SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

June 2022 Free to members, subscriptions $12 for 12 issues **Volume 49, Number 6**

This is M8, best known as the Lagoon nebula. Jim Windlinger took this image in 2005 from our Anza site using a Borg 125 ED refractor and a modified Canon DSLR camera.

Because of the COVID-19 crisis and ongoing efforts to reduce exposure to the virus:
. **Some in-person club events are cancelled**

Please read more about how OC Astronomers has modified its activities on page 2.

Upcoming Events - free and open to the public

Beginner's class	Friday, 1 July at 7:30 to 9:30 PM This is session 5 of the class. This session is "How to Use Your Telescope". Class materials can be downloaded from OCA website.	ONLINE
Club Meeting	Friday, 10 June at 7:30 to 9:30 PM "What's Up?": Doug Millar from OCA Main speaker: Christopher Gainor whose talk will be "Three Decades of the Hubble Space Telescope".	ONLINE
Open Spiral Bar	Saturday, 11 June at 10:00 to 11:30 PM Want to socialize? Grab your images, experiences, questions, or none and see your fellow Orange County Astronomers face-to-face.	ONLINE

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

Owens Valley Radio Observatory Trip Reminder

SCIENCE BEYOND THE BOOK June 25, 2022 With Dr. Mark Hodges and Dr. Doug Millar

Reminder and summary of details:

Science education at the Owens Valley Radio Observatory outside of Big Pine, CA. Included are science activities at the 40m antenna, tour, walking scale model of planetary spacing, solar and nighttime astronomy. We make ice cream with liquid nitrogen. All the above is free and courtesy of Dr. Mark Hodges, OVRO and Cal Tech. This trip is open to teachers and their families, members of local astronomy clubs and radio hams.

- The full details including a destination map are in the May issue of Sirius Astronomer.
- RSVP to Dr. Millar so that we know how many to expect and which days you will be there. Please provide your cell phone number.
- The observatory asks that anyone who is not vaccinated against COVID-19 wear a mask while on site.
- Provide your own transportation and lodging. Hotels are in Big Pine. There are several motels and camping in Big Pine or camp out at the dish. You may bring your own telescope.

Friday Setup by main office building by sunset for astronomy; 110vac, bathroom, coffee, water available.
Saturday 1 pm arrive at OVRO 40m dish / 5 pm dinner in Bishop / Evening- Astronomy at the site
Sunday Breakfast 9:30 am at Country Kitchen / Leave whenever you like.

Directions from the LA area: North on the I-5/CA-14 through Palmdale, Mojave, Inyokern to join US-395 North. Continue 395 North through Lone Pine to Big Pine. Just as you get to the end of town turn right towards the Westgard Pass. Go out about 2 miles and after Zurich, turn left onto the observatory road. You should be able to see the dish in the distance, but it is 4 miles away! Continue onto the property and go to the large dish. We will be at the base or inside of it.

Owens Valley Radio Observatory: http://www.ovro.caltech.edu/

For any questions and RSVP's Doug's contact information is: Dr. Doug Millar Cell- 562-810-3989
and email is drzarkof56@yahoo.com

Thank you and I hope to see you on the trip! -- Dr. Millar

SOAR Event Reminder

Summer Observational Astrophysics Retreat at Mount Wilson Observatory 17 – 30 July 2022

Please see full details in the May issue of Sirius Astronomer.
This is hands-on research with observatory equipment, seminars, individual projects. See details in May issue of Sirius.
Cost of $1500 includes all room and board expenses and airport pickup / drop-off. Participants reside in Mount Wilson's "Monastery" like astronomers of old.

See https://sites.google.com/a/kenyon.edu/mwss/home for info and application.

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
Meeting via Zoom:	Monthly club meeting, Beginner's Astronomy class
Cancelled until further notice:	Orange County Star Parties, AstroImaging SIG, in-person club general meetings
Check with Coordinator:	Outreach events

President's Message

By Barbara Toy

June is the month of the Summer Solstice – June 21 this year (sometimes it's June 20). That's popularly referred to as the "longest day of the year," meaning the longest period of daylight and the shortest night, at least at our latitude. If you go far enough north it would mark the midpoint of the period of 24-hour daylight, a condition that many of us mid-latitude types find hard to visualize living in, even having seen videos of the sun circumnavigating the sky through an entire 24-hour period without ever going below the horizon. The video of that phenomenon that I recall was done in Antarctica during its summer, but the principle is the same.

Aside from the effects on sleep cycles (which good observing nights mess with anyway), going weeks to months (depending on where you are) without seeing stars other than the sun would be difficult. It would certainly cut into one's astronomical activities, and that in a season where it's generally a lot more comfortable to engage in those activities than in winter months. Those winter months when those in the far north get 24 hours of darkness, which should be good for observing (between storms) also tend to be cold, often far below zero. I guess I'm too much of a wuss at this point to think about observing in those temperatures with any level of enthusiasm.

I don't know how many ardent amateur astronomers there may be in the far north, but I do know that Canada, whose borders include a lot of the far north, has a very active astronomy community despite frequently harsh observing conditions. Per one website, they have 90 amateur astronomy clubs in the country. For a start, they have the Royal Astronomical Society of Canada, which has over 4900 members and has published its very informative Observers Handbook since 1907, among many astronomical activities. Canada is also the home of Attilla Danko, who developed and maintains the Clear Sky Charts using data from the Canadian Meteorological Centre to give forecasts on weather factors most important to astronomers, tailored for specific sites (see the two linked to our website, for Orange County and Anza, with the Anza Chart currently sponsored by OCA member John Kerns). Attilla is active with Ottawa Astronomy Friends, or "OAFs," identified as a "group" rather than a "club," but active in outreach and other astronomical activities anyway – and most of its members are (per their website) also members of the Royal Astronomical Society of Canada Ottawa Centre.

Years back OAFs had an email group that I used to eavesdrop on periodically. They seemed like fun people, and some of the problems they talked about for their astronomy activities showed how soft we have it here in Southern California, even in the winter. The one that sticks in my mind the most is a discussion about dealing with ambient light caused by starlight reflected off snow during astroimaging sessions – not, I'm happy to say, a problem I've had to deal with myself but apparently something one needs to take into account when doing lengthy exposures in areas with lots of snow. They didn't seem to think it any problem to be observing or imaging at 20° or more below zero – and even if that's in Centigrade rather than Fahrenheit, that's certainly pretty cold by our standards.

I don't know how warm it nights get in Ottawa during the summers for viewing, but here it sometimes can be close to shirtsleeve weather all night. Viewing Orion and other winter objects in the pre-dawn hours of late summer without needing a jacket is one of the pleasures of viewing in those hours instead of sleeping – though I wonder if I've got the stamina now for the viewing all-nighters, especially after two years of Covid-sloth. Even though our days are hot (they're frequently over 100° F at Anza) and nights can be pleasant, they can also chill down a lot, which is noticeable when you're not moving around much, so it's wise to bring at least a couple layers of jackets – viewing quickly loses its luster when you get cold. Speaking from unfortunate experience, it's a lot better to have warm clothes with you and not need them than the reverse.

Starbecue July 30, 2022:

By the time you see this, our first formal post-Covid star party at Anza will be behind us – it's scheduled for the Saturday closest to the new moon in May, which is May 28 (New Moon is May 30, Memorial Day). We're in a period right now where the monthly new moons are near the end of the month, and our standard practice has been that the Anza star parties are on the Saturdays closest to the new moon. When New Moon is on a Wednesday, we traditionally have two star parties, one before and one after. Using this formula, the Anza Star Party for June will be June 25 (New Moon is on Tuesday, June 28), and the July Anza Star Party on July 30 (New Moon is on Thursday, July 28). I mention this for those who may not have understood the reasoning behind setting the star party dates, or who may have forgotten during our 2-year hiatus due to the pandemic.

Another tradition that went on hiatus with the star parties was our annual Starbecue potluck party. This has generally been at the July Anza Star Party, though sometimes we've had it at the August Star Party. Now that the star parties are back on track, barring some horrible backsliding event that would close things up again, we're resuming the Starbecue as well. That's now set on the evening of the July Star Party, July 30, 2022.

The general plan for the Starbecue is to gather around 5:00 p.m. on the east side of the club observatory, which by then is the biggest area in shade on the Anza site. The club has some tables in the storage shed that we put up for the food, a barbecue we set up for those who bring things to barbecue, and we'll have paper plates, utensils, napkins, and bottled water (cold, in an ice chest). The food is brought by the members attending – each should bring enough for approximately six people. Some people bring things they make themselves (and we have some excellent cooks in the club), some things they buy – it's all good. If you want to drink something other than water, please bring that for yourself. And it would be a good idea to bring your own folding chair so you're certain of a comfortable place to sit.

When you leave the party, please remember to take anything you brought away with you, including leftover food. It's important not to leave leftover food around, as it will attract rats, mice and other local inhabitants that will only cause problems. We'll have some trash bags set up during the party and will need volunteers to take them away after the party as we don't have trash service at Anza – if you can volunteer for this, that would be much appreciated.

For the party itself, all members and their guests are welcome, and these are generally events that let us catch up with people we haven't seen for a while, meet members we may not know in person yet, and maybe even meet family members who may not generally attend the star parties. Traditionally there have been quite a few family members who come out for these parties, which makes it more fun for everyone. Since it's been over two years since our last Starbecue, I think we'll all have a lot of catching up to do, and I hope we'll have a good turnout.

As a word of caution – please remember that we don't have a lot of parking by the observatory, so please plan to park elsewhere. Some people park on the level below the observatory, the 10 Pad Alley level, some walk up from wherever they're setting up for the evening, some drive up to drop things off at the site of the party and then park below – the only vehicles that should be parked on the club observatory level would be for those who are helping to operate the observatory for the evening and for anyone who is disabled.

We intend to have the club observatory open for anyone on the site to visit and do some viewing during the star party itself, and hope we'll see you there!

In the meantime (and always), may you and your loved ones all stay healthy, and may you all have clear skies when you want them!

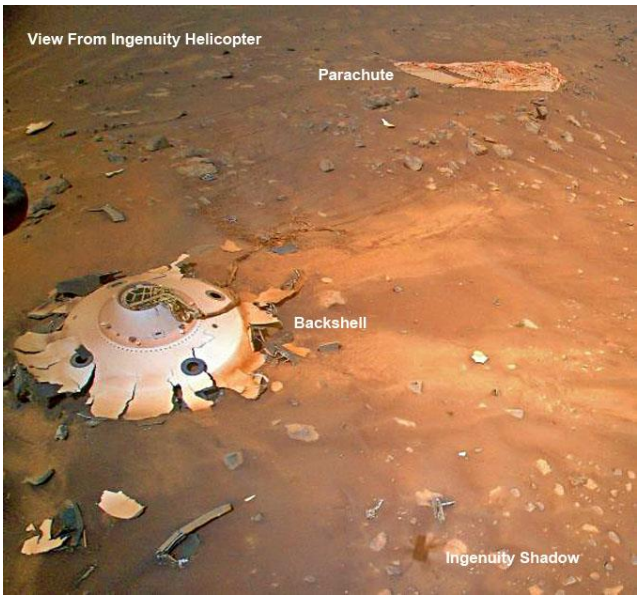
Here is an aerial shot of the 2015 Starbecue where, as usual, the food was good and plentiful, and so was the conversation.

AstroSpace Update

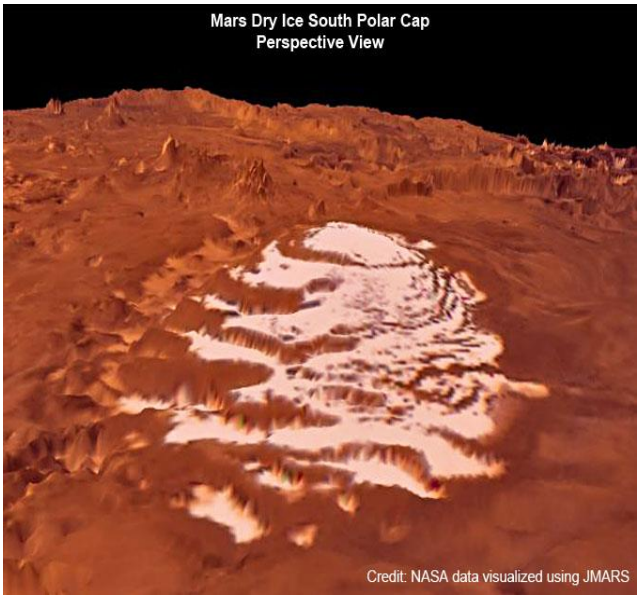
June 2022

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

Ingenuity – The Mars helicopter Ingenuity visited and imaged the site where the backshell and parachute crashed as a planned part of the Perseverance rover landing procedure. On May 3 the rover Perseverance lost radio contact with the Mars helicopter Ingenuity. It was determined that Ingenuity shut itself down when its battery charge became too low due to dust in the air reducing sunlight hitting the solar panel and heavy use of battery power by internal heaters. When sunlight levels increased a few days later, Ingenuity came back to life, but with its clock wrong. Spacecraft controllers did not know when Ingenuity would make its scheduled radio report to Perseverance, so they told the rover to listen all day for the report. Eventually it was heard and contact reestablished. Controllers changed parameters regulating helicopter internal heaters to reduce the chances of repeating the loss of contact. 28 flights have been completed, traveling over 4.2 miles.



Dry Ice Glaciers – A new study of the dry ice (carbon dioxide) at the south pole of Mars shows that it has flowed like glaciers. The evidence is that it has accumulated thicker in low areas (basins and troughs) but was believed to have been deposited more uniformly in thickness originally. Dry ice began being deposited around the pole about 600,000 years ago due to a colder time in long-term climate cycles. The longest dry ice glacier found in this study is about 125 miles long by 25 miles wide. The study looked at the properties of dry ice and determined that under Martian conditions the dry ice glacier flow should be about 100 times as fast as water ice flow. Water ice is also present at the Martian south pole but does not appear to be flowing glacier-like.



Marsquakes – The InSight seismometer on Mars has been recording quakes, more than 1300 of them, for more than 3 years, but the 3 strongest quakes have only recently been recorded. Strong quakes are important because they provide more information about the interior structure of the planet. These strong quakes were above magnitude 4, and one of them about magnitude 5. These are not large compared to earthly quakes, but Mars was expected to have much weaker seismic activity. The strong marsquakes included ones originating on the far side of Mars, which causes some types of seismic waves to be blocked by the core, giving more information about it. One originated near Valles Marineris, the largest canyon in the Solar System, showing that region has seismic activity. One of these strong quakes shook for 94 minutes, a new marsquake record.

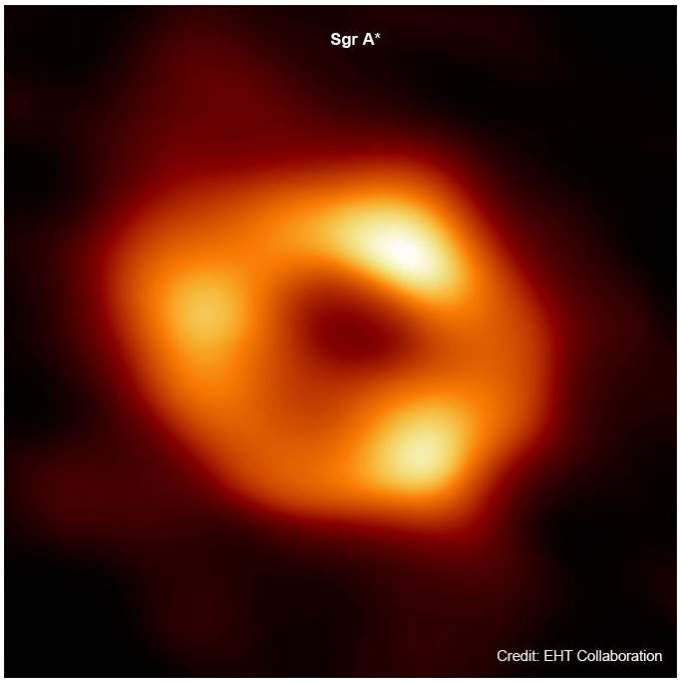
InSight – NASA announced that accumulating dust on InSight's solar panels has drastically reduced the amount of electrical power available to run the craft's instruments. They are expecting to have to shut down the seismometer by late summer, and the whole spacecraft by the end of the year. Only a dust devil or other strong wind hitting the solar panels could save it. NASA has already tried techniques including shaking the panels to try to clear dust.

Asteroids Found – Astronomers have developed a program using humans and computers to find the tracks of asteroids that intruded on images taken by the Hubble Space Telescope. Applying this to 19 years of archived images found tracks of 1701 asteroids, of which about 1/3 were identified as known asteroids. Further work is planned to see what can be learned from these tracks regarding the asteroids' distances and orbits.

Neptune Cools – A study of two decades of archived infrared observations of Neptune, made by ground- and space-based telescopes, shows that the temperature of its upper atmosphere has over those years generally dropped by about 14°F, though near the south pole it has warmed 20°F in just the last few years. Astronomers had expected simple seasonal changes in temperature, which would have the entire southern hemisphere warming. Neptune's year is so long that each of the 4 seasons takes about 40 Earth years, so this study spanned only a half season. More observations and study are needed to understand the cause of these temperature changes.

Planet-Forming Disks – A team of astronomers used the ALMA radiotelescope array to study 870 planet-forming disks in the Orion A cloud. They believed that the presence of nearby massive stars could disturb such disks, so they eliminated such cases from the study. They found that the total mass of small particles in the disks steadily declined with age. Within a few million years, disk masses decline substantially. This implies that if planets are going to form, they do so within a few million years. The study did not establish whether the particles disappearing with age had gone to form planets, had migrated into the star, or had evaporated from heat.

Milky Way Black Hole – A team of astronomers released the first detailed image of the black hole at the center of our Milky Way galaxy, which is known as Sgr A*. This team is the one that showed us the black hole at the center of galaxy M87 (known as M87*) about 3 years ago. The observations for both black holes were made about the same time, but it took the extra time to process the Sgr A* image because of the difference in apparent speed of rotation of the disks about the black holes. The Sgr A* disk rotates in minutes, while M87* disk takes many days. The reason for this is that M87* is roughly 1000 times the diameter of Sgr A*, but coincidentally about 1000 times more distant. Since the disks of both move at about the same speed, near the speed of light, the far larger disk takes far longer to rotate. So, the team had to develop processing techniques that compensated for the rotation of the Sgr A* disk during the days-long time exposures. The disk of gas about the black hole is seen distorted by the extremely strong gravity of the black hole, which bends light. The disk size, as distorted, exactly matches calculations made using Einstein's General Relativity. The observations of both black holes were made with the Event Horizon Telescope, a combination of signals from 8 radiotelescopes scattered across our planet, which yielded resolution equivalent to a telescope the size of the Earth. The result is hundreds of times better resolution than any space telescope.



Magnetic Reversal – Astronomers have been watching a galaxy in Draco known as IES 1927+654 in X-rays, ultraviolet (UV), visible light, and radio with various space- and ground-based telescopes. In 2018 the galaxy brightened by nearly 100 times in visible light, and also brightened in UV. Subsequently the high-energy X-rays disappeared, and then returned 4 months later. The theory that best explains the observations is that the magnetic field of the galaxy's central black hole reversed, that is, the north and south magnetic poles reversed places. Other explanations were considered and ruled out.

Black Hole Echoes – As matter falls into a black hole, often from a closely orbiting companion star, friction heats the matter until it emits X-rays. If there is other material nearby, the X-ray light can echo off that material. Astronomers have developed an automated search tool to find these echoes in X-ray telescope observations, and the tool found 8 new places with such X-ray echoes when applied to observations from the NICER X-ray telescope on the International Space Station. Only 2 such echo places in our galaxy were known previously. They found a pattern to such systems: the black hole emits a jet of high-speed particles, then gives a high-energy flash, and finally drops to low energy emission. Astronomers use such X-ray echoes to learn what material lies where in the vicinity of the black hole, so they are pleased to see new echo discoveries.

Black Widow Binary Discovered – A "black widow binary" is a pair of stars in which one star is a neutron star that is gravitationally eating its companion star. Only about 2 dozen of them are known in our galaxy. A new one has been apparently discovered, though not yet confirmed in X-ray or gamma rays. It is known as ZTF J1406+1222 and is about 3000 light-years away. It has the fastest orbital period of any known black widow binary, at 62 minutes. It is actually a triple star, though the third is quite distant, taking 10,000 years to orbit the close pair. The other black widow binaries have been found by the X-ray or gamma ray radiation emitted by the neutron star, but this new discovery was found by the visible light pulse emitted by the hot side of the companion star on each orbit. The radiation from the neutron star makes one side of its companion much hotter. The discoverers were specifically looking for such hot-side pulses in archived data from the Zwicky Transient Facility, a project using the large Schmidt telescope at Palomar. The search also found a dozen known black widow binaries, demonstrating this is a viable search technique.

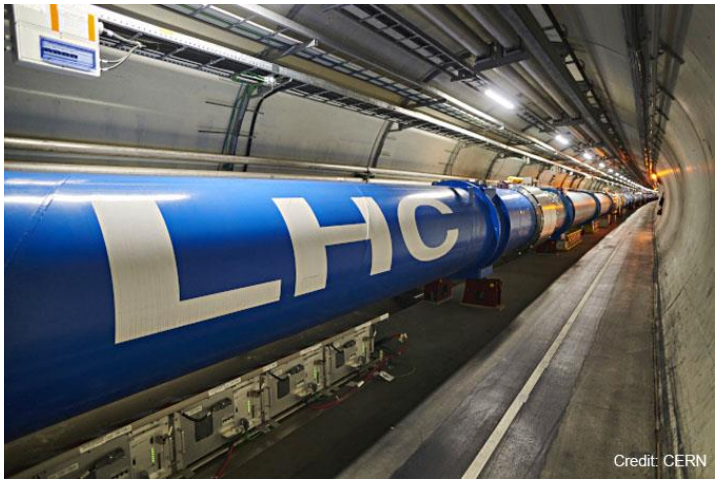
Hydrogenless Supernova – The Hubble Space Telescope has discovered a faint companion star that withstood the supernova explosion of its binary partner star. The supernova was of the type not showing hydrogen spectra, meaning that before exploding the star had been stripped of its hydrogen outer layer. This fits with the theory that hydrogenless supernovas occur when a closely orbiting companion star gravitationally steals the hydrogen layer. This is the best evidence seen for this theory. The companion was found in ultraviolet light and had become detectable as the glare from the supernova faded. That explosion occurred in 2013. The companion star also explains the observation made during the explosion that ultraviolet light peaked in brightness twice. The second peak is explained by the explosion shock wave hitting the companion star.

Black Hole Growth – Astronomers using the Chandra X-ray space telescope studied 108 galaxies that have dense star clusters at their centers. They found that the denser the star clusters were, the more likely they contained a black hole that was heavily feeding on star material falling in. This may explain how stellar-mass black holes, which are created by massive stars reaching the ends of their lives and collapsing, grow to intermediate-mass or larger black holes.

Nova In X-rays – Astronomers happened to be observing a white dwarf star in soft (low energy) X-ray light using the eROSITA space telescope when the star exploded. The flash lasted less than 8 hours and was so bright that it overloaded the sensors in eROSITA. Those astronomers believe that the explosion was caused by hydrogen drawn from a companion star accumulating on the surface of the white dwarf until it reached the temperature and pressure to fuse into helium. This is the same cause as ordinary novas seen in visible light. So, they believe that this flash in X-rays is the first stage of a nova. The visible light of a nova is given off by the cloud of gas blown away by the explosion, as it cools to temperatures that glow in visible light, and this light lasts for weeks or months. Indeed, this visible glow was seen at the star that eROSITA saw exploding, but beginning a half day later. It appears that the connection between the X-ray flash and the visible light glow of novas has not been observed before because there have been few X-ray telescopes sensitive to soft X-rays, soft X-rays are more easily blocked by interstellar medium, and the X-ray flash doesn't last long.

Starliner – A Boeing CST-100 Starliner launched from Florida and docked with the International Space Station for a stay of approximately 4 days. Both up and down this trip carried cargo only, no passengers. But it brings our country closer to passenger capability to the Station from two American sources (the other being SpaceX). Starliner is designed to carry 4 astronauts.

LHC Restart – The Large Hadron Collider (LHC) has been restarted after a 3 plus year shut down that permitted hardware upgrading to allow more energy to be applied to the particles that it smashes and to increase the capabilities of its particle detectors. It is scheduled to make a 4-year run of taking data on subatomic particles.



Missions Extended – NASA has, after evaluation of cost and benefit, extended the missions of these spacecraft: Mars Odyssey, Mars Reconnaissance Orbiter, MAVEN Mars orbiter, Curiosity Mars rover, InSight Mars lander, Lunar Reconnaissance Orbiter, OSIRIS-REx asteroid sampler, and New Horizons. All of these missions were scheduled to run out of funding this year. OSIRIS-REx, after it drops off to Earth the sample of material from asteroid Bennu, is given a new target, Apophis, which is the asteroid that will closely flyby Earth in 2029. It will orbit this new target, but not obtain a sample of it. InSight will continue to take seismic and other data on Mars until the end of this year unless its power holds out longer or shorter than that (see InSight paragraph above). New Horizons will continue to explore the Kuiper Belt beyond Pluto, though no new target body has been found suitable for a close flyby.

From the Editor

Sirius wants photograph submissions from club members

Sirius is running low on pictures. Please send pictures to me along with a brief description of the subject, where the image was taken, and the equipment used.

Ideas for Future articles

The newsletter includes articles from members or about subjects suggested by our members. We seek ideas and writers to cover them. To contribute an article or work with the editor to produce one, please contact me at newsletter@ocastronomers.org .

Due dates for submission of articles, pictures and advertisements

Issue	Due date
July	18 June
August	23 July
September	20 August
October	18 September

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 reduced price $ 1800 +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 $1900, any OCA member may purchase it for $1800 plus shipping.
Please feel free to contact me with any questions.

For Sale contact Rick Hull hull3hull3@yahoo.com 949-636-2920 cell
- SBIG ST-i Mono; Guide/Planetary camera with mechanical shutter reduced price $280

Price includes shipping and PP fees

For Sale contact Jerry Floyd jlfloyd720@gmail.com
- Losmandy G-11 mount with Gemini-1 controller $1200

Originally purchased 7/12/1997, later updated with Gemini-1 controller, high precision brass worm and bearing block. Includes polar alignment borescope, new Michael Herman high-friction clutch pads, 2 18-pound counterweights, HGM clutch knob set. No tripod. Will deliver in Southern California.

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
- Bushnell Red Dot Finder 1X30RD with mounting rail, Green & RED variable intensity LED. $ 30
  1:1 magnification, end caps, precision, like new
- Bushnell type Red Dot Finder made by Comunite 1X30RD with mounting rail. Almost exactly like $ 20
  the Bushnell, Green & Red variable intensity LED. 1:1 magnification, end caps, precision, like new.

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

Another Look

Dave Phelps, June 2022

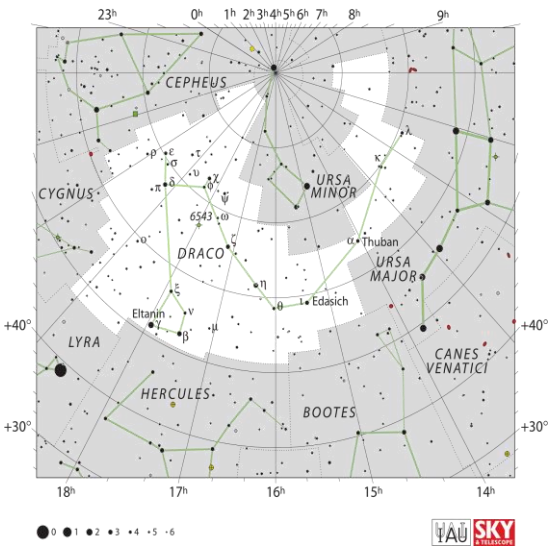
June 1 moon 2 days old, new moon June 29, full moon June 14

Strawberry Moon. Other native names are Berries Ripen Moon, Green Corn Moon, and Hot Moon. The Celtic names are Mead Moon, Horse Moon, Dyan Moon, and Rose Moon. Other English names are Flower Moon and Planting Moon.

I went with a troop of Boy Scouts to Calico Ghost Town some years ago back when it was owned by Knott's Berry Farm. We went to explore the town, have a camp out nearby and work on their Astronomy Merit Badges. What I remember most about the night was Polaris. The sky was so clear that its 9th magnitude companion was brilliant as were the ring of stars surrounding our North Star. The boys earned their badge successfully and I had a great time showing off bright double stars, nebula, and galaxies.

Polaris has as long a history as any object in the sky. It has history in Greece, Mesopotamia, India, Southeast Asia, Australia, New Zealand and of course all over the Pacific Islands. Polaris as a name was coined in the Renaissance, but our modern version of the constellation of Ursa Minor was first included in Ptolemy's Almagest. Scientifically speaking, Polaris is a Cepheid variable and near it is Beta β Ursa Minoris, named Kochab, an orange giant that has fallen off the main sequence. Kochab has a planet orbiting it. Three other stars in Ursa Minor also have planets.

There are not too many deep sky objects in Ursa Minor. The only one I've looked for is NGC 6217, because it's listed as a starburst galaxy, and I was looking for those bright knots in the spiral arms.



https://upload.wikimedia.org/wikipedia/commons/b/b6/Draco_IAU.svg

One card from Urania's Mirror

Wrapping around Ursa Minor is Draco. There are three main stories about Draco that have come down through the years. In one, the Greeks have him fighting the gods and losing. Athena throws him into the sky in retaliation and he ends up twisting around himself.

Eratosthenes depicted Draco as Ladon, the dragon the goddess Hera tasked with guarding the golden apples of the Hesperides, who are nymphs of the evening or maybe sunset. Hercules defeated Ladon when he went to steal the apples. Hera honored his service by placing him into the heavens after Hercules killed him.

Tangentially, I have a theory. Suppose the golden apples were oranges, maybe a little easier to grow in the climate around Turkey at that time. Imagine Hercules as those ancient mariners who skipped along the islands in the Aegean exploring the world and investigating new lands and ports-a-call. They planned to steal orange trees and then return home in one piece. Perhaps Draco is the Bosphorus and the Dardanelles, two extremely twisted and narrow waterways guarding Turkey on the north and the south. Be they thieves, smugglers, or traders, it was ancient free enterprise at its finest.

Although the Arabs knew the Greeks description of Draco as a serpent, the Arabic theme for this constellation was a herd of camels. The stars Beta β (Alwaid), Gamma γ (Etamin), Nu ν (Kuma and Xi χ (Grumium) in the Head of the Dragon represent four mother camels protecting a baby camel from the attack of two hyenas, (Eta η and Zeta ζ (Nodus 1). The nomads' camp is located nearby (the three unnamed stars in the neck of the Dragon: Epsilon υ, Tau τ, and Sigma σ). ***Nodus 1 – Constellations of Words***

There are a couple of interesting objects in Draco. Right next to Omega ω is Gliese 687. Gliese was a German astronomer whose first catalog was of nearby stars within 20 parsecs. There have been two subsequent editions since extending the distance out to 25 parsecs. G687 is small, red and 9th magnitude It seems to be sitting right on top of Omega ω. If you center Ω in your telrad, G687 will be at about PA 180 near the inner ring. G 687 also has two planets that are Uranus size (?) that you

won't see. Close to G687 is the North Ecliptic Pole. The NEP is of interest because NGC 6543, the Cat's Eye nebula is sitting almost right on top of it. Some awful spectacular images of the Cat's Eye have been made but I have only seen a bluish-greenish blob. They tell me the core is 20" across and maybe the right filtering on a bigger telescope will bring out some of the outer shell.

A last image to look at in Draco this month is up by M81/M82. NGC 3147 is a nice 10th magnitude face on spiral about 4' across. It's been cataloged as a Seyfert galaxy with an active nucleus. I don't remember any details about it, but the pictures show me a bright, condensed nucleus. Any takers?

> "The Pyramids on the Giza Plateau were designed to have one side facing north, with an entrance passage geometrically aligned so that Thuban or Draconis would be visible at night. At the time the Great Pyramid was built, one of the shafts aimed toward the star that was then closest to the north celestial pole. The other aimed at the Belt of Orion, one of the brightest and most impressive constellations. The Egyptians described these stars as "imperishable" or "undying." The pharaoh of the time expected that when he died, he would join not only with the Sun, but with Thuban as well - maintaining order in the celestial realm, just as he had on Earth."
>
> **https://www.gshpa.org/content/dam/girlscouts-gshpa/documents/girl-scouts-at-home/constellation-discovery/Draco.pdf**

Not all scientists and archaeologists agree with that last passage. It does seem a little complex. For an alternative discussion click on the hyperlink to an article from Astronomy Magazine: ***"Are the Egyptian pyramids aligned with the stars? - Astronomy ..."***

Back in the second century, Ptolemy compiled his Almagest of 48 constellations. Ptolemy lived in Alexandria, about 31 degrees north latitude, just a little lower than Southern California. How did he compile all the stars of and name the constellation of the Centaur? Was he far enough south? Still the Almagest was the Astronomy reference up till and past the time of Copernicus. ***(Kentauren_1602_-_Skoklosters_slott_-_102438.gif (1200×996) (universetoday.com))***

Centaurus, as depicted on a globe created by Gullielmus Janssonius Blaeu (1602), photographed at Skokloster Castle in Stockholm, Sweden.
Credit: Wikipedia Commons/Erik Lernestål
Thank you universetoday.com

Sometime, back in the 80's during early spring around midnight I took my binoculars to Black Star Canyon road to check out the seeing. I had forever been searching the Thomas Guides for back roads that might lead me to close-in observing sites. Considering that I was in the middle of the Orange County light dome, the seeing was pretty good and the sky darkness also pretty okay. I remember that evening because it got so cold that the dew froze on my windshield and mostly because I saw Omega Centauri and Centaurus A in the same field. My binoculars are an old pair of Tasco wide field 7xs50's that I picked up back in the 60's. What impressed me most about them was that I could see the entire constellation of Lyra in my eyepiece. So, now its your turn.

Cataloged by Bayer as a star and visible to us at 4th magnitude, Omega is claimed by Burnham and echoed by Herschel and others to be the finest Globular Cluster in the sky. It has been written about and studied extensively with descriptions of its large population of RR Lyrae variables used to determine its distance and its own H-R Diagram to map its stellar population. Omega is low to the southern horizon for us, rising to about 10 degrees at its highest. Near the end of June, it will transit between 9 and 10 pm.

About 5 degrees north of Omega and in the same binocular field is 6th magnitude Centaurus A, disrespectfully called the Hamburger Galaxy, also number 77 on Patrick's Caldwell list and listed as NGC 5128.

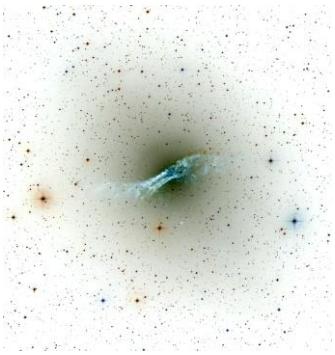
Much has been written about it but most recently it seems that it's an elliptical that has undergone or is undergoing a collision with another galaxy. Details aside, it is a magnificent object to observe and along with its companion are challengers for nearest spectacular celestial companions.

Centaurus is no slug in the galaxy department either. Abell 3526, the Centaurus galaxy cluster, has hundreds of galaxies of all types and sizes. The brightest member of the cluster, I think, is NGC 4696 a 11th magnitude but if you want a bit of a challenge and maybe a telescope with a few extra inches look for NGC 4622, a 12-13th magnitude RING galaxy not too distant from N4696. It is round at 2'x2'; now that you know what to look for, perhaps you will glimpse the ring. Check out APOD, they have terrific images.

I've never been to the Winter Star Party on the Florida Keys, nor to Cabo San Lucas in Baja California. However, if I ever get down there, the first thing I will look at is the Southern Cross. The first thing I will point my telescope at is Alpha α Centauri. Alpha is, as you know, a multiple star system that is closest to us.

Alpha's name is Rigel Kentaurus meaning foot of hoof of the Centaur. Alpha Centauri B's name is Toliman, derived from the Arabic the meaning is "the two male Ostriches". This makes a little more sense when we realize that the original name for both stars was Toliman, making a very closely matched small telescopic double. Rigel Kentaurus came later. The third member, as you know, is Proxima and is determined to be the closest to us of the three stars. A, B, and C Centauri are gravitationally bound. At 0 and 1 magnitude A and B are about 8' of arc apart per Burnham - so easily split. Proxima, however, is 2 degrees from the two and 11th magnitude, easy to spot in your 12 inch but harder to identify.

As long as we're looking at doubles from the tip of Baja, let's look at Beta β Centauri, Hadar. Hadar has a multitude of meanings from knee to spear carrier. It forms a largish double with Alpha some 4.5 degrees distant. Hadar is also a multiple star system whose 4th magnitude companion is probably too close for anything but professional instruments at this moment in its orbit. Of historical significance, Alpha and Beta were instrumental as navigation stars to the south pacific islanders whose ocean travel between islands in dugout canoes is the stuff of legends.



Centaurus A (nasa.gov)
APOD: 2022 March 17 –
Image Credit & Copyright:
David Alemazkour

Boötes as depicted in Uranis's Mirror - a set of constellation cards published in London c.1825.

In his left hand he holds his hunting dogs, Canes Venatici. Below them is the constellation Coma Berenices. Above the head of Boötes is Quadrans Muralis, now obsolete, but which lives on as the name of the early January Quadratic meteor shower. Mons Maenalus can be seen at his feet.

Https://en.wikipedia.org/wiki/Bo%C3%B6tes
Copied from Wikipedia.org

Bootes is an ancient constellation with mythic references to the Greek gods Zeus and Callisto to the more modern interpretation of a plowman. His nearness to Ursa Major adds to his story. In England and many other countries, the Big Dipper is not a bear but a plow. Ergo, the Plowman and the Plow.

The Greek story about Bootes is not only a little gory but complicated by alternative references. In brief, the ancient name for the constellation was Arcas. Arcas was famed as a hunter and his mother, Callisto, was changed into a bear by one of the gods, either Hera or Artemis, and thus we have a hunter holding a spear chasing a bear around the heavens for eternity. There are references that go as far back as Mesopotamia depicting Bootes as a hunter. Ptolemy settled on a Herdsman in his Almagest using the name Bootes, whose meaning is derived from older words meaning Herdsman or Plowman. The stars in Bootes lend flavor to the legend. Arcturus is old, its name going back to 700 BCE. Originally, it was thought to mean Guardian, with the bear added to the story later. The next star up to the left is 2nd magnitude Izar, Epsilon ε Bootis. Epsilon is a double star system with some interesting science. It is also one of the finest telescopic binaries in the sky. The separate magnitudes are 2nd and 5th, and they are separated by 3" of arc. Epsilon A is bright orangeish or yellowish and its companion blue, though the colors are subtle. Back in the 19th century Friedrich Struve named Izar "Pulcherrima", Latin for "the loveliest". Currently we translate Izar as "guardian" though it is likely that its name is also derived from the same root as Mizar in Ursa Major, meaning the thigh, loin or rider.

Up at the right hand of Bootes is the star Alkalurops, mu μ Bootis. Alkalurops' meaning is derived from shepherd's crook or staff, though in the Urania's Mirror image above it is the hand holding the leashes of Canis Venatici. Mu is a double-double system bright enough to see but narrow enough to need some mirror size to split.

Moving away from doubles, NGC 5248 is a cool galaxy located about as far south as you can get and still be in Bootes; very near Virgo. It' s a 6' oval, 10th but nearly 11th magnitude and considered to be a member of the Virgo Cluster. I've seen terrific images of it, but I don't think I've ever searched for it. NGC 5248 is also Caldwell 45.

NGC 5466 is also a very interesting character. It is a 10th magnitude globular of class XII, which means it has no apparent central condensation. NGC 5466 is largish at 11', somewhat larger than the apparent size of the crater Tycho at 7'. Still, it will be a little bit of a challenge because the light of the stars is so spread out.

If we move almost as far north into Bootes as we can, we will find our last faint fuzzy. I chose NGC 5820 because of its extreme nature, much like NGC 5466. NGC 5820 is a class S0 lenticular galaxy. Meaning, I am told, that it is halfway from and elliptical to a spiral galaxy. It appears edge on with no arms or dark band. It'll be tough, Wikipedia gives its magnitude at 11.98. But, as a bonus, you may be able to pick out NGC 5821 in the same field.

Dark Skies

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