# SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

**April 2023** Free to members, subscriptions $12 for 12 issues **Volume 50, Number 4**


This is LDN1235, called the Shark nebula. Imaged by David Fischer from the OCA Anza site in August 2021 using an 80mm refractor and ASI2600MC camera.

## Upcoming Events - free and open to the public

| | |
|---|---|
| **Beginner's class** | Friday, 5 May at 7:30 to 9:30 PM **ONLINE**<br>This is session 3 of the class which covers different methods of finding objects in the night sky. |
| **Club Meeting** | Friday, 14 April at 7:30 to 9:30 PM **In person** at Chapman University and **ONLINE**<br>"What's Up?": Chris Butler from OCA<br>Main speaker: Erika Hamden from University of Arizona whose talk will be "Observing the Universe in the Ultraviolet" |
| **Open Spiral Bar** | Saturday,15 April at 10:00 to 11:30 PM **ONLINE**<br>Want to socialize? Grab your images, experiences, questions, or none and see your fellow Orange County Astronomers face-to-face. |
| **Star Parties** | Saturday, 15 and 22 April at the OCA Anza site.<br>??? Irvine site dates are yet to be determined |

The monthly club meeting is viewable in progress on Zoom and our social media platforms. The recording is available on these platforms after the meeting is over.

https://twitter.com/OCAstronomers
https://www.facebook.com/OrangeCountyAstronomers
https://www.youtube.com/@ocastronomers

**Please consult the calendar on the OCA website to RSVP online meetings (required)**

# President's Message

By Barbara Toy

Welcome to April and maybe to a period with a higher percentage of clear nights than we've seen so far in 2023! Whatever clear nights we have should be getting warmer so at least viewing should be getting more comfortable.

Unfortunately, I wasn't able to go out to Anza for the March Star Party, even if the weather had been good. The forecast was for complete cloud cover before dark – since yet another atmospheric river was moving in and Orange County was clouding up by mid-afternoon, it seemed likely the forecasts were correct. I couldn't see anything but clouds on the night of the star party where I was yet was able to see two Messier objects naked-eye the night before, the Orion Nebula (M42) and the Pleiades (M45). I could see the area of the Crab Nebula (M1) but neither my eyes nor my skies were good enough to see it without equipment. That was it for my Marathon this year – I hope others who decided to give it a try had better luck!

If you're out for a night at Anza, late March and April is a good time to see a fun Southern Hemisphere object, the giant globular cluster Omega Centauri, which rises over the hills to the south of our site at this time of year. It never gets very high for us but is still an impressive sight in the eyepiece.

**April General Meeting**

Since April starts on a Saturday, our April General Meeting is the latest it could be on our regular schedule, the 14th day of the month. As you may have noticed, you can reach the information page on the meeting through the calendar entry (just click on it) or the link on the home page. I mention this because the home page didn't properly update when the speaker information for the March meeting was uploaded to the website, though the calendar did. We didn't realize this until about a week before the meeting, when it was corrected. The delay was particularly unfortunate as our speaker, Dr. Rachel Street, was excellent, and her topic, finding isolated black holes and what that population can tell us about stellar evolution, was very interesting. I do hope none of you missed it because of this glitch on the website.

Our speaker for April is Dr. Erika Hamden, who is involved in building professional telescopes to study the universe in the ultraviolet, and she'll be discussing what observing the universe in those wavelengths can tell us, and upcoming UV missions. That should be another excellent talk from someone actively involved in cutting-edge research, and I hope we'll see you there for it!

As to who you can expect to see if you come to the in-person part of the meeting, Charlie Oostdyk, our Treasurer, makes it a priority to be there to help members out with any club business they may have. Karen Schnabel plans to be there to open the library, so you can peruse the collection for books and videos to check out. Doug Millar and Helen Mahoney (who were on vacation in March) will be running the coffee-and-donut stand, and Doug will also probably be helping with the equipment that connects us with the on-line portion of the meeting. John Hoot, who has taken the lead on the computer-and-related-equipment issues for our in-person meetings so far will be out of town, but Sam Saeed will be helping out. Alan Smallbone will try to be there as well and I'll be lending a hand where I can. Hopefully the weather will be better for the April meeting than it was in March, and we'll get a good turn-out, as it is really nice to see folks in person.

**New Volunteer Position – Communications Coordinator**

At the last Board meeting, we determined that it would be helpful to the club to have someone who could maintain our social media presence and handle sending out information to our membership and to the outside world when needed. Reza AmirArjomand, our Vice President and Webmaster, has been handling our social media postings with assistance from Ceci Caballero, but both have increasing family responsibilities and neither has time to do this at this point.

If you are interested in helping the club in this communications position, please contact Alan Smallbone, our Secretary (Alan@ocastronomers.org). We haven't fully defined the position, as we would like to work out details with the volunteer who takes it on, but we expect it will include reminders about upcoming events and notices on matters of interest to our membership.

**Anza Site**

While it's nice we haven't had another drought year, all the growth from this winter's rains means that there will be a lot of fuel this summer if a wildfire gets started in our area. We need to be sure all structures on our Anza site have a clear area around them to reduce the chance of damage if a fire comes through and to make them defensible, to help firefighting efforts if they are needed.

We normally send out reminders to licensees at Anza to clear the areas around their pads and observatories around May, and we step up our requests to other club members who use the Anza facilities to help with weed clearance around the same time. This year, it seems likely that the extensive rains we've had will give us a bigger and earlier crop of weed and brush growth than usual, so we need to start clearing vegetation that's too close to buildings and pads without delay, preferably while it's still green and easier to cut or uproot.

If you are a pad or observatory licensee, please take early steps to get the vegetation around your location under control. If you aren't the formal holder of a pad license but you use a member pad, please clear any vegetation around the pad you're using. If you set up in the Football Field, please clear any vegetation in that area. Anza House and the club observatory are general club facilities, and any help you can give to clear vegetation around them would be very much appreciated.

Thank you for your assistance, and I truly hope that we don't have to deal with fire on our site, or anywhere where it might affect any of our members. I'm also hoping that we have clear skies, particularly around New Moon, which would be a nice change from this winter!



# OWENS VALLEY RADIO OBSERVATORY TRIP

SCIENCE BEYOND THE BOOK
June 23-25, 2023

With Dr. Mark Hodges, Dr. Doug Millar, Cecilia Caballero, MA

Please join with us on the above dates for an extraordinary adventure in science education at the Owens Valley Radio Observatory outside of Big Pine, CA. Included are science activities at the 40m antenna and a tour, walking a scale model of the distances of the planets, solar astronomy, and nighttime astronomy. We will also make ice cream with liquid nitrogen.

This year we are emphasizing the DSA projects that are being built at OVRO. See the OVRO website for more info: http://www.ovro.caltech.edu .

If you want to come on Friday, we will have an evening of astronomy to the south of Building #10 at the west end of the observatory. You can bring your own telescope and there will be a number of telescopes set up to share their views. 120V AC is available. We will also do astronomy on Saturday night. The main program will be on Saturday afternoon, starting in the dining area in Building #10. We will go to the Pizza Factory in Bishop for dinner.

All the above is free and courtesy of Dr. Mark Hodges, OVRO, and Caltech. This trip is open to teachers, students with their families, members of local astronomy clubs, and radio hams. You must RSVP to go on the trip to Dr. Millar so that we know how many to expect (contact information below). Please also forward your cell phone number.

This is not a school or OCA sponsored event. Everyone is on their own for transportation and lodging. You have many options. You can stay at a motel nearby, camp in a campground, bring a tent or trailer and stay at the OVRO site. If you decide to camp at OVRO, you must provide your own bathroom, as the buildings will be locked. There are places to eat in Big Pine and Bishop.

The weather will be warm and dry. Evenings will be a little cooler, so dress accordingly for the nighttime astronomy.

Please try to arrive at OVRO by 1:00 PM on Saturday for the program.

Schedule:

| | | |
|---|---|---|
| Friday | Setup outside the main office building for astronomy by sunset. 110v AC, bathroom, coffee and water will be available. | |
| Saturday | 1pm | Arrive at kitchen for start of program and tour. |
| | 5pm | Check in at your Motel (if needed) and go to dinner in Bishop. |
| | Evening | Astronomy at the site |
| Sunday | A lot of us like to gather for breakfast about 9:30 at one of the local restaurants. More information will be available on Saturday. Leave whenever you like | |

For any questions and RSVP's my contact information is

Dr. Doug Millar Cell- 562-810-3989 and email is drzarkof56@yahoo.com

Directions and more information will be in the May Sirius.

# AstroSpace Update

April 2023
Astronomy and space news summarized by Don Lynn from NASA and other sources

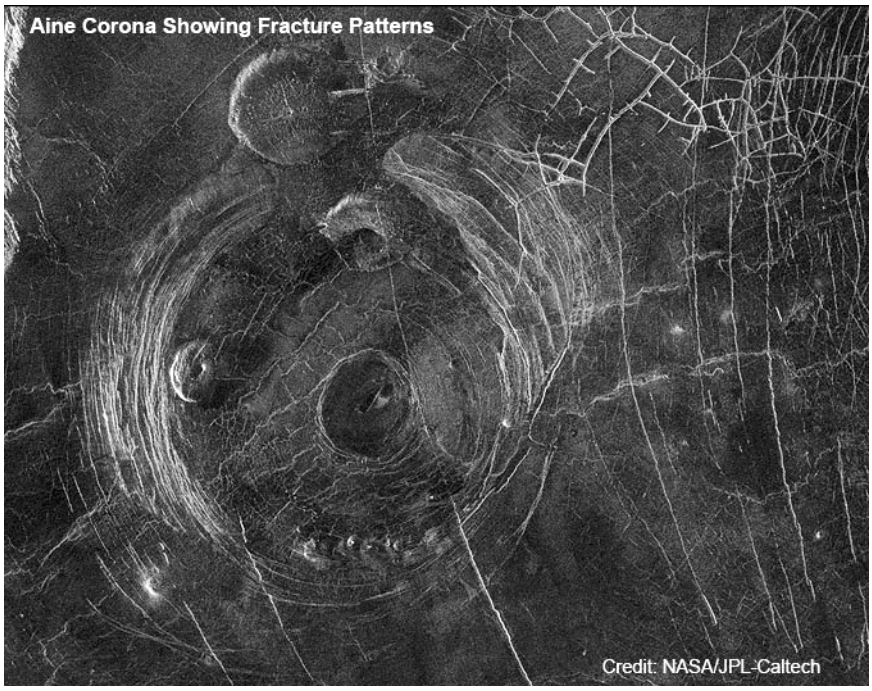
**Planet Too Large** – Astronomers found an unusually large exoplanet (about the size of Jupiter) orbiting a small star (about 40% the mass of our Sun). Theory says that small stars during formation should not have enough material in their planet-forming disks to form such large planets. The planet, known as TOI 5205b, was found by TESS, a planet-finding space telescope. It is about 280 light-years away in the constellation Vulpecula.

**Exoplanet Discoveries** – A program named CARMENES is using a highly sensitive spectrograph, also named CARMENES, at the Calar Alto Observatory in Spain, to search for exoplanets orbiting nearby red dwarf stars, using the radial velocity technique. The program just released data on 20,000 observations of 362 stars, revealing 59 newly-found or newly-confirmed planets. One of their recent discoveries is planet Wolf 1069 b, which may be in the habitable zone, that region where temperatures will allow liquid water to exist.

**Complex Exoplanet System** – Astronomers have made radial velocity and astrometry observations of a system known as Kepler 444, consisting of 3 stars and 5 planets to further characterize the system. All the planets orbit the largest of the 3 stars, and all are smaller than the Earth in diameter, and thus likely rocky planets. All orbit closely enough that their orbital periods are under 10 Earth days. The system is 117 light-years away in Lyra. The orbits of the 2 smaller stars were found to approach the larger star and its planets no closer than 23 AU (where 1 AU is the Earth's distance from the Sun). Previous estimates had them approaching much closer, and this greater distance better explains the stability during planet formation.

**Raining Sand** – Researchers using the Webb Space Telescope determined that the clouds covering the exoplanet VHS 1256 b consist of silicate particles, sized from dust grains up to sand grains. Thus it rains sand on this planet. The observations also found water, methane, carbon monoxide and possibly carbon dioxide in the atmosphere. The planet is about 40 light-years away and orbits a pair of stars so distantly that it takes about 10,000 Earth years for each orbit. That great distance from its stars means that Webb can resolve the planet from its stars, making the observations of the planet easier. The planet formed only about 150 million years ago.

**Venusian Geologic Activity** – A study of archived Magellan spacecraft radar images concluded that coronae, large roughly circular raised areas on Venus, are likely places where interior heat is causing plumes of molten rock to rise to the surface. The study found that coronae are located where the upper layer of the planet is thin, averaging only 7 miles thick, and where internal heat flow is large. This may be how heat flow occurred on Earth about 2.5 billion years ago before continental plates formed (these plates are involved in heat flow now).

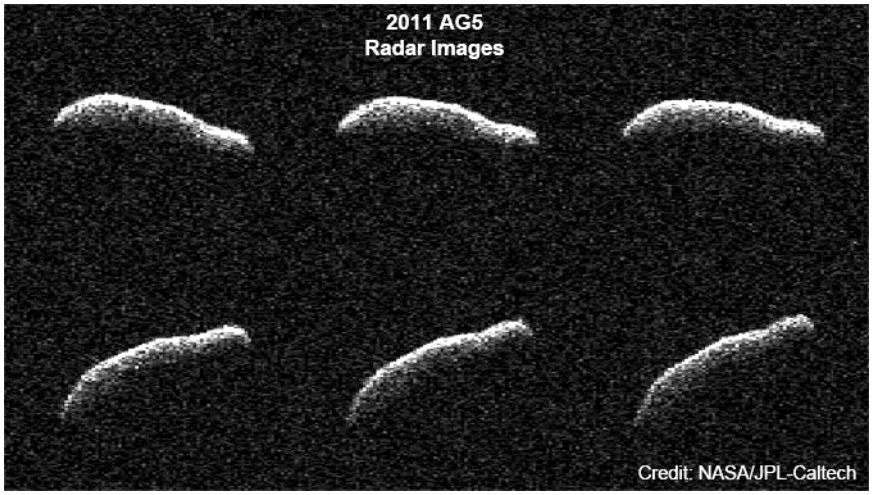



**Venusian Volcanic Activity** – Another study of archived Magellan images found a volcanic vent that changed shape between images taken 8 months apart, showing that volcanic activity is occurring. Because many of the Venusian volcanoes appear young, many astronomers believed that some Venusian volcanoes are still active, but this is the first proof of that. The study only examined about 1.5% of the surface of Venus for changes, so there are likely many other examples of volcanic activity waiting to be found.

**New Horizons Update** – New discoveries are still being made from data sent by the New Horizons spacecraft about 8 years after it flew by Pluto. There is evidence that Pluto's axis of rotation wandered substantially with respect to surface features, apparently due to the distribution of mass within the body. New Horizons will continue observations, monitoring Uranus and Neptune from afar, but at angles never seen from Earth, and will search for further Kuiper Belt objects that may be near enough to its trajectory to visit. Because New Horizons is beyond the dust that makes up the zodiacal light, the spacecraft will be able to search the cosmos for ultraviolet and visible light background glows without zodiacal light interference.

**Water-Rich Asteroids** – A new class of asteroids was established by means of infrared spectral observations that found a few asteroids in the main asteroid belt that are water-rich. Most main belt asteroids have little water. It was already known that Ceres, the largest asteroid, is water-rich, from close-up observations made by the Dawn spacecraft. It is thought that the water-rich asteroids must have formed farther from the Sun than the main asteroid belt, because the main belt was too warm for ice to accumulate in an asteroid, but then later were deflected into orbits with the main belt. One possible source of the water in the Earth's oceans could be such water-rich asteroids colliding with the early Earth, possibly during the Late Heavy Bombardment, when asteroid collisions with the inner planets were known to be frequent. The water-rich asteroids all orbit in the outer regions of the main asteroid belt, and all seem to be porous, that is, having void spaces within.

**Asteroid Radared** – An asteroid known as 2011 AG5 made a fairly close approach to Earth on February 3. That put it within radar range, so astronomers observed it with the 230-foot radio antenna in Goldstone, California. It was found to be about 3 times as long as wide, an unusual shape for an asteroid. Its size is about that of a skyscraper building. Its rotation period of about 9 hours was confirmed with the radar observation. Additionally, its distance was precisely tracked, allowing its orbit to be refined. It won't have a very close pass by Earth until 2040, when it will fly by at about 2/3 of a million miles, with no chance of collision.




**Spinning Asteroids** – Study of images from the DART mission shows that the asteroid Didymos is spinning so fast that it is flinging material into space. Some of the particles fall back to the asteroid, some go into orbit about it, and some are lost to space. Most of the material observed at Didymos fell back. Because effects of sunlight can spin up small bodies over time, this flinging may be common among small asteroids. The OSIRIS-REx mission also imaged material being thrown off Bennu, the small asteroid that it visited.

**Molecules At a Forming Star** – Astronomers using the Webb Space Telescope have detected fairly complex organic (carbon containing) molecules in the gas and ice about a forming star. Researchers suspect that chemical reactions take place on the surface of ice grains in these conditions to form these complex molecules. The observations found water ice, carbon dioxide, silicates, ammonia, methane, methanol, formaldehyde, formic acid, and possibly ethanol and acetaldehyde. The observations also determined the content of a jet, too hot for organic molecules, to be hydrogen, iron, nickel, neon, argon and sulfur.

**Wolf-Rayet Star Observed** – The Webb Telescope has observed the Wolf-Rayet (WR) star WR 124 in unprecedented detail. WR stars are very massive and in a phase in which they throw off huge amounts of their outer layers. The phase doesn't last long in astronomical terms, so WR stars are fairly rare. WR 124 is about 15,000 light-years away in the constellation Sagitta. Astronomers would like to know if the dust thrown off by WR stars survives their eventual supernova explosions and thus becomes part of the huge amount of dust now observed in the Universe. These new Webb observations may help answer such questions about WR stars.

**Star Near Supermassive Black Hole** – Researchers found a very young star forming near the supermassive black hole at the center of our Milky Way galaxy. Theorists have opined that the conditions there are too violent for stars to form. The discoverers believe that the star formed a few light-years away in a ring of gas and dust that shields from the violence, then fell closer to the black hole. The star is only several tens of thousands of years old and has been dubbed X3a.

**Lonely Galaxy** – A galaxy was found that has no visible other galaxies nearby. Apparently, it gravitationally pulled in and absorbed all the galaxies of any size near it. X-ray data shows it resembling a cluster of galaxies, so it probably was a member of such a cluster, and devoured its neighbors, as opposed to the galaxy forming all by itself. This galaxy is so distant that its light took 9.2 billion years to reach us, so this happened fairly early in the history of the Universe.

**Growing Supermassive Black Holes** – Theorists have been unable to explain how supermassive black holes can have grown to those super masses as early in the history of the Universe as some have been observed. A new computer simulation of galaxy formation may have solved this mystery. The simulation, known as Astrid, showed several black holes with masses billions of times our Sun's mass forming 10 to 11 billion years ago when 3 somewhat smaller (but still supermassive) black holes merged.


**Soyuz Replaced** – The Soyuz MS-22 spacecraft suffered a coolant leak in December while docked at the International Space Station (ISS), awaiting its use by 3 of the current station crew to return to Earth in a few months. The leak was determined to have been caused by a micrometeoroid strike. As it is not known how well a Soyuz with lost coolant will perform, spacecraft controllers launched Soyuz MS-23 to ISS, without passengers, for the 3 crew members to use for their trip back to Earth. Their stay on ISS was extended, probably to allow time to prepare another Soyuz to bring up the next crew. Soyuz MS-22 will be brought down without crew and examined to see what effects the coolant leak had.

**3D Printed Rocket** – The Relativity Space company has developed a rocket, named the Terran 1, that consists of 85% by weight parts manufactured by 3D printers. It is designed to lift over a ton to low Earth orbit. However, in its first launch the second stage failed, leaving it short of orbit. If it had made orbit, it would have been the first rocket in orbit using liquid methane and liquid oxygen for fuel. Enough went right with the attempt that Relativity expects a successful launch to orbit soon. The company is developing a bigger version of the rocket that will take over 20 tons to orbit.

**Odyssey Fuel** – The Mars Odyssey spacecraft has been in orbit about the Red Planet for over 20 years. It is aimed using reaction wheels, which use solar-generated electricity, not fuel, but every so often the reaction wheels have to be spun down using hydrazine-fueled jets. There is no fuel tank gauge on Odyssey, so spacecraft controllers have to do tank warming experiments to calculate remaining hydrazine. Such tests in recent years have resulted in fear that the fuel is about to run out. The warming calculations showed much less fuel left as compared to counting jet usage over the years. A new study using a more comprehensive model of the spacecraft temperatures and heating showed that there is enough fuel left to last at least through 2025. Odyssey has mapped minerals on Mars, found ice deposits, measured radiation levels, scouted landing sites for other missions, and relayed data to Earth from rovers and landers.

## Response to COVID-19 Crisis

Any use of the club's Anza site by members is at their own risk. Visitors should bring supplies to clean and sanitize surfaces they contact. When you leave, take any trash that you generate or find on site out with you. Please maintain social distancing if anyone else is out there.

| | |
|---|---|
| Meeting in person: | Astrophysics SIG, Anza star parties, Beginner's class (July) and **monthly club meeting** |
| Meeting via Zoom: | **Monthly club meeting**, Beginner's Astronomy class (other than July) |
| Coming soon: | Orange County Star Parties |
| Cancelled until further notice: | AstroImaging SIG |
| Check with Coordinator: | Outreach events |

# Another Look

Dave Phelps

Full Moon April 6, New Moon April 20
Native American call this the Red Grass moon, the Budding moon and the Flowering moon.
Other tribes called it the Fish moon, the Frog moon and the Breaking Ice moon.
Northeastern Native American tribes called it the Sugar Bush moon and the Sugar Maker moon.
In Islamic culture the night of the April Full Moon is called the Night of Innocence, Christians refer to the first full moon after Easter as the Paschal moon. Today, we call the April Full Moon the Pink moon.

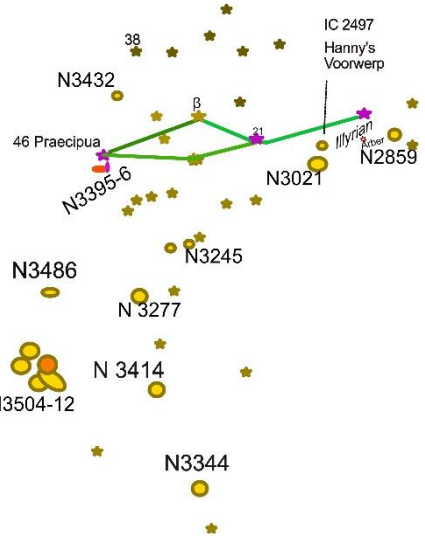
Leo Minor wasn't known as such in antiquity. Ptolomy didn't ascribe that area between the feet of Ursa Major and Leo as anything more than amorphous. The faint stars there generally assigned to Leo.


***Albrecht Dürer 1515***


***Helvelius Leo Minor Combined***

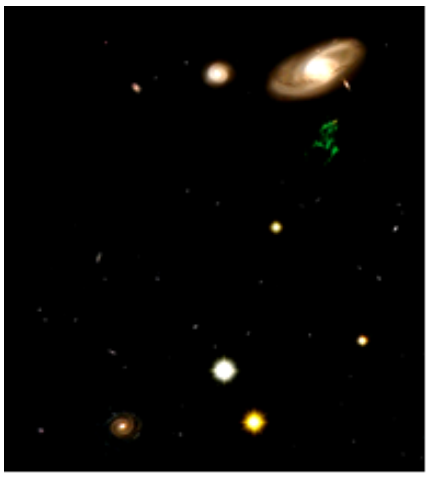
Polish Astronomer and Cartographer Johannes Hevelius added the outline of a small lion between the drawing of the Great Bear and Leo. Later, Bayer added a Greek letter to one of the stars and Draper numbered many more.

Leo Minor has two named stars. The one, 46 Leonis Minoris has the name Praecipua and is the brightest star in LMi. The other is an 8th magnitude star with the Draper designation HD 82886 named Illyrian. The International Astronomical Union thought to give each country its own star and planet and HD 82886 was given to Albania. The Illyria were the ancient people of the Balkans and the Arber, its planet, the medieval name of the people of Albania.




One of the more interesting objects in Leo Minor is Hanny's Voorwarp. IC 2497 is 15th magnitude and I read that Hanny's Voorwarp is as faint as 19th magnitude. IC 2497 is a possibly great inclusion into our catalog of potential black holes. A decently condensed explanation of the physics can be found at: ***http://cseligman.com/text/atlas/ic24a.htm#ic2497***.

There are a couple of 10th magnitude galaxies in Leo Minor: NGC 3344 and NGC 3486. Both galaxies are face on and may be slightly barred in the case of N3486. N3344 is great but will take some star hopping skills to find it out there in the reaches of no-man's land.



***IC2497***

***NGC3486***

***NGC2859***

On the other side of Leo Min is Abell 779 and NGC 2859. A cluster of galaxies close to 11th magnitude N2859 and also alpha α Lyncis.

https://www.flickr.com/photos/avdhoeven/15741726033/in/photolist-5nqpdq-8ZPDoH-qsiEyW-rpiZp2-nn3TTy-99ABqD-wuaz1n-r1K45z-wM7mJh-6VwnkE-pZ3sHx-99uoLC-nrH8r7-ff7cPa-rEYeRY-rXu547-qxqyAq-F6DV6Y-kjHA1M-s91CpL-QZPzSC-r1x1So-ovEpXp-rF5XRg-LL5aAW-rF61fV-r1wZY9

**hla.stsci.edu/cgi-bin/display?image=hst_09042_44_wfpc2_f8...(color)%20NGC3486**

**https://www.flickr.com/photos/113933437@N06/11961961204/in/photolist-2mzX9HH-2npX8y3-fH4csT-SxBHrX-Riyrkp-2kKM6du-riq6LG-2hsMriW-sVFvXW-2hsQaXh-exXzEZ-je3bjq-GoEwcJ-RLd5Nv**

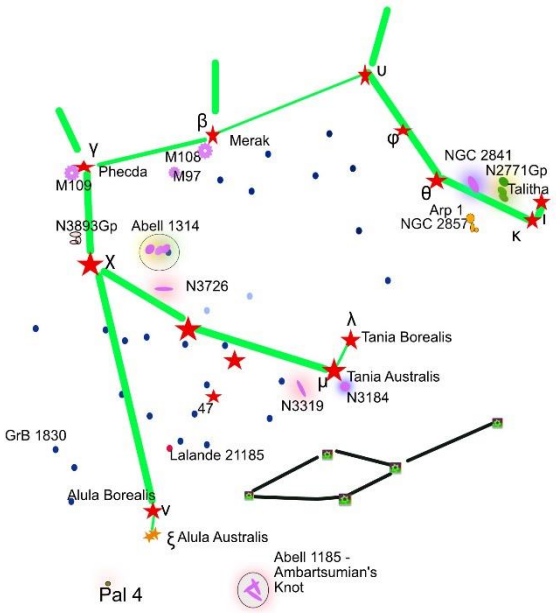
It is common knowledge that Ursa Major has from prehistoric times been known as a Bear. I have read, however, that apparently this knowledge is uncommonly wrong. Among the different civilizations that grew in and around the confluence of the Tigris and Euphrates rivers that we typically think of as Mesopotamia and Babylonia, the asterism was known as "the constellation of the Long Chariot." (The Origin of Ursa Major, Davis, G.A. Jr. 1946.) Likewise, per Davis, neither the Chinese, Egyptians, Arabs or Persians had a bear. Also, even the Anglo-Saxon and Teutonic almost universally referred to it as a "Wain", Wagon or in modern idiom, a plow. Whence then, you ask, the bear? Per Davis, a series of linguistic misconceptions and misspellings going as far back as Sanskrit has caused the constellation's parts, identified in antiquity as "stars", to became "bears". This isn't actually an unusual circumstance. We can find translation errors in our star names and constellations even as recently as Arabic to Latin and vice-versa.

**clipped from http://judy-volker.com/StarLore/Art/HarmoniaMacrocosmica.html**

Common or uncommon knowledge aside, the idea of a bear in the sky permeated the beliefs of cultures throughout history. I find it unlikely that the concept of a nation descending from an animal would pop up all over the world without social dissemination. Historians list too many native American nations identifying with animal ancestors for it to be coincidence. In the thousands of years of humanity's existence from Lucy to the pyramids of the Aztecs; ideas, knowledge and concepts traveled along with their herds up into Europe, west as far as Iceland and Greenland, to the east and across the land bridge into the Americas.

So, that brings us to the Greeks and Callisto and Arcas, mother and son, transported into the heavens to become the greater and the lesser bear.

> *Jove — snatched them through the air*
> *In whirlwinds up to heaven and fix'd them there;*
> *Where the new constellations nightly rise,*
> *And add a lustre to the northern skies.*
>
> ***Ovid's "Metamorphoses"***




Normally we look at Ursa Major and see only the ladle. There are so many objects near, on, and in the asterism that we can spend hours searching for large, small and interesting galaxies and globular clusters as well as a famous planetary nebula. But as you can see by the chart I made and the drawing of Ursa Major by Jordanis showing his Jordan River between UMaj and Leo, the legs and feet of Ursa are a treasure trove of bright, interesting and unusual stars and galaxies.

One very interesting star in Lalande 21185, at 7th magnitude the brightest red dwarf in the northern skys. It's down by the left rear foot of Ursa, close to Alula Borealis and Alula Australis. L21185 is very close to us and in the next ice age should be almost as close Alpha Centauri. L21185 also has a couple of planets with long histories of discovery, disapproval, and rediscovery.

Another very interesting star is Groombridge 1830. Also near, but on the other side of Ursa's paw, Gmb 1830 has a big proper motion and based on its distance from the sun, the highest proper motion we've measured so far. Gmb 1830 is a "halo" star, meaning it is rotating counter to our galaxies rotation and has probably an eccentric orbit around the Milky Way.

Alula Borealis is Nu ν Ursae Majoris and Alula Austrlis is Xi ξ Ursae Majoris and their names come from the Arabs as the "first leaps of the gazelle". Both Nu and Xi are double: Nu is 3rd mag, Xi is 4th. Nu is an easier double to split with our backyard telescopes.

Two objects also by the paw are Palomar 4, a very challenging globular, and Abell 1185 a swarm of 13th, 14th and fainter galaxies. At least one of these, NGC 3550, appears to be a merge of at least two galaxies. Part of Abell 1185 is Ambartsumian's knot, a small dot under 14th magnitude NGC 3561 that they think is a dwarf companion galaxy. Pal 4, like all Palomar globulars is tough. Its combined magnitude is given as 14, so your big scopes can find it, seeing it is another thing. It is faint and diffuse, but once you've identified it visually all you can say is "Wow".

Tania Borealis and Tania Australis – λ (Lambda) and μ (Mu) Ursae Majoris – "the second leap", mark the right rear paw. They are both 3rd magnitude. Talitha Borealis and Talitha Australis – ι (Iota) and κ (Kappa) Ursae Majoris – "the third leap", mark the front paw of Ursa. Both stars are 3rd magnitude. Kappa is a double system while Iota is a system with two double stars. The main star is 3rd magnitude while the companions are 9th ,10th, and spectroscopic.

Moving up into Ursa Major we have three Messier's near the stars marking the hips of the bear. Messier 97, Messier 108 and Messier 109

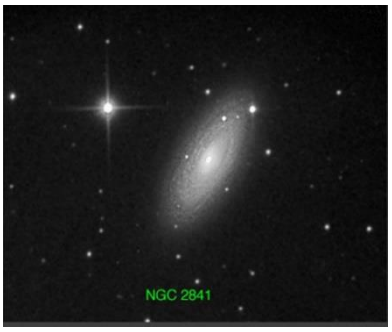
Two very nice galaxies and one of the most famous planetary nebulas in the sky. As long as you are up there, move 14 degrees west to the area around the tail star, Alkaid, and find M51, technically in Canes Venatici, one of the most spectacular galaxies we can see. All three images can be found by following the links to the OCA website.

***https://ocastronomers.org/wp-content/uploads/2018/12/M97-108_LA_31012007.jpg by Larry Arnold***

***https://ocastronomers.org/wp-content/uploads2018/12/m109_01-28-03_150.jpg by Arnie Rosner***

Moving over to the 3rd magnitude theta θ Ursae Majoris, the front "knee" is three objects of interest, one quite bright and the other two a bit of a challenge. NGC 2841 is 10th magnitude and tilted obliquely to us as the image by Bill Hall shows. Very close is the NGC 2771 group halfway between θ and ι, 3rd magnitude Talitha. A look though the NGC or Simbab shows four galaxies from 12th to 15th magnitudes clustered together. Be sure to check out NGC 2769, a close neighbor, lenticular with a large dark lane.

***M51 https://ocastronomers.org/wp-content/uploads/2018/12/M51_LRGB_12-08-02_150.jpg Arnie Rosner***




***https://ocastronomers.org/wp-content/uploads/2018/12/spring-galaxies2008-r3. jpg Bill Hall***

**NGC3319**
***https://www.flickr.com/people/detterline/***

Across from theta about 40 percent of the way to kappa, also 3rd magnitude, is number one on Arp's List of Peculiar Galaxies. NGC 2857. It is a 2' by 2' face on open spiral that made Apr's list because of its low surface brightness.

The left rear paw of UMa is made up of 3rd magnitude Tania Boraelis, λ, and 3rd magnitude double Tania Australis, μ. There are a number of galaxies around the two stars, among the brightest are NGC's 3202, 3205 and 3207. A little further up the leg is NGC 3319, an 11th magnitude barred spiral. Right next to mu μ, is the magnificent 10th magnitude NGC 3184, the little pinwheel. This 7' by 7' face on spiral even has its own NGC's embedded, just like its large cousin.

Up near Xi, χ, Uma are three areas of interest. Abell 1314 is a cluster of hundreds of galaxies centered on a trio of 13th and 14th magnitude galaxies, one with the unusual name of Papillon, IC 708 and next door to IC 709 and IC 712. Papillon is 13th magnitude, IC 709 is almost 14th magnitude and IC 712 is 14th. Papillon is unremarkable visually but got its name from its energy intensity map.

Nearby is NGC 3726, 10th magnitude and 7 min. NGC 3893, is an 11th-magnitude spiral galaxy. The small faint galaxy to the upper right is NGC 3896, a 14th magnitude spiral, while the small round galaxy in the lower right corner is MCG 8-22-9. This is a 60-second image taken on 12 March 1994 at 07:55 UT.

Dark Skys

***NGC3893***
***https://ocastronomers.org/wp-content/uploads/2018/12/NGC3893_20150418_CE_01.jpg***

***NGC3184 Joel Kuiper at***
***https://astrophotography.nl/***

Dave's column has been abbreviated to fit the space available this month - The editor

## Help Wanted (Volunteering Opportunities)

- OC Astronomers Club Representative to WAA (Western Amateur Astronomers)
- Communications Coordinator doing social media presence and announcements to members

Carpooling OC to Anza contact Gene Kent kenthouse@cox.net 714-604-8396

I'm Gene Kent, a long time OCA member. I live in Tustin, CA. I'm looking to find someone to share the drive to and from Anza. I have a Chevy Trail Blazer. It will hold all the astronomy stuff for 2 people. I usually set up on the ball field below Anza House. If you have a pad or an observatory, I can drop you and your gear off there.

## From the Editor

**Sirius wants photograph submissions from club members**
Sirius is getting short on pictures. We want more! Please send pictures to me along with a brief description of the subject, where the image was taken, and the equipment used.

**Is our font too small ?**
We've been using 9 point font recently to squeeze more content into the newsletter. Is it getting too small to read ? I need some feedback on this.
Is our content mix OK ? Boring ? Any comments about it ?
Send your opinion via email to newsletter@ocastronomers.org .

**Due dates for submission of articles, pictures and advertisements**

| Issue | Due date |
|---|---|
| May | 22 April |
| June | 20 May |
| July | 24 June |
| August | 22 July |

# Advertisements

Buy, Sell or Trade some of your gear? This is where club members can place advertisements. Please contact the editor at newsletter@ocastronomers.org to place an advertisement or to learn more about placing one. There is no cost to club members for non-commercial advertisements in the newsletter.

For Sale contact Ron Choi rongrace2@cox.net

- Orion StarShoot AutoGuider further reduced price $ 200

For Sale contact Rick Hull hull3hull3@yahoo.com 949-636-2920 cell

- QSI 6120C OSC CCD camera with Mechanical Shutter $ 1625 +sh

This unit was built before the ATIK acquisition, so you know it was built to QSI quality standards.
Camera body is the "-s" version with mechanical shutter. The front end can be replaced to have an integrated OAG and/or filter wheel. Unlike more economical cameras using only desiccant, QSI 6xx series have a sealed chamber, purged and filled with a noble gas.

Built around the Sony ICX834 with EXview HAD CCD II technology, this 12M sensor is perhaps the best CCD by Sony before ending CCD production - high in sensitivity, low in noise. Pixels are 3.1um for high resolution and image array is 8.8x13.2mm in size. The 3.1um pixels are nearly ideal for those using focal lengths of 600 - 1200mm desiring to achieve maximum resolution, as seeing permits. I believe the Bayer mask is superior to most found on CMOS sensors which are designed for consumer cameras, providing less overlap of the color channel band-passes.
I can provide a few images taken at 770mm focal length out at Anza. Contact me by email.

New, this camera is now $4200, and the ATIK 4120C which is a basic lower-end cousin, is $3K. On CN I am asking $1750, any OCA member may purchase it for $1625 plus shipping. Please feel free to contact me with any questions.

For Sale contact Michael Newman mnewman2112@gmail.com

- Pad lease for LP-12 in Lower Pads section and the pier upon it $ 1000

It includes a pier that is very nicely aligned and can support a C-8 up to a C-14 I believe although the new owner may need to drill new holes. For questions and to express your interest in the pad, please contact me via email.

For Sale contact Bill Prats b.bill.p@gmail.com

- QHYCCD PoleMaster Camera Adapter for Losmandy GM811xx Mount, IEQ30/IEQ45 # 020038 $ 30
  3 Pieces, Bright red finish, no scratches
- Spotter Scope: Orion 6X30mm Correct Image Right Angle $ 30 obo
- ZWO OAG, Off Access Guider, new never used, full kit $ 100
- 12VDC to 17VDC 3 amp Voltage booster with digital voltmeter used on a Losmandy G811GM $ 50
- Losmandy Servo motor/Gemini 2 cables (pair) recent & hardly used Make offer
- Losmandy Gemini 2 Hand Controller, recent & hardly used Make offer

Contact Bill Prats b.bill.p@gmail.com Shipping is extra. All items can be picked up in Huntington Beach.

For Sale contact Sam Pitts sam@samsastro.com 951-676-1345

- Sky-Watcher Star Adventurer 2i Pro Pack S20512 $ 300
  With 2 Vello Canon Camera connectors for Rebel series and D series cameras. These items have never been used (Like new in Box). I have not taken them out of the box.
  Retail prices $ 520 - $ 450

- 2 Losmandy DC-14 Dovetail Plate kits for Celestron C14 $ 85 each
  Like new, used to mount C14 one time, bolts to existing holes. Wt. 3.75 lbs. Length 24" HS 23.00, height. top of tube to top of dovetail plate 1.20" Thickness 0.7" Retail $ 140.00 ea.

I can meet at Anza to deliver purchased items.

For Sale contact Eric Mjolsness emj@uci.edu

- Mars Hill Pad # MH-05 OCA license is up for sale. Includes solid equatorial pier. $ 2300 obo
  Price in 2010 was $2300. I am seeking that amount back or best offer.

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### COORDINATORS

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| Anza Site Maintenance | Don Lynn | dlynn@ieee.org |
| Beginner's Class | David Pearson | p.davidw@yahoo.com |
| Orange County Star Parties | Steve Mizera | mizeras@cox.net |
| Explore the Stars | Bob Nanz | bob@nanzscience.com |
| Librarian | Karen Schnable | karen@schnabel.net |
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### SPECIAL INTEREST GROUPS (SIGs)

| | | |
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