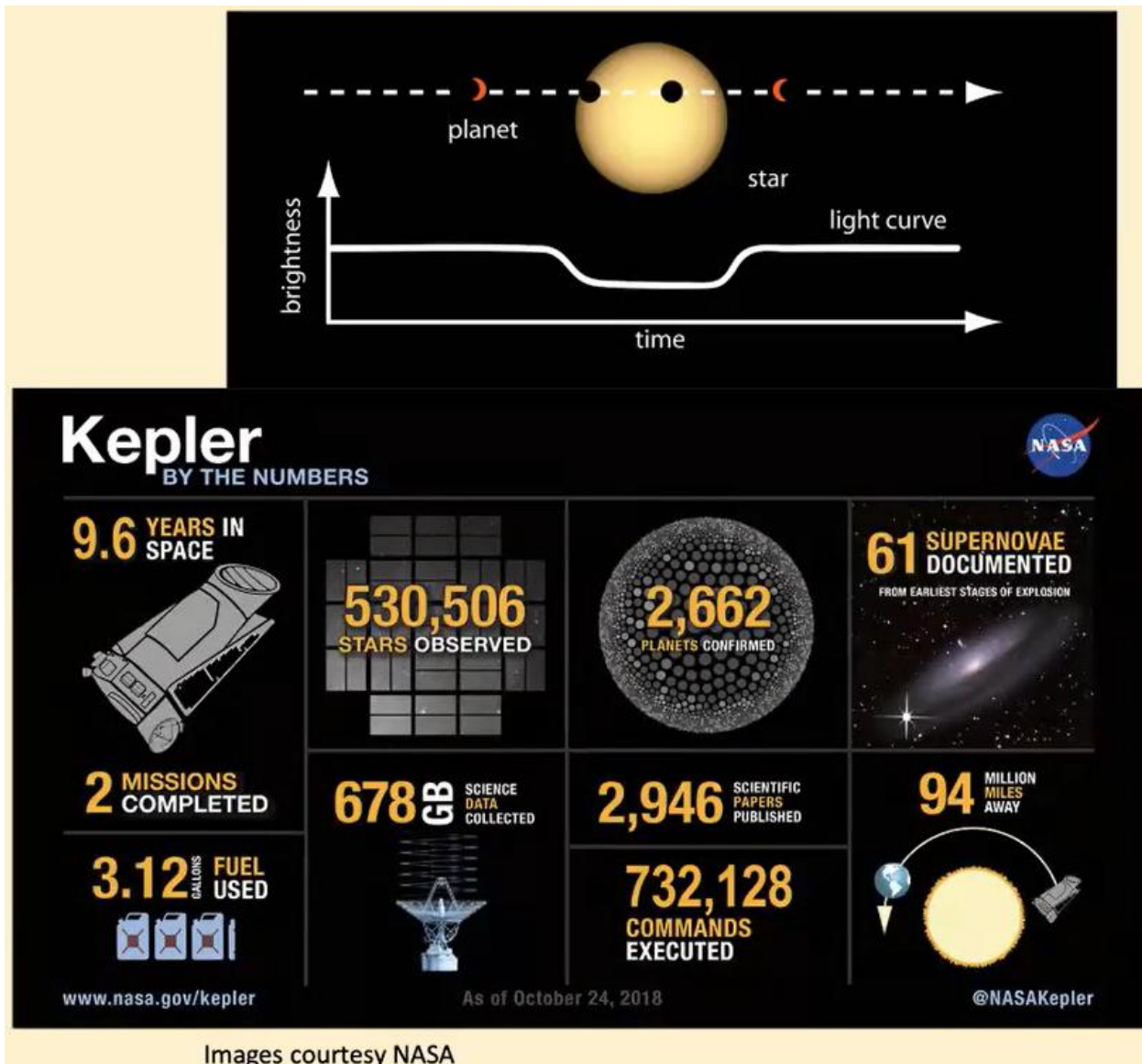


Our final speaker of the night was by member Dave Kary – Professor of Astronomy at Citrus College. His topic for the night was ‘The Strange Case of Kepler 1658b: A Doomed Planet.’ The Kepler spacecraft was launched in 2009 to search for exoplanets using the transit method. (Looking for dips in the stars’ brightness as the planet(s) pass in front of their stars,) Kepler had a constant view of 15 square degrees, viewing half a million stars. The easiest planets to find using this method were “hot Jupiters”, giant planets close to their stars. NASA had to have stringent criteria to remove false positives. Case in point was the first new exoplanet discovered by Kepler: KOI (Kepler Object of Interest)-4.01 (2010) Initial data suggested a Neptune-sized planet with an orbit of 3.8 days. There was a secondary eclipse seen when the planet passed behind the star – the planet should not be so bright as to cause the dimming of the light. It was listed as either a FP (False Positive) or PC (Planet Candidate). It was never considered confirmed as a planet during the Kepler

mission. Scientists took another look at the system and discovered that the star is having stellar vibrations as it is running out of fuel and becoming a giant. This means the star was bigger than they originally thought, so the planet had to be bigger – Jupiter sized, and yes it could cause a secondary eclipse. The system was then named Kepler 1658, so the planet is Kepler 1658b. Looking at the data – Kepler 1658b orbits faster than the star spins, so the planet is spinning into the star. This is heating up the planet, making it glow. WASP 12b is the only other planet known to do this. This planet is a possible “carbon planet” due to its unusually dark surface. Our solar system will also become a sub-giant and then a giant in a few billion years. You can get more information at:

https://www.nasa.gov/mission_pages/kepler/main/index.html

Gary Thompson



Images courtesy NASA

Another Look - March 2023

New Moon on March 21, Full Moon on March 7

Named the Worm Moon by southern Native American tribes and the Sap Moon by northern tribes.

Pueblo tribes called it the "Moon when the leaves break forth"

Importantly if the full moon occurs before the spring equinox, it is called the Lenten moon

Other names include chaste moon, death moon, crust moon, crow moon and warming moon

First point of Aries, i.e, Vernal Equinox is March 20, 2023 at 1424 hrs

Daylight saving begins March 12, 2023

*Raged with storms, wave and shingle were shackled
in ice until another year appeared in the yard as it does
to this day, the seasons constant, the wonder of light
coming over us. Then winter was gone, spring comes,
earth's lap grew lovely, longing woke in the cooped-up
exile for a voyage home— Beowulf*

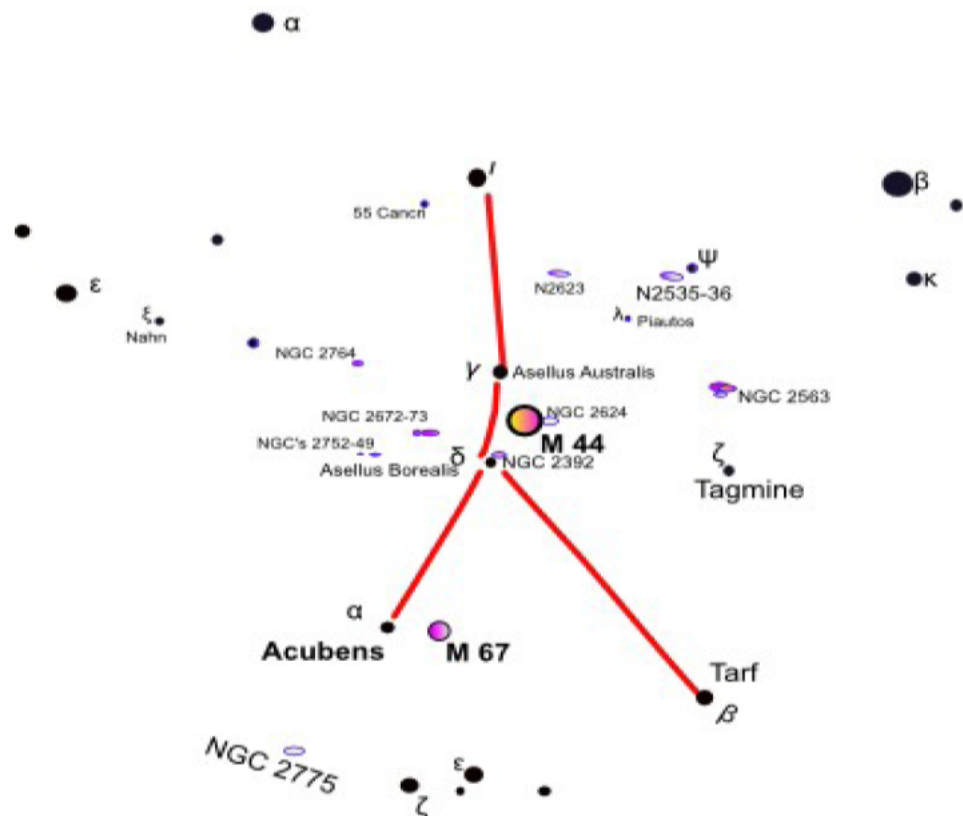
Cancer is part of that blank slate the ancients saw when they looked up between the twins, the bear and the lion. In China Cancer and M44 were known, as the "Exhalation of Piled-up Corpses," the source of mischief and blindness. The Hindus called it Flower. The Arabs stretched Leo out as far as Castor and Pollux and called Cancer the muzzle of the Lion.

A blank canvas ready to be brushed with their imagination, Cancer was know well before the Greeks and Romans. In the land of the two rivers, the Babylonians, Assyrians and before them the Chaldaeans identified the area as a Tortoise and also a Crab. As early as 4000BC and perhaps even earlier, the Egyptians placed a Scarab in the sky, an emblem of immortality and from the Chaldaeans to the Greeks is was a gateway through which souls descended to rest in Man and Woman. The Crab eventually replaced the Beetle. From long ago this portion of the sky was significant because the Sun's apparent motion begins its retrograde and its oblique move downward.

*"The nebula called
Praesepe, which is not
one star, only, but a
mass of more than forty
small stars. I have
noticed thirty stars
besides the Aselli."
Galileo*

So, what are the Aselli?

The Greeks placed two donkeys, one above and one below the little mist or cloud we now know as the more of less recent Latin name Praesepe. These two stars are Asellus Borealius and Asellus Australius, Delta δ and Gamma γ Cancri. We now identify over one hundred stars brighter than 6.5 and only



one, Tarf the end, Beta β Cancri as bright as 3rd magnitude. Cancer contains 10 named stars. Acubens from the arabic claws, Asellus Australius who holds the record for the longest name, "Arkushanangarushashutu," derived from ancient Babylonian language, which translates to "the southeast star in the Crab." Next Asellus Borealius, Copernicus named after the astronomer Nicolaus Copernicus, Meleph the stall, Nahn the nose (Persian), Piautos bright fire (Chinese), Tarf the end, and Tegmine-zeta the cover. Gakyid and Copernicus are recent names, Copernicus obvious and Gakyid from the nation of Bhutan meaning Happiness. Of interest Bhutan's official name is Druk Yul, Land of the Thunder Dragon.

The most ancient scientific observation of Jupiter that is known to us was noted by Ptolemy as having occurred eighty-three years after the death of Alexander the Great, when Jupiter happened to pass over the Praesepe. This was in 240 B.C.

As early as several century's BC, the invisibility of M44 has been considered an omen of coming rain. I will let the poets speak for themselves of the one thing they ascribed to Cancer, the weather.

From Aratos, a third century BC Greek poet who wrote the Phenomena and the Prognostica:

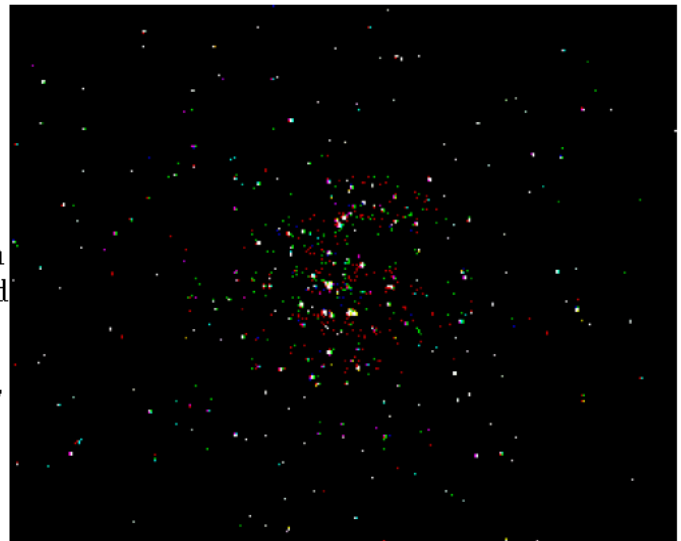
And watch the Manger like a little mist.
 Far north, in Cancer's territory, it floats,
 Its confines are two faintly glimmering stars,
 One on the north, the other on the south,
 These are two asses that the Manger parts,
 Which suddenly, when all the sky is clear,
 Sometimes quite vanishes, and the two stars
 Seem closer to have moved their sundered orbs.
 No feeble tempest then will soak the leas.
 A murky Manger with both stars
 Unaltered, is a sign of rain.
 If while the Northern Ass is dimmed
 By vaporous shroud, he of the south gleams radiant,
 Expect a south wind. Vapour and radiance
 Exchanging stars, harbinger Boreas.

Pliny wrote: "If Praesepe is not visible in a clear sky it is a presage of a violent storm."

Plenty has been said already about M44. Ptolemy called it the nebulous mass in the breast of Cancer and its presage to storms. Scientifically its not that old but oddly enough 60% of its stars are red dwarfs. It is beautiful to look at.

<https://ocastronomers.org/wp-content/uploads/2019/01/m044.jpg>

The other open cluster, M67, is a little further down near Acubens α . M44 is half a billions years old and M67 is 5 billion years old. M44 has a thousand stars, M67 one hundred. Most of its stars are main sequence like the sun but has a few red giants. M67 is also beautiful to look at.



Caldwell 48, NGC 2775 is a large, 10th magnitude galaxy low in the constellation near the head of Hydra. It is rather odd looking. You will see a bright nucleus and, if you have the resolution, tightly knit spiral arms.



Messier 67, image: [Sloan Digital Sky Survey](#)

Tegmine – ζ Cancri (Zeta Cancri) is the only star in Cancer that Camille Flammarion chose to include in his book “Popular Astronomy” first printed in 1888. As Flammarion writes:

A triple star more easy to observe is ζ of Cancer, composed of three orbs of fifth magnitude, at a distance of 1" and 5"; the first two revolve round their common center of gravity in fifty-nine years, the third takes over three hundred years.

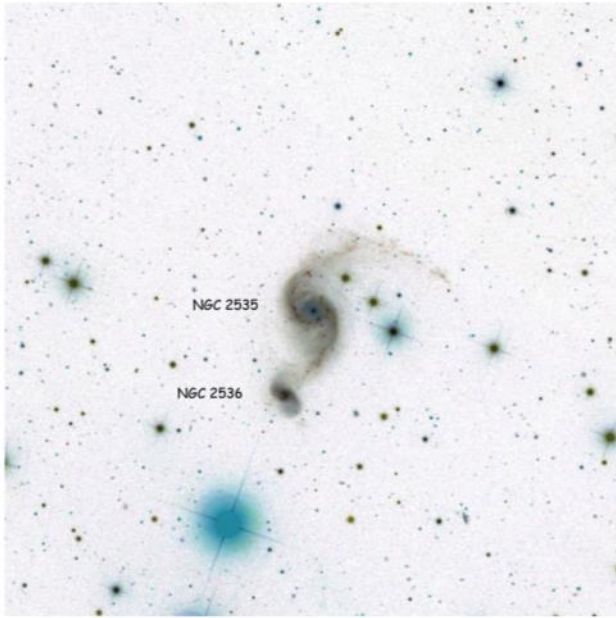
CAMILLE FLAMMARION "POPULAR ASTRONOMY" OBSERVATORY OF JUVISY, November, 1903.

Not surprisingly, there has been new discoveries in the last few hundred years. A fourth star, a red dwarf, of 10th magnitude is in orbit with C, separated by only 0.3".

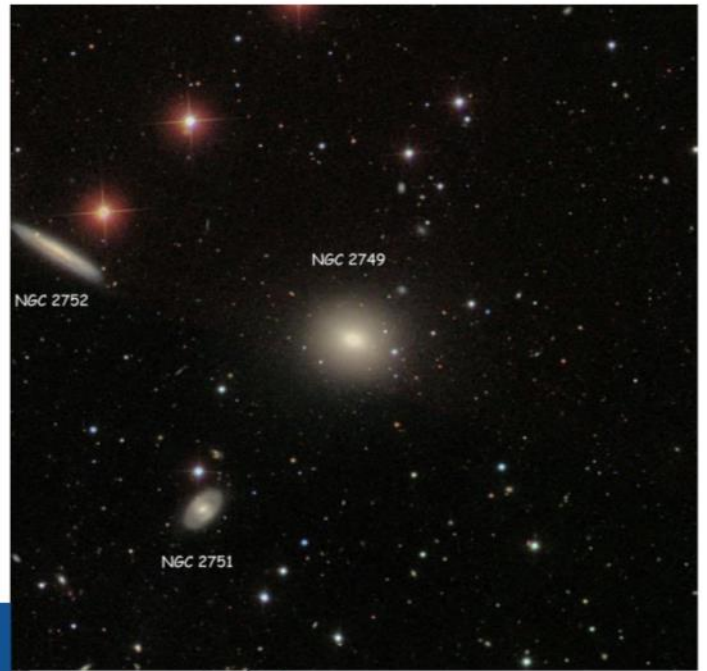
Located near the southern end of Cancer and just below M67 is Sharpless 2-290, also known as Abell 31. This is a large faint planetary that is a challenge to all. I estimate its size as 15' and can't figure out a magnitude because it can't be seen unfiltered. The astrophotographers are using OIII and H α filters. <http://annesastronomynews.com/photo-gallery-ii/nebulae-clouds/abell-31-by-adam-block/>

There are varying estimates of magnitude for the double galaxies NGC 2535 and NGC 2536, but the NGC gives magnitude of 12 and 14. The object is an extended pair of interacting galaxies, 2 to 3 arcmins across so likely visible to some extent in our backyard scopes.





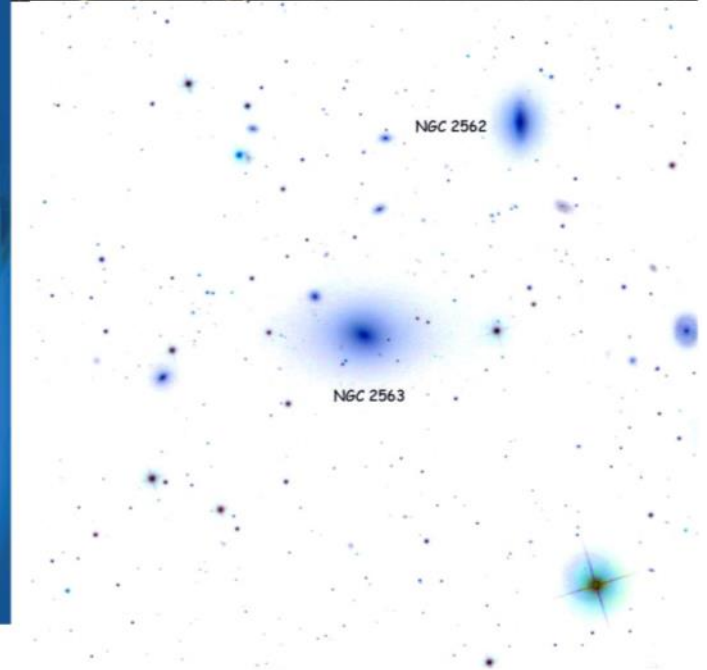
NGC 2749, 2751 and 2752 are three close by galaxies of 11, 13 and 14th magnitude and three different visual classifications: Elliptical, Edge on spiral and Tilted spiral. These are real faint and fuzzies. *Galaxy Images copied from the New General Catalog.*

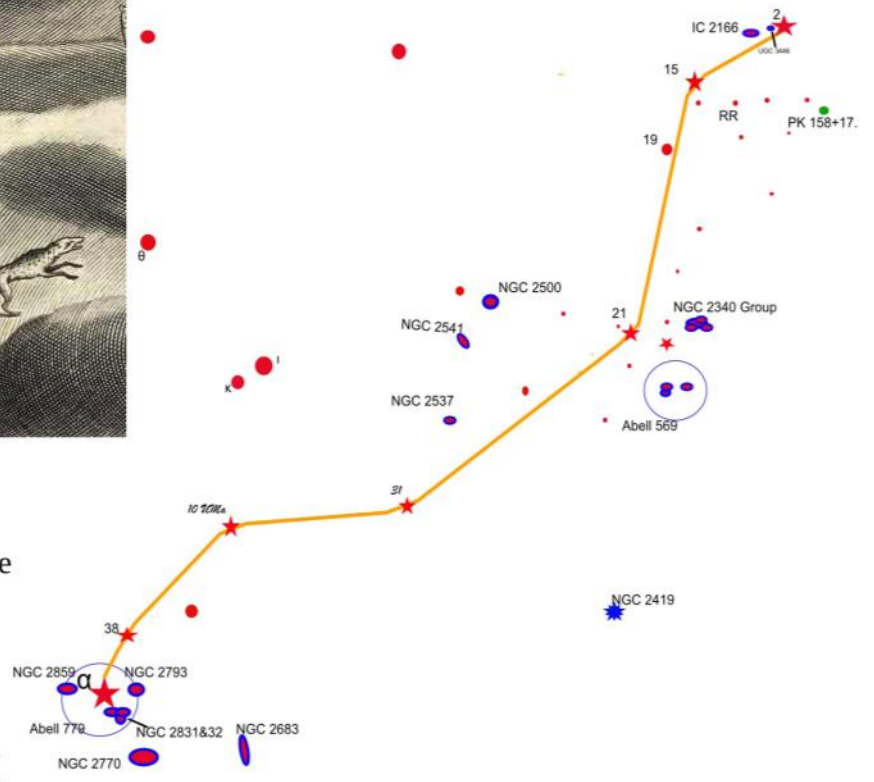


If your taste for faint galaxies hasn't been sated yet, slip over to the NGC 2562 and 2563 group. We have two 12th magnitude galaxies presenting different aspects and possibly visible in a single field.



<https://www.wallhapp.com/urano/globe-celeste-de-coronelli-1683>





“High in the evening sky in late March lies one of the great vacant spaces of the celestial vault. Between the cluster-studded sparkling of Auriga and the hordes of galaxies in Ursa Major is a void that was ignored by celestial cartographers until the late 17th century. Then Polish astronomer and instrument maker Johannes Hevelius, unable to resist the temptation of a blank space, filled the area with his constellation Lynx”

Scott Houston

So, in 1690 Hevelius added the Giraffe, the Unicorn, the Little Lion, the Little Triangle, Herschel’s Telescope and the Lynx. The drawing above is a portion if the frontpiece of Hevelius’s atlas “[Firmamentum Sobiescianum](#)” printed in 1687. It shows Lynx, Canis Venatici, Vulpecula, Leo Minor and Lacerta. In the top left is Cerebus, since forgotten as is Herschel’s Telescope.

Although you needed the eyes of a Lynx to observe it, Webb mentions that Lynx is noted for the number and beauty of its multiple stars.

2 Lyncis is the furthest northern star in Lynx that you can see visually at 4th magnitude. Its a fairly interesting star, not only because it’s the jumping off point for three deep sky objects but also because it’s a variable spectroscopic double. They think maybe the variable part comes from the unseen companion crossing between #2 and us. 3.5 degrees due south of 2 is a huge planetary that was only recently found off the Palomar survey plates. It’s PK 158+17.1 also know as PuWe 1, (Purgathofer-Weinberger). Although it’s on the Uranometria charts I never noticed it before I started studying Lynx. I never spent much time in Lynx before, with Auriga, Gemini and all the other fancy constellations around, now if I can, I’ll try to rectify that mistake.



PuWe 1 is a large, 20 arcmin, faint 15th magnitude, per Simbad, planetary recently, 1980 or so, discovered off the Palomar plates. The main redish nebula is about 20' and I picked this particular image from [Astroanarchy](#) because it shows the expanded halo around the object taking it up to full moon size. I also like this image because it compares PuWE 1 to the Dumbbell, M27. This image was done in H α and OIII, so you will need a big mirror and quality filters.



IC 2166 and UGC 3446 are the other galaxies up by 2 Lyncis. Both are smallish, around the one to three arcmin size and findable at 12th magnitude. Straight down from there is the NGC 2340 group and Abell 569. They are about 13th magnitude and one to three arcmin size, but a nice test for your eye. <https://astroanarchy.blogspot.com/2011/03/puwe1-planetary-nebula-project.html>

A big mirror is also appropriate for NGC 2419, Caldwell 25, aka “The Intergalactic Wanderer”, so called because it is the furthest visible visually globular cluster to our Milky Way. N2419 is 8th magnitude and is a rather compact 2 arcmin. Burnham lists N2419 as 11.5 magnitude and describes it as very rich and extremely condensed. A 12 arcmin field of view will show a bright star next to the cluster while a 6 arcmin field will blow it up.

<https://cseligman.com/text/atlas/ngc24.htm#2419>

The awesome Schmidt camera at Palomar has found more intergalactic globulars, too faint for us to see. Still, you can find globulars around M32 as described a couple of months ago to sate your globular satchet. <http://simbad.u-strasbg.fr/simbad/sim-id?Ident=NGC++2830>



Down at the bottom of Lynx is a neat little asterism of galaxies that

use alpha α Lyncis as a finder. These three galaxies NGC 2859, NGC 2793 and NGC 2832 which is a member of Abell 779. They are all within a degree of Alpha but small. N2832 is 13th magnitude and the prominent member of the group. You should be able to glimpse its companion 14th magnitude 2831 and then the lectilinear NGC 2830. NGC 2859 is the brightest member of the three, 12th magnitude and actually in Leo Minor. NGC 2793 is also 12th magnitude and round.



Also very close to Alpha is NGC 2683. A lecticular 9th magnitude spindle. The NGC catalog has the dimension at about 9x3 arcmin. Copeland called NGC 2683 “the forerunner of the galactic host of the spring and early summer”.

There are three galaxies strung like pearls along the west side of Lynx, between it and Kappa κ and Iota ι Ursa Majoris, the front paw of the bear. This seems appropriate for the first galaxy, NGC 2537, the Bear Paw galaxy. Its 12th magnitude and small at 2x2 arcmin. An interesting object. Four degrees north

is NGC 2541, also 12 magnitude. It may appear knotty in your eyepiece at 6x3 aremin. Lastly is a 3x3 aremin face on barred? knotty spiral also at 12th magnitude.

While there drop down ten degrees to between 10 Ursa Majoris and 38 Lynceis. NGC 2782 is a 12th magnitude, 3x3 aremin peculiar, merged galaxy with an active nucleus. The nucleus will be starlike and bright. vBarnham lists 12 galaxies in Lynx 12th magnitude and brighter and another three of 13th magnitude. The bigger star atlases show dozens more. A healthy hunting ground for you supernova specialists out there and a fitting precursor to the realm of galaxies in the coming months.

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!

Spot the Morning and Evening Star: Observe Venus

David Prosper

Venus is usually the brightest planet in our skies, and is called "Earth's Twin" due to its similar size to Earth and its rocky composition. However, Venus is a nightmare version of our planet, featuring a thick, crushing atmosphere of acidic clouds, greenhouse gasses, howling winds, and intense heat at its surface.

This rocky inner world's orbit brings it closer to Earth than any of the other planets, and is the second closest to the Sun after Mercury. Like Mercury, Venus orbits between our planet and the Sun, so Earth-based observers can observe Venus in the morning before sunrise, or in the evening after sunset – but never high in the sky in the middle of the evening, unlike the outer planets. Since Venus is so striking in its twilight appearances, the planet features heavily in sky mythologies worldwide. Venus's bright morning and evening appearances are the origin for its dual nicknames: the Morning Star, and the Evening Star. Some ancient astronomers never made the connection, and assumed the Evening Star and Morning Star were two unrelated objects! Observers can even spot Venus during the daytime, if the sky is very clear and the planet is bright enough. Venus also has phases, similar to the Moon and Mercury. Galileo's observations of Venus's phases helped turn the astronomy world upside down in the early 1600s, and you can see them yourself using a telescope or even a surprisingly low-power pair of binoculars. **Warning:** Please be very careful when observing Venus with a telescope in the early morning or daytime. Never allow the Sun to enter your instrument's field of view, as you could be permanently blinded.

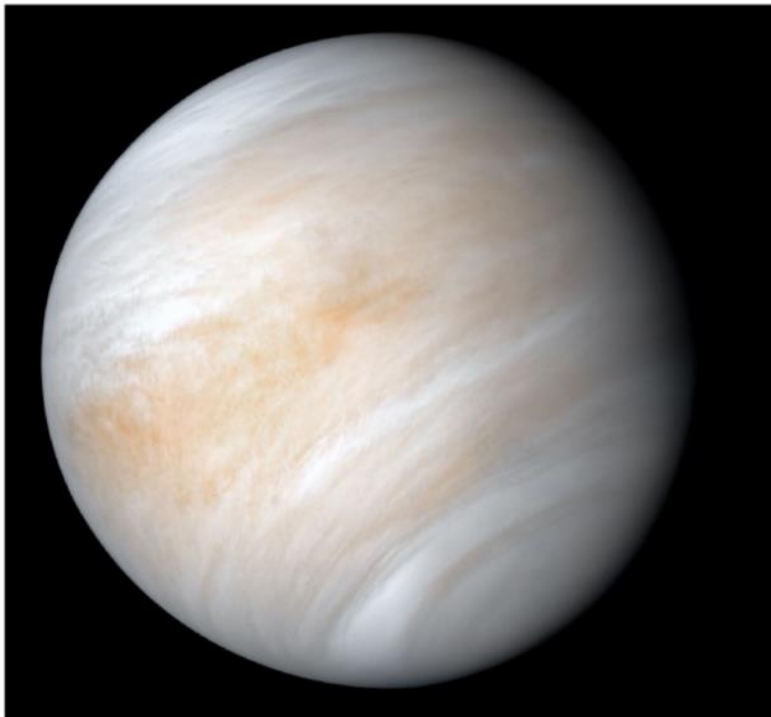
Venus's other moniker of "Earth's Twin" is a bit misleading. In terms of their surface temperatures and atmospheres, Venus and Earth are extremely different! The surface of Venus is warmer than that of Mercury, despite Mercury being many millions of miles closer to the Sun. While Mercury is still a scorching 800 degrees Fahrenheit (427 degrees Celsius), Venus is even hotter: 900 degrees Fahrenheit (482 degrees Celsius). The vast amount of carbon dioxide in the thick Venusian atmosphere acts as an insulating blanket that retains much of the Sun's heat, creating the runaway greenhouse effect that dominates its present-day climate. The Venusian surface is a crushing 90 Earth atmospheres on top of its absurd temperatures. These extreme conditions mean that the mission life of any past Venusian robotic landers were measured in **hours** at best – and usually minutes! However, conditions in Venus's upper atmosphere may be much more hospitable, with temperatures and pressures at 30 miles (50 km) above the surface that are much more Earth-like in temperature and pressure. Studies of the Venusian atmosphere, including seasonal appearances of dark streaks and faint signals of suggestive chemistry, intrigue researchers with the possibility that some sort of life may persist in its clouds. But far more evidence is needed to confirm such a claim, since non-biological factors like volcanism and other processes could also be the source for these signals.

Venus's thick sulfuric acid clouds block direct visual observations of its surface from optical telescopes on Earth. Multiwavelength observations from space probes show evidence of active volcanoes and possibly some sort of plate tectonics, but followup missions will be needed to confirm the presence of active volcanism, plate tectonics, and any possible signs of life. In order to do so, NASA is sending two new missions to Venus by the end of this decade: the orbiter **VERITAS**, which will map the surface in high detail and study the chemistry of its rocks and volcanoes, and **DAVINCI+**, which will study its atmosphere and possible tectonic surface features via a "descent sphere" that will plunge into Venus's clouds. Follow their development and discover more about Venus at solarsystem.nasa.gov/venus, and of course, continue your exploration of the universe at nasa.gov.



Venus and Jupiter continue to move closer together in the evening sky this month. Jupiter will continue its descent towards the horizon while Venus will continue to climb and will be visible in the evenings through mid-summer of 2023. It's a great year for Venus fans!

Image created with assistance from Stellarium



The top layers of Venus's cloud pop in this contrast-enhanced image, reprocessed with modern techniques from Mariner 10 data.

Credit: NASA/JPL-Caltech

Source: <https://solarsystem.nasa.gov/resources/2524/newly-processed-views-of-venus-from-mariner-10/>

PVAA Membership Renewal for April 30, 2023

- _____ \$30 - Individual Membership
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Thank you for your continued membership!