SIRIUS ASTRONOMER

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The Newsletter of the Orange County Astronomers

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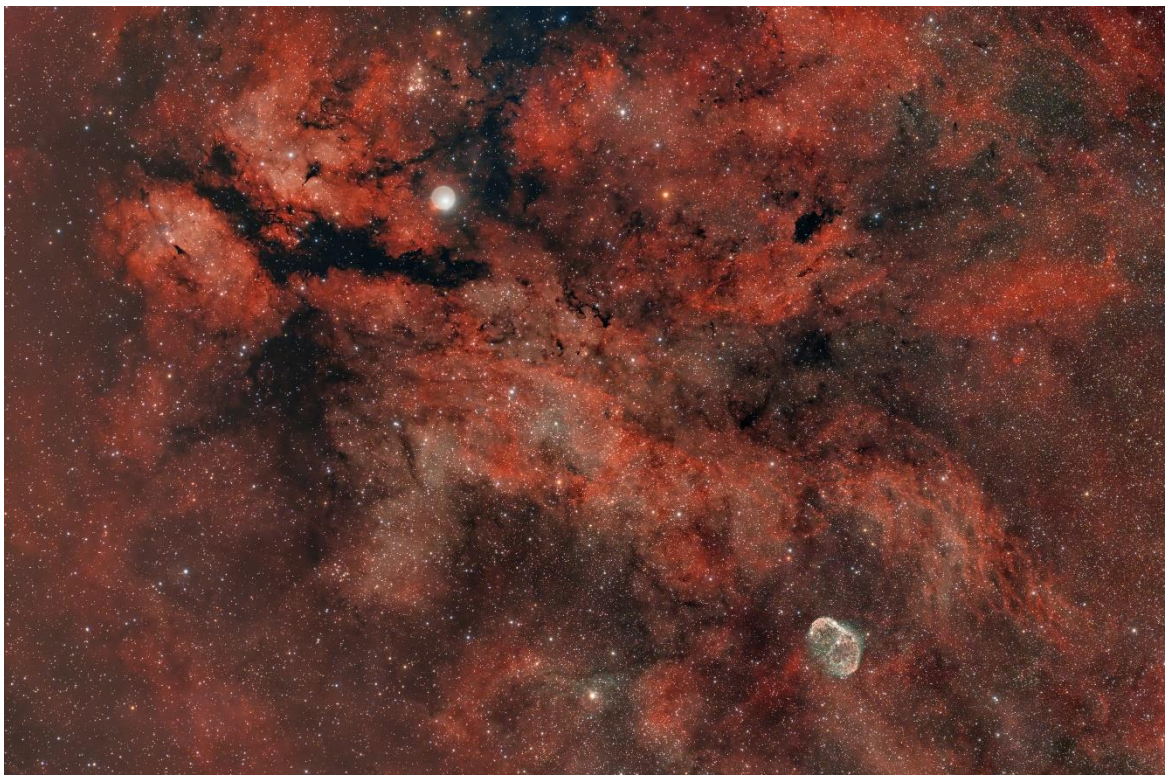


This is the IC1318 region in Cygnus with the Butterfly nebula visible middle left side and Crescent nebula (NGC6888) towards the lower right corner. It was taken by Seung Jun Kim using a William optics Redcat 51 refractor, Touptek IMX571 OSC camera, and Optolong L-eXtreme filter. It was taken on May 29th from OCA Anza site.

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 3.

Upcoming Events - free and open to the public

Beginner's class	Friday, 4 November at 7:30 to 9:30 PM ONLINE This is session 3 of the class. It covers different methods of finding objects in the night sky. Class materials can be downloaded from OCA website.
Club Meeting	Friday, 14 October at 7:30 to 9:30 PM ONLINE "What's Up?": John Garrett from Temecula Valley Astronomers Main speaker: Dr. Griffin Hosseinzadeh from Steward Observatory and the talk will be "The Dynamic Sky: How We Find Discover and Understand Stellar Explosions in the 21st Century"
Open Spiral Bar	Saturday, 15 October at 10:00 to 11:30 PM ONLINE Want to socialize? Grab your images, experiences, questions, or none and see your fellow Orange County Astronomers face-to-face.

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

President's Message

By Barbara Toy

We passed the fall equinox in September (just after the deadline for the October Sirius Astronomer, actually) and we're on our way to the winter solstice – though the heat-wave temperatures this September have been much more consistent with summer than winter, even by California standards. Unfortunately, the drought is continuing, there's talk of a "triple-dip La Niña" that indicates another dry year ahead, and wildfires continue to be a serious threat.

As you may have seen from notices and comments on the club's email groups, there was a possibility that the Fairview Fire that started near Hemet on September 6, 2022, would reach our Anza site. Fortunately, rain in the area from what had been Hurricane Kay helped slow the fire and the firefighters were able to get more of it under control; as I write this, it is still burning but evacuation orders have been lifted and we're hoping that it won't present any further threat to us. Of course, that will all be history by the time you see this, but the explosive growth of that fire and of the fire that started in the canyon behind Laguna Beach in May and burned so many homes in Laguna Niguel shows that wildfires in Southern California can grow as fast and, when circumstances are against us, can be as dangerous as the horrific fires that have caused such damage in Northern California.

So, it's quite important to eliminate as much potential fuel as possible around structures at our Anza site. I hope you're all eliminating similar risks around your own homes, and that you all remain safe from fire as well as all the other dangers we're concerned about these days.

If you're considering a trip to Anza or some other location for viewing or imaging, smoke from our local fires as well as from those that are more distant can definitely affect the sky quality. Fortunately, there are some weather websites that give smoke forecasts along with forecasts of other conditions that could affect viewing. One that is easily accessible is the Clear Sky Chart; the basic chart shows up on our website home page and clicking on it will take you to a page with more detailed information, which itself can link you to the underlying maps of the specific conditions shown in its forecasts.

Covid-Related Update:
After the changes and challenges of the last two-and-a-half years, we've found that we can't just pick up our previous club activities where they were left when everyone went into lock-down mode in March 2020. With ongoing concerns about new strains of the Covid 19 virus and possible additional surges in infections, there have been changes in how we go forward with in-person activities, particularly with maintaining social distancing and continuing to use masks as appropriate. With Outreaches, as one example, the number of students and family members who are allowed into the area of the telescopes at any one time for viewing is much lower than in the past, to reduce risks for the volunteers as well as those attending.

One activity that has not yet resumed is in-person meetings at Chapman University. One of the changes from pre-Covid days that has delayed our return is that there are a lot more formalities than we had to deal with in the past. Charlie Oostdyk has been working on these with Chapman and we should be fully authorized to use the facilities at Irvine Auditorium again soon – at least, when Chapman doesn't need them for their own activities. As you may recall, in most pre-Covid years there would be at least one month when Chapman needed the auditorium for its own activities on our selected night (second Friday night of each month). We've already been told that there are one or two of our regular meeting nights in the 2022-2023 school year when the auditorium won't be available for us and we'll have to decide on the best alternative for those meetings (the alternatives we can choose from are to move the meeting date to the first or third Friday instead of the second Friday of that month, move the in-person meeting to a different location at Chapman if there's one available, or have that meeting entirely on Zoom with no in-person meeting. We don't have a fixed rule on what we do when this type of conflict comes up, and I expect we'll continue to make that decision based on the circumstances at the time).

When we do go back to Chapman, we expect to have our meetings concurrently in person at Chapman and on Zoom. This has a number of advantages: it will allow members who are out of the area or who have health concerns about attending an in-person meeting to continue to participate, it will allow us to continue taking advantage of the much larger pool of potential speakers Reza has been able to tap for virtual talks instead of restricting us to local speakers who can attend our meetings in person, and we will be able to continue making recordings from the Zoom aspect of the meetings available when that's allowed by the speakers. When the plans for that first in-person meeting are finalized, we'll be putting word out through all the usual channels, so please check the website and the email groups for notices of when it is set.

Orange County Star Parties:
Charlie continues to be a mine of information on many aspects of the club's activities and has advised me that we now have a volunteer who can work with Steve Mizera to get the Orange County Star Parties going again, and that Steve's work schedule is changing, and he may be available on at least some Star Party nights to host in person. I understand that they are working out the details with OC Parks and with the primary tenant of the model aircraft area that we have been using for viewing, and that those star parties should be starting up again very soon. When we get the date, we'll put it on the website and on the email groups and the club's social media accounts, so please check regularly if you want to attend those star parties. You can also email Steve Mizera if you want more information or if you want to be sure you are on his email list for notices about these star parties: MizeraS@cox.net.

OCA Election Season Starts:
All of the positions on the OCA Board are for one-year terms, so we have elections each January to decide on the membership of the Board for that year. The actual schedule for events related to our elections is that we take nominations in October and November, the ballot is finalized after the November general meeting and is made available so voting can begin. Voting ends at the end of the general meeting in January (in practice that's by midnight of the day of the January general meeting).

At one point in time, all of the ballots were paper, and had to be mailed in or turned in at the January general meeting. Because of the disruptions due to Covid, we decided to try electronic voting two years ago. This has been enormously successful – a lot more people voted in those elections than in past years, and most of those votes were sent in using the electronic method (only a few sent in paper ballots). Given that success, we'll be keeping electronic voting, and will also allow voting by paper ballots for those who prefer them for at least one more year.

The Board is the governing body for our club, and currently has seven Trustees and four Officers (President, Vice President, Secretary and Treasurer). If you've been a club member in good standing for at least a year you are eligible to run for any of the Trustee positions, Secretary or Treasurer. If you also have served on the Board for at least one year in the past, you would be eligible to run for President or Vice President.

Why should you consider running for a position on the Board? Of course, there's a lot of satisfaction in dealing with different issues as they come up, knowing that the club will be better off as a result. It's also simply fun to work with a group of interesting people toward a common goal. And it's also interesting to learn about different aspects of the club that most members are not aware of as they become relevant to issues the Board considers. I think most Board members find it a really enriching experience, shown by the fact that they're generally willing to continue serving on the Board after their first year.

As to the basics: the Board has six regular meetings each year, set in odd-numbered months starting in January with the installation of the Board for that year. There sometimes are emergency Board meetings in addition to these, but those are rare, fewer than one a year on average. All Board meetings are on Zoom, as we have found that to be the most effective way to have them – since we went to Zoom meetings, even Board members who were out of town have been able to attend, which wasn't possible with in-person meetings. At this point, the meetings are on Sunday mornings and have been around two hours long, so not too much of an imposition.

If you're interested in running for a position, please send an email to our current Secretary, Alan Smallbone, at Alan@ocastronomers.org. We'll be formally announcing that nominations are open at the October general meeting, but you don't have to wait for that.

We look forward to hearing from you, and here's hoping you have some great nights for viewing despite whatever the weather is throwing at us!

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
Coming soon:	Orange County Star Parties
Cancelled until further notice:	AstroImaging SIG, in-person club general meetings (getting closer to resuming)
Check with Coordinator:	Outreach events

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.

AstroSpace Update

October 2022

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

SLS To Launch – Like last month's report, as I write this, the first Space Launch System (SLS) rocket is still on its launch pad in Florida preparing for its Artemis 1 mission. Hydrogen leaks, a temperature sensor problem, weather and other causes have delayed it. This flight will test, with only test dummies aboard, the ability to orbit the Moon and return a capsule to Earth. Artemis 2, with crew aboard, is still scheduled to orbit the Moon in 2024. The SLS rocket has more liftoff thrust and more payload-to-orbit than the Saturn V rockets used for the Apollo missions to the Moon. Though the Soviet N1 rocket, designed to take cosmonauts to the Moon, had more liftoff thrust than SLS, by other measures, SLS will be the most powerful rocket ever (the N1 never successfully orbited in 4 attempts).

SMC Star Formation – A team of astronomers observed massive young stars in the Small Magellanic Cloud (SMC) using the ALMA radiotelescope array. The SMC has a low abundance of elements heavier than helium, so star formation there should resemble the early Universe, when all galaxies had low abundances of heavier elements (because the generations of stars necessary to create heavy elements had not yet occurred). The observations showed high-speed double gas streams flowing out of a forming star known as Y246. Such streams are known to occur in star formation with abundant heavy elements, but this shows the same process occurs with low abundance. Such streams are believed to discard excess spin in the collapsing gas clouds to aid in star formation.

Cosmic Ray Source – Cosmic rays are subatomic particles, many of them protons, traveling near the speed of light. Many cosmic rays have energies larger than can be achieved by the most powerful particle accelerators on Earth. Because cosmic rays are deflected by magnetic fields, it has been extremely difficult to pin down where they originate. If the area of origination has substantial interstellar gas, then collisions of the cosmic rays near the origin create gamma rays, which are not deflected by magnetic fields. A new study using 12 years of data from the Fermi Gamma-ray Space Telescope has found such a gamma-ray source that is also a cosmic-ray source. It is a supernova remnant known as G106.3+2.7. The shock wave from the exploding supernova is accelerating protons to extremely high energies to become cosmic rays. More work is needed to show if all supernova remnants can produce cosmic rays, and if supernova remnants are the only source of cosmic rays.

Gravity Is Unchanging – A new study using data from the Dark Energy Camera on the Victor M. Blanco 4-meter telescope in Chile and other telescopes shows that the strength of gravity has not changed measurably for the past 5 billion years. Einstein's General Relativity assumes gravitational strength remains constant, but some other competing theories call for it to change with time. The strength of gravity was calculated from the amount that light from distant objects was bent by gravity of mass that the light passed by. The Euclid and Nancy Grace Roman space telescopes, planned to launch in the next few years, will be able to make similar measurements to greater distances and therefore further back in time.

Star Formation in the Galactic Center – A new high-resolution infrared survey of the center of our Milky Way galaxy has given astronomers the best data yet on star formation there. Visible light from this area is blocked by dust, but some infrared wavelengths penetrate the dust well. They found that star formation rate in the central region about 1300 light-years has been about 10 times higher than average over the past 100 million years. The star formation started out near the center and worked outward. This matches star formation patterns seen in other galaxies. It was also found that most stars in the Milky Way central region formed in loose associations rather than tight clusters and the member stars of these associations have dispersed since their formation. The variety of star ages found showed that star formation occurred in various phases that took place as much as 7 billion years ago. The new survey was made with infrared instruments on the Very Large Telescope in Chile and obtained data on 3 million stars near the galactic center. Even with 3 million stars, the survey was seeing only the brighter stars due to the distance of the galaxy center. Astronomers plan to follow up this survey with observations of spectra and proper motions of these same stars.

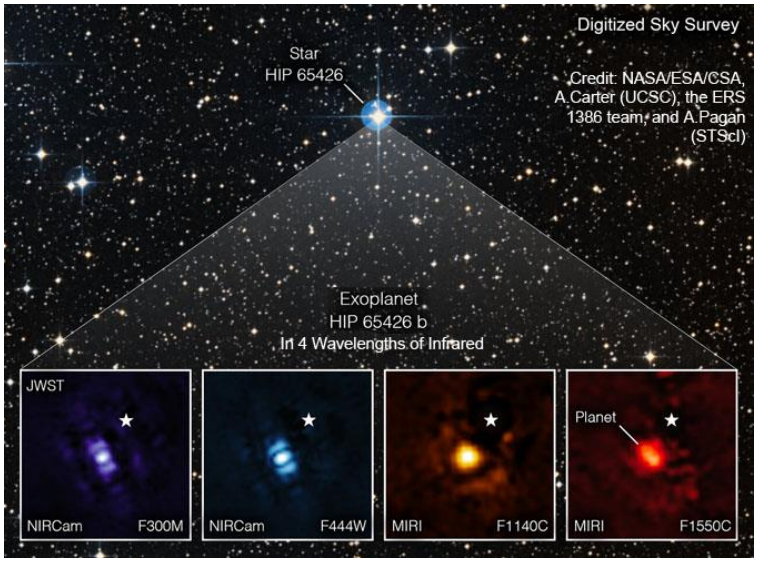
Star Formation Stops – Observations of a galaxy, known as SDSS J1448+1010, that recently stopped forming stars, were made using the ALMA radiotelescope array in Chile and the Hubble Space Telescope. These show that the cause of star formation stoppage is that a collision with another galaxy flung away much of the cool gas out of which stars are formed. Strangely, other galaxy collisions have stirred up more star formation, not less. There is evidence that the studied galaxy underwent a burst of star formation just before it quit about 70 million years ago. Many astronomers have long believed that a rash of supernovas would blow away or heat the cold gas of a galaxy and stop star formation, so there may be more than one way to stop.

Stars Flaring – The purpose of the TESS space telescope is to find planets when they pass in front of (transit) their stars. But as a side effect, it recorded more than 25,000 stars flaring. A computer program sorted these flarings out from other blips in stars' light. Of the stars being watched, 7.7% of them flared. The flares were similar to those observed on our own Sun, but some were much stronger, up to a billion times the energy of a typical flare on the Sun. Most of the stars found to flare had temperatures lower than 8,000° Kelvin. Red dwarfs were more likely to flare than other types of stars.

Oldest Planetary Nebula – A team of astronomers has discovered the oldest known planetary nebula. Such a nebula is formed when a star near the end of its life blows off substantial material in an expanding cloud, which usually dissipates in 10 or 20 thousand years. The speed of expansion of the new discovery indicates it is about 70,000 years old. William Herschel called such nebulas "planetary" even though they have nothing to do with planets, other than the ones that are round resemble planets through a small telescope. The new discovery is located in the open star cluster M37. There are only 3 planetary nebulas known to be members of open clusters. Astronomers believe that there is less disruption from interstellar medium within an open cluster, which allows a planetary nebula there to resist dissipation longer.

Exoplanet Atmospheric Carbon Dioxide – The James Webb Space Telescope made the first ever certain detection of carbon dioxide in the atmosphere of an exoplanet. This was accomplished by taking the spectrum of the planet, known as WASP-39b, as it passed in front of its star. This is a gas giant planet with roughly ¼ the mass of Jupiter, located about 700 light-years away. It orbits its Sun-like star quite closely, so is puffed up from the heat. The planet was discovered in 2011 by the dimming of its star when it transited in front. Previous observations by other telescopes had detected water vapor, sodium and potassium in the planet's atmosphere, but it took the Webb scope to detect the weaker signal of carbon dioxide.

Exoplanet Imaged – The James Webb Space Telescope (JWST) took its first image of an exoplanet, though it had already observed other exoplanets that were too close to their stars to be separately resolved in images. It is known as HIP 65426 b, is a gas giant 9 times the mass of Jupiter and is 355 light-years away. It had previously been imaged in infrared by the Very Large Telescope in Chile. Because JWST can operate at much longer infrared wavelengths than Earth-based telescopes, the new images should reveal more about the planet. The new images were made using a coronagraph on JWST to block the blindingly brighter light of the planet's star. The planet orbits quite far from its star, taking 630.7 Earth years per orbit. But this distance from its star makes it easier to image.



Binary Star and Planet Orbits – The VLBA, an interconnection of 10 radiotelescopes scattered across the country, has for the first time ever mapped out orbits of a binary star and the planet that orbits one of them, in 3 dimensions. This is one of only 3 exoplanets found by astrometry, that is, precise measurement of star movements in the plane of the sky. The star pair is known as GJ 896 and is about 20 light-years away. Both are red dwarf stars, considerably smaller than our Sun. Their orbit about each other is about the size of Neptune's orbit about the Sun. The planet is about twice as massive as Jupiter and its year is 284 Earth days. The planet orbits in the opposite direction that the stars orbit each other, and the planes of planet orbit and star orbit are tilted by 32°. Astronomers had thought that planets and companion stars would form from the same disk, and therefore in the same plane and direction. Astronomers are also having trouble explaining how such a large planet would form about such a small star.

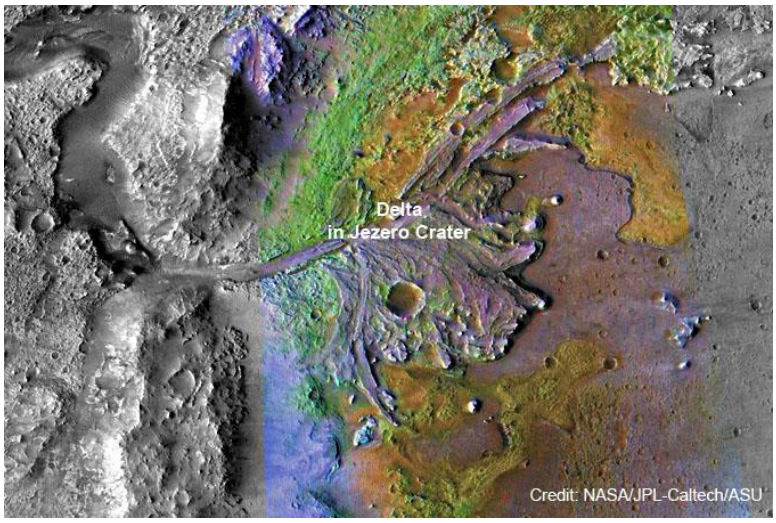
Nearby Black Hole – Examination of data from the Gaia Space Telescope showed a nearby (about 1500 light-years distant) Sun-like star is orbiting an object of about 10 times the mass of our Sun but is so dark it must be a black hole. The Sun-like star is a G type star with heavy element content about that of the Sun. It revolves about the dark object every 185.6 Earth days in a modestly eccentric orbit. The dark object would be the nearest known black hole. But the difficulty of finding it implies there may be many more nearby black holes waiting to be discovered.

Water World – A team of astronomers has discovered an exoplanet that appears to have a substantial content of water, far more than Earth's oceans. The planet is known as TOI-1452 b and was found to orbit one of a pair of stars orbiting each other. The system is about 100 light-years away in Draco. The planet's diameter and mass are somewhat larger than Earth's, and it orbits in the habitable zone, that area where temperatures should allow liquid water to exist on its surface. It was first detected by the TESS planet-finding space telescope and was then observed by ground-based telescopes. These determined the planet's mass, which showed its density is too low to be an entirely rocky planet, but must have considerable water, perhaps as much as 30% of its mass. The host star is smaller and dimmer than our Sun, and the planet's year is only 11 Earth days. The astronomers hope to further study this planet with the Webb Space Telescope.

Missing Carbon Monoxide – It has long been a mystery why the concentration of carbon monoxide observed in protoplanetary (planet-forming) disks is often less than in computer simulations of planet forming. A new simulation better matches observations, and it shows that the carbon monoxide is freezing. In the solid form it is much more difficult to detect. The simulation was validated by matching it with observations of 4 protoplanetary disks using ALMA (radiotelescope array in Chile). The freezing starts about a million years into the planet forming process. Because carbon monoxide gas is easy to detect, it is often used to estimate other constituents, so getting the carbon monoxide concentration right is important to understanding planet formation.

Solar Switchbacks – Solar space telescopes, including the Parker Solar Probe, have occasionally flown through sharp reversals of the Sun's magnetic field, and these have been dubbed switchbacks. For the first time a spacecraft, the Solar Orbiter, has imaged a whole S-shaped magnetic feature that must be such a switchback. It was located above an active sunspot region, which apparently was the source of the feature. The circumstances match one theory of how switchbacks form: open magnetic fields (ones stretching away from the Sun) and closed magnetic fields (ones that loop back into the Sun) interact and reconnect, creating a new open magnetic field line with S-shaped kinks in it. The kinks then rise away from the Sun. It has been observed that solar wind speeds up in a switchback, so this may explain the mystery of how solar wind gets hotter and faster as it recedes from the Sun.

Mars Rover Radar – Analysis of ground-penetrating radar observations from the Mars rover Perseverance showed the geology of Jezero Crater is more complicated than expected, with tilted rock layers rather than just horizontal layers of lava or sediment deposited over time. Most of the rocks found in the bottom of the crater have been determined to be volcanic rock. The non-volcanic rocks seem to be limited to the delta area where water flowed into Jezero billions of years ago. The rover continues to sample rocks and soil, some of which will be brought back to Earth on a future mission. The radar observations give context to these samples.



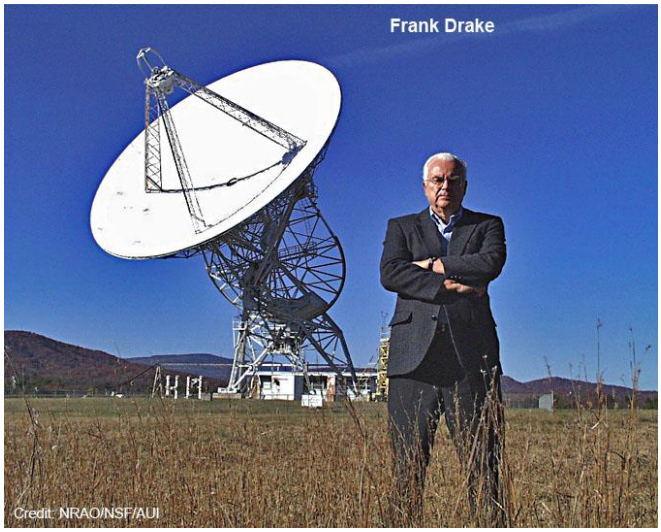
Mars Water Lacking – More analysis of seismic data from the Insight Mars lander has been released. The top roughly 1000 feet beneath the lander contains little ice. The crust is more porous than expected. Sediments are not well cemented. Scientists had expected that the water that was evidently plentiful billions of years ago was expected to be found now underground in minerals that cemented sediments together or as underground ice. Other missions have found plentiful underground ice, but closer to the planet's poles.

Green Planet? – Mars is known as the Red Planet because almost all its surface is covered with rusty red dust. But the rover Perseverance found grains of olivine, a green mineral. But I don't think "The Mostly Red and Occasionally Green Planet" is going to catch on. The rocks including the olivine are believed to be volcanic in origin with some interaction with water and are probably close to 4 billion years old.

Pre-Solar Material – Examination of samples returned from asteroid Ryugu by the Hayabusa2 spacecraft found microscopic grains older than our Sun. The ages were found by the ratios of isotopes of elements. Similar pre-solar grains have been found in carbonaceous chondrites, a type of meteorite. The grains newly found duplicated types of meteorite grains, and additionally included a new silicate. This reinforces the theory that microscopic grains get recycled from earlier stellar systems to later ones.

Voyager 1 Repaired – As reported here in July, the Voyager 1 spacecraft has been jumbling some of the data it sends to Earth. Analysis showed that the spacecraft was sending attitude data through an onboard computer that was determined to be faulty and turned off years ago. Controllers again commanded it to turn off use of that computer (and use the backup computer) and that cured the problem. Voyager 1 continues to collect data on interstellar space about 45 years after it was launched to Jupiter and Saturn.

Rocket Failure – A Blue Origin New Shepard rocket failed about a minute into flight. The capsule contained only zero-gravity science experiments, no crew. The escape system worked perfectly and separated the capsule from the rocket, gently returning it to Earth by parachutes. The same rocket system has launched several crews into near space successfully. The incident shows that rocket launches are not yet routine.



Frank Drake, key figure in the search for extraterrestrial intelligence (SETI), has died at age 92. About 60 years ago he planned and executed Project Ozma, which listened (unsuccessfully) by radiotelescope for signals from nearby stars Tau Ceti and Epsilon Eridani. It was decades later when planets were finally proved to orbit those stars. Drake developed the Drake Equation, which figured the probable number of civilizations in our galaxy that might communicate with us. At the time, most of the factors in the Equation were unknown, but we now have a good idea of such factors as the fraction of stars that have planets. Other factors, like the fraction of planets that develop intelligent life, are still anybody's guess. But the Equation began the discussion on SETI. Drake has said that his best accomplishment was the 9 years he spent answering calls on the Suicide Prevention Hotline.

Starliner Delayed – Boeing announced that its Starliner space capsule will undergo some fixes that will delay its first launch with crew until next February. The Starliner is the second privately developed crew space capsule, after SpaceX's Crew Dragon. Starliner had 2 thrusters fail during its last test flight without crew to the International Space Station. The thrusters are on a part of the spacecraft that is burned up on return to Earth, so it may take a while to determine the fixes necessary.

Another Look

Dave Phelps, October 2022

Full moon October 9, called the Hunter's Moon; New Moons Sunday Sept 25 and Tuesday Oct. 25
Native Americans named this Full Moon after Autumn, including Drying Rice Moon, Falling Leaves Moon, and Freezing Moon. The Celts used Seed Fall Moon to describe this moon. Also, the Pagan Blood Moon or Sanguine Moon.

On Oct 25 is a partial solar eclipse. At max the Moon covers 82.11% of Sun's surface somewhere east of the Urals and north of Novosibersk. The partial phase is visible into Spain, Africa; the southern tip of India will see a tiny notch taken out.

When you take into account that Aries is one of the puny constellations surrounded by Triangulum and Pisces it is a wonder why it is so famous. That being said, Aries could be one of the oldest constellations identified. If we accept that the constellations as we know them, excluding India and China, were first named several thousands of years ago in and around the region of the Euphrates River, it is probable, 3500 years ago, that the stars were not named because they looked like anything but because they identified with a certain significance in their daily lives. It is also probable that star configurations were pinpointed by civilizations preceding the Euphratean era. One thing is likely, however, that many of the names given any particular star grouping meandered all over the ancient world and influenced civilizations from Greece and Mesopotamia down to Egypt and the Nile valley; and as we know, the Romans incorporated Grecian culture into their own, Latinizing their names.

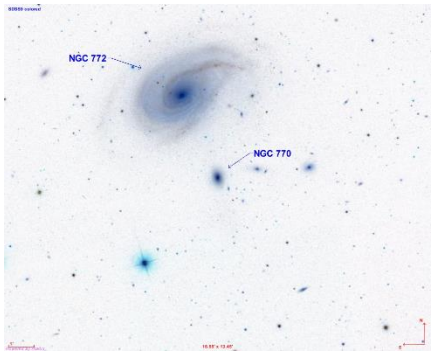
(Aries and Musca Borealis as depicted in Urania's Mirror, a set of constellation cards published in London c.1825)

Thus, 3500 years ago the Chaldeans, who named the sun after their flocks, put a name to the stars where the sun shone as the seasons changed. Through the centuries the name stuck. Now, as the seasons change the vernal equinox is in Pisces while 3500 years ago, it was in Aries. Now, the First Point in Aries is slightly below the circlet of Pisces.

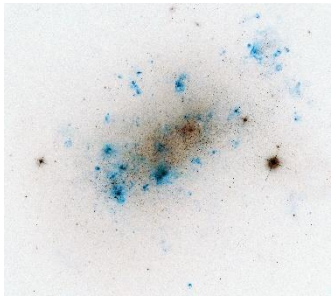
I think one of the more fun myths associated with Aries was that of Helles and Phrixus, who were given a ram to escape their evil stepmother. Racing across the Adriatic up into Asia Minor, Helles fell off, thus naming that narrow strait, near the Dardanelles, between Greece and Turkey the Hellespont. The ram raced across the Black Sea bringing the brave young man to safety in Colchis, now modern Georgia. The Ram magically changed its fleece to gold, was sacrificed in thanks to the gods, (I wonder if the ram thought it was such a great honor) and the fleece placed in a grove guarded by a dragon, ready to be stolen by Jason and the Argonauts.

Near Beta and Gamma Arietis is NGC 772 and it satellite galaxy 770. N772 is big and bright at 11th magnitude and you can find N770 at 14th. It is interesting that N772 is also number 78 in Arp's **Atlas of Peculiar Galaxies.**

Aries also has its own dwarf galaxy NGC 1156. N1156 is interesting. It has no structure because of interaction with other galaxies. Those bright spots are star forming regions. N1156 is 12th magnitude so you will find it in your 8" backyard telescope.



NGC772 Image courtesy of Image créée à l'aide du logiciel Aladin Sky Atlas du Centre de Données astronomiques de Strasbourg et des données de SDSS (Sloan Digital Sky Survey).

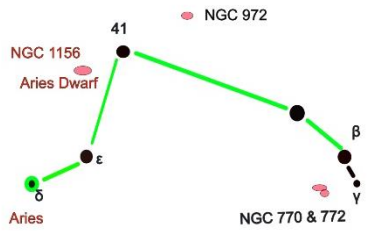


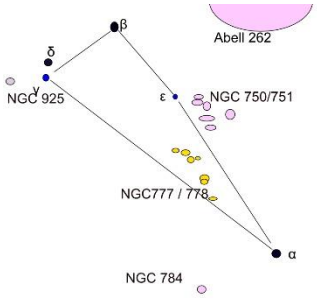
NGC1156
Credit: Hubble Image of the Week

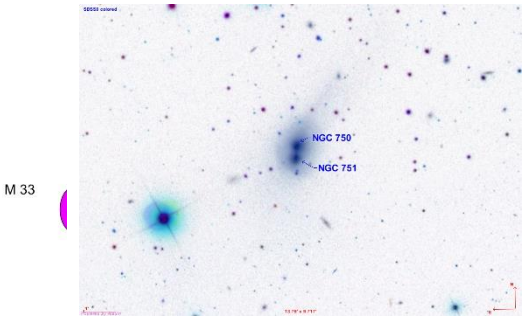
NGC972
Credit: Hubble Image of the Week

Up at the top of Aries is NGC 972, another interesting galaxy. Images of it from Hubble show what looks like at first glance an irregular galaxy, but closer study finds its spiral structure hidden by the knots of star nurseries gas and dust. It is 12th magnitude but only 10 arcmin in size. Still if you compare the moon is at 31 arcmin, you can get a good idea of the relative size of N972.

While up at the top of Aries find 41 Arietis. It is a triple star system with components of 4th, 11th and 11th magnitudes. 41 Ari has an official name from the Hindu, Bharani, it means 2nd lunar mansion. 41 Ari is also a part of the obsolete constellation of Musca Borealis, first introduced on a globe of 1612 by the Dutchman Petrus Plancius and shown above the Ram in our clipping from Urania's Mirror.



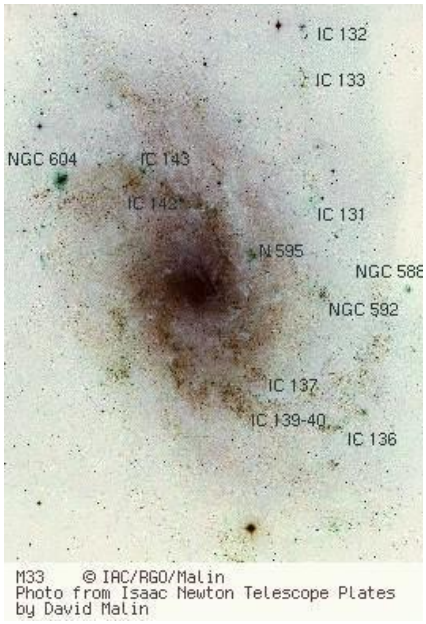




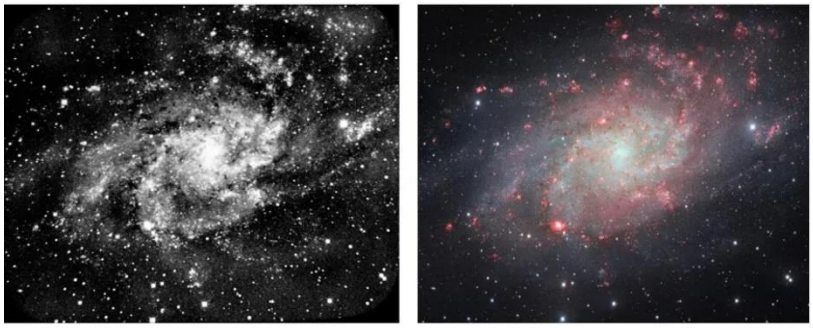
It being that time of year, Triangulum is galaxies, galaxies and more galaxies.

Near each other just off the line from delta to alpha are NGC's 777 and 778. N777 is a bright 12th magnitude nearly textbook elliptical. It's beatifically formed, an oval gradually getting denser and brighter from the edges of the galaxy to it star-like nucleus. NGC 778 is not too far off and can be seen in wide angle images much smaller than its companion. N778 visual magnitude is 14 in the blue range so it will be a properly difficult object to locate. If you can spread out its 8x4 arcsec image you will see a tilled spiral with some unusual knots and clumps.

Moving over to the other side of Triangulum, there is another knot of interacting galaxies comprised of NGC 750 and NGC 751, number 166 on Arp's **"Atlas of Peculiar Galaxies"**. Near delta δ and gamma γ Ttrianguli is **N925** a nice loose spiral. It is named the Almatha Galaxy: Quite pretty and at 10' by 5', should be fairly easy to see, though a little low in surface brightness.



M33 © IAC/RGO/Malin
Photo from Isaac Newton Telescope Plates
by David Malin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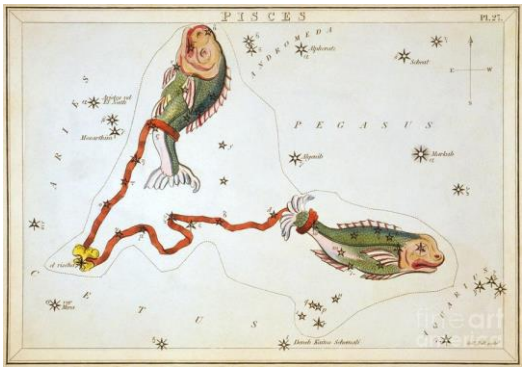
https://www.drewexmachina.com/2021/06/27/a-century-of-progress-telescopic-views-of-the-triangulum-galaxy /and
https://www.messier.seds.org/more/m033_map.html

NGC 598 or better known at M33 is one of the largest deep sky objects and one of the brightest we have. So, why is it so hard to see sometimes? It's huge, 70×41moa, but that size compared with its low surface brightness has given it the reputation of being a difficult object. It's 5th magnitude so we should be able to see it visually under dark enough skies, and we can. I have a homemade collimation eyepiece, a 1.25" round piece of aluminum with a 1/8" hole bored through it. It works as a great eye focuser, eliminating extraneous light around the edge of your eye. With it on a mountain in Utah I saw M33 and even resolved a few knots. The Malin image shows four NGC's and 8 IC's. The trick is to try it identify them visually using a map like this as your guide. The four H II star forming regions identified in the image are NGC 595, NGC 588, NGC 592 and NGC 604.

In antiquity Triangulum was seen as a triangle and the Greeks even called it Deltaton because it resembled the capital letter delta in their alphabet. It resembled the Nile delta and the Island of Sicily because of three peaks on the island. Sicily is the legendary home of Ceres, the goddess of agriculture and our minor planet. Ceres apparently loved the island so much she asked Zeus to place it in the heavens.

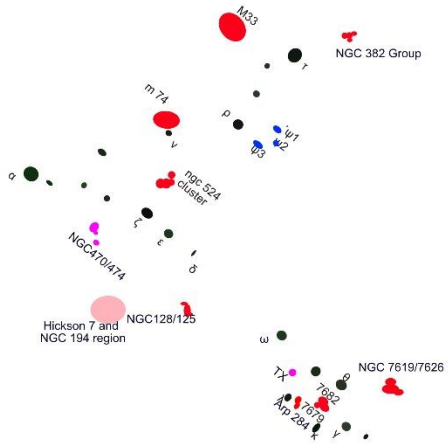


Pisces Urania's Mirror, Second Edition

Pisces

"The Fishes shine one higher than the other,
from each of them extends as 'twere a band
that fastens tail to tail, as wide it floats, and
one star large and brilliant clasps its ends"

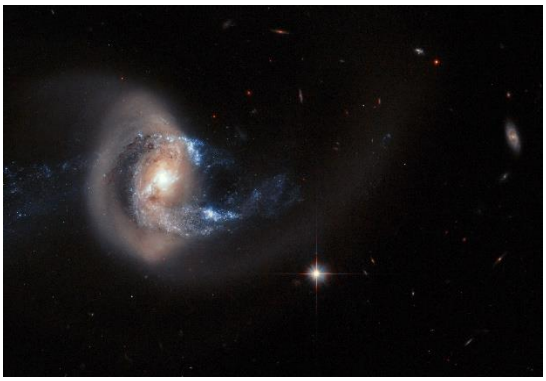
The Heavenly Knot' tis called" Frothingham's Aratos



The asterisms that make up Pisces, the Northern Fish and the Western Fish are a part of Ptolemy's original 48 but are thousands of years more ancient. The Babylonians and other civilizations up to and including the Romans regarded the star group as two fishes tied together by a cord or ribbon. The star at the base of the ribbons is Alpha α Piscium. It is a named star, Al Rescha, meaning the knot. In one of my references, it is posited that the dual nature of the constellation contributed to or was in turn contributed to by the addition of an extra month every six years of the Babylonian calendar. That's how ancient this constellation is. Due to the precession of the equinoxes, the vernal equinox is close to the circlet.

The Greeks had the most fun with this constellation. They wove into it the Titan's war with the gods, the birth of the most dangerous Titan of all, an escape and a stellar honor. Typhon was supposedly the fiercest monster ever created. He had serpentine feet, many heads and could breathe fire. His story easily goes back to the Egyptians, and we can trace its origin back millennia, as far as the civilizations that grew along the Euphrates. In the Greek saga, Typhon, our monster, attacked the gods, seeking to give the Titans rule over the world. The gods escaped by turning themselves into animals. Aphrodite and her son Eros escaped into the river (either the Euphrates or the Nile depending on the narrator), by changing themselves into fish. Minerva honored this pretense by placing the fish in the heavens. So, what happened to Typhon? Zeus defeated him thus cementing his authority over the heavens. He then buried him under Mt. Etna, making it the largest volcano in Europe.

The single Messier in Pisces is M74, a big, beautiful face on spiral. M74, also known as NGC 628, is a large, 10'x10', 9th magnitude galaxy that is usually the bane of the Messier Marathoner. It all has to do with its surface brightness. M74 doesn't have much in the way of bright star forming regions. Its face is uniform from the nucleus out to the spiral arms. M74 courtesy of: ***ESO PESSTO***



My observing plan was to choose a particular constellation and learn it. I figured that I would never be able to find out everything that a constellation had to offer and doing a constellation a month would ensure that I would have a lifetime's work ahead of me. Pisces is a great example of that. I was first interested because it is faint and had an interesting circlet of stars. I decided to search for and identify every galaxy within reach of my 17.5 inch mirror. I never came close. In the circlet neighborhood alone, there are three clusters of galaxies within reach of your 12 inch and detectable in your 8 inch. The rough chart I made shows eight reachable clusters.
https://esahubble.org/images/heic1503a/

Near the circlet are 12th magnitude NGC's 7714 and 7715 also known as Apr 284. A pair of interacting galaxies discovered by John Herschel in 1830. Next to the circlet is 19 Piscium, better known as TX Piscium. 19 Piscium is one of the reddest stars known. The star has an apparent magnitude that varies between 4.9 and 5.5 magnitudes. It is a variable carbon star, which is to say a late type star that contains clouds of carbon circulating in the atmosphere. That's kinda wowser to imagine, isn't it?

This wide field image of N524 was taken by Gregg L. Rupple on http://greggsastronomy.com /ngc524.html

In the center of Pisces near the cusp is another group dominated by the 10th magnitude NGC 524. It's going to look like an elliptical, in fact early observers described it as a dense E1 galaxy. Actually, N524 is a tightly wound face on galaxy. It will be tough to see it, however.

The NGC 383 group is up north against Andromeda, not too far from τ Piscium. It is another "string of pearls" and quite beautiful as I remember. Arp put it into his ***Atlas of Peculiar Galaxies*** as number 331. No room for a picture this time.

So, Aries, Triangulum and Pisces, bundled together beneath Andromeda and Pegasus and maybe passed over a little bit by their more famous neighbors. Still, they are a significant part of the realm of galaxies. I hope you enjoy finding and observing them.

Dark Skys
Dave Phelps

From the Editor

Sirius wants photograph submissions from club members
Sirius is doing okay for pictures but still wants more! 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
November	21 October
December	19 November
January 2023	22 December
February	21 January

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 — further reduced price — $ 1700 +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 $1700 plus shipping.
Please feel free to contact me with any questions.

For Sale contact Jerry Floyd jlfloyd720@gmail.com

- Denkmeier Binoviewer II — reduced price — $ 800 or make offer

Complete with SCD holders, Power X Switch, Newtonian spacer tube, 2" nosepiece, 2" Multipurpose OCS cell, 2x14mm Denkmeier eyepieces, but does NOT have 1.25" nosepiece.

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.

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

For Sale contact Michael Newman mnewman2112@gmail.com

- Pad lease for LP-12 in Lower Pads section and the pier upon it — $1250

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.

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