



This is NGC253, a spiral galaxy in Sculptor. Ray Stann took this at the club's Anza site in 2006 using a Celestron NexStar 11 telescope and SAC10 camera.

Because of the COVID-19 crisis and ongoing efforts to reduce exposure to the virus:

- **Most but not all in-person club events are cancelled**
- **Use of the Anza site is discouraged**

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 April at 7:30 to 9:30 PM This is session 2 of the class. It covers equipment for night sky observation (visual). Class materials can be downloaded from OCA website.	ONLINE
Club Meeting	Friday, 11 March at 7:30 to 9:30 PM "What's Up?": John Garrett from TVA Main speaker: Prof. Karim Jaffer from John Abbott College whose talk will be "Bringing Astronomy Alive: Student Engagement at John Abbott College"	ONLINE
Open Spiral Bar	Saturday, 12 March 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)

Response to COVID-19 Crisis

COVID-19 continues to affect all our activities. Some in-person club events remain cancelled while others are beginning to occur or are in the process of being scheduled. Cancellation periods for specific events are detailed below. Please see the President's Message for additional information.

Any use of the club's Anza site by members is at their own risk as we have no way of cleaning or sanitizing the site to CDC standards. If you must go to the site, be sure to clean and sanitize surfaces you have contact with and make sure it is cleaner when you leave than it was when you arrived. You must bring cleaning supplies and sanitizer with you as it is not provided at the site. Be sure to take any trash that you generate or find on the site out with you and please maintain social distancing if anyone else is out there.

If you have any questions, feel free to contact board members or post them to the email groups or through social media. We will do our best to respond, but please bear with us if there is a delay as we all have other responsibilities as well.

We hope you and your families and friends all remain safe and healthy, and best wishes to all of you!

Summary of Cancellations of OCA In-Person Events

Due to the ongoing COVID-19 crisis, all in-person club events are cancelled through at least the following periods:

General Meetings	Cancelled until further notice; please try our virtual meetings instead.
Anza Star Parties	Not yet, more said in the President's Message.
Orange County Star Party	Cancelled until allowed by Orange County Parks.
Outreaches	Suspended.
Beginners Astronomy Class	Held only as Zoom meetings. Please contact Dave Pearson to attend.
SIG Meetings	Astrophysics SIG has resumed meeting in person. AstroImaging remains cancelled indefinitely, depending in part on availability of facilities and when meetings could go forward safely.

Please check the website, email groups and social media for updates.

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

<u>Issue</u>	<u>Due date</u>
April	19 March
May	23 April
June	21 May

The editor apologizes for the extraordinary number of typographical errors and factual mistakes that appeared in the February issue. A stronger effort will be made in the future to maintain the quality of our newsletter.

President's Message

By Barbara Toy

There's a long, dark ridgeline about five miles north of my home. For years, when I've gone out at night to look at the moon and stars, I've admired its silhouette against the glow of the lights beyond it, rising like a dark island out of the city lights on my side of it. Now though, I find myself surveying it more anxiously, sobered by the view I had of it in the early morning hours of February 10, silhouetted against the leaping flames of the Emerald Fire. Through a lot of hard work from firefighters, good preparation from the homeowners in the fire's path that made their homes defensible, and a fortunate change in wind direction, no homes were lost in that fire. Another brush fire broke out in Whittier later that same day, and, sadly, at least two homes were lost before it was controlled.

Brush fires are part of the natural cycle in California – but we don't expect them in February. These two fires were reminders that we can't assume that we're safe from fires in winter months. For the club, this means that we need to be sure that all the structures on our Anza site are defensible from fire year-round, not just in the spring and summer, which is generally when we've concentrated our efforts. By "defensible," I mean that weeds and shrubs need to be cleared away from them, so it's harder for fire to spread to them if we get another fire burning across our site. The same is true for pads – keeping the areas around them clear of weeds and grasses makes it much less likely there would be damage to anything on the pads that might be flammable.

We had a promising start to the rainy season in December, but the dry months since then have shown that we're still in a serious drought and whatever rain we're fortunate enough to get in the remaining weeks of this rainy season won't be enough to end it. It looks like we'll be having another hot and dry summer, with the danger of fire increasing as the vegetation dries out. Last year we were fortunate not to have many major fires in Southern California and I hope that good fortune continues and that we don't see any fires anywhere in California or the western states like the massive fires that caused so much destruction in Northern California over the last three years.

Smoke and Weather...

Even a wildfire that doesn't threaten structures throws smoke into the atmosphere that, among other problems, can affect viewing conditions miles away. Smoke from distant fires can become a factor to consider when planning for a night under the stars. Fortunately, there are websites and apps to help determine where smoke plumes may be a problem (one is the AirNow Fire and Smoke Map, <https://fire.airnow.gov/>, and you can also ask for recommendations for those that other members have found helpful through the club email groups).

Most of us find, as we get more involved in hands-on astronomy, that we also become a lot more interested in weather and ways of predicting sky conditions. For club resources, the Anza and Orange County Sky Charts on our website are convenient resources for forecasting weather for our regular viewing sites for two or three days in advance. If you click on the chart for the location you're interested in you'll get a more detailed image and more information; the individualized charts are from programming by Attila Danko using data from the Canadian Meteorological Centre. There is also a link to the Sky Chart Homepage that includes a list of links to all the other locations he has charts for, which can be helpful if you're planning to travel to a different location.

The club website also has a link to the Anza Sky Monitor, which gives a current view of the entire sky at Anza with other current weather information for the site. If you drag the cursor across the line of indicators below the image, you can also see images taken for the previous 24 hours. It doesn't give a forecast, of course, but you can use it to see how accurate particular forecasts may have been. On a recent Saturday night when we decided not to go out to Anza because different forecasts indicated that the sky would be covered with clouds until after midnight, it was reassuring to see via the Monitor, that the forecasts were accurate and we weren't missing anything out there.

There are additional different weather apps and websites that people use, including Weather Underground (<https://www.wunderground.com>), AccuWeather (<https://www.accuweather.com>) and Meteoblue (<https://content.meteoblue.com/en/spatial-dimensions/air/astronomy-seeing> for seeing conditions). I know there are others – if you want other recommendations for sites that are particularly good for checking on astronomically significant conditions, I'd suggest sending an inquiry out on the club's email groups (see the homepage on our website).

One website/app that I learned recently has extensive capabilities for forecasting weather conditions is Windy (<https://windy.com>). My original interest in it was for its animated wind map, showing wind patterns over the entire world, which you can see at different zoom levels (you can actually zoom in far enough to see streets on the map, still showing wind direction). It'll show you wind speeds and directions at different altitudes, from the surface up to 13.5 km. You can see this with temperatures at the different levels, or clouds, or humidity; it can also show rain, snow, thunderstorms, dew point and a lot more.

It gives forecasts for up to 10 days and you can get maps based on three to four different weather models (depending on the data), ECMWF (the European model), GFS (Global Forecast System, from National Centers for Environmental Prediction, part of NOAA), NAM (the North America Mesoscale Forecast System, also from National Centers for Environmental Prediction) and ICON (from the German Weather Service). If you set up an account, you can get forecasts for specific saved locations. Overall, I think it's the most entertaining as well as informative weather website I've come across...

COVID Update

Fortunately, as I write this, the surge from the Omicron variant seems to be subsiding. Even though it's been a very infectious strain, it seems overall not to have been as virulent as the previous strains. I think everyone is hoping that this marks a shift toward lower virulence in future Covid strains, but it's too early to tell.

We still do not know when we might be allowed access to our usual meeting place at Chapman University, so our general meetings will continue to be held via Zoom. As I've mentioned before, even after we're able to have our meetings in person we're planning to continue to broadcast them via Zoom and our other portals for those who may not be able to attend in person, hoping to have the best of both worlds. Having them on Zoom has the side benefit of giving us recordings of the meetings that can be posted online for later viewing for those speakers who will allow us to do that. Not all speakers are able to give us permission to post them but fortunately many do.

Our Astrophysics SIG is continuing with its meetings at the Heritage Museum with appropriate precautions. If you would like more information about its meetings and other planned activities, please contact Mark Price at mark@ocastronomers.org. The meetings are regularly scheduled for the third Friday of each month, and we're working to get information about the meetings on the website calendar.

After having some successful in-person Outreach events last October and November, all pending events had to be cancelled or postponed due to the Omicron surge. Ceci Caballero is hoping to schedule a few events in February and March, but it'll become a lot harder to have them at the schools after Daylight Savings starts because of the later start of full darkness. If you would like more information on what is happening with the program or to get on the Outreach mailing list, please contact Ceci at Outreach@ocastronomers.org.

Meanwhile, Happy March, and may your skies be clear when you want to do some viewing!

© Barbara Toy, February 2022

Astrophysics SIG Activity Report

By Mark Price (mark@ocastronomers.org)

Astrophysics Special Interest Group held its first in-person meeting of 2022 at the Heritage Museum of Orange County on the evening of January 21 with 7 attendees. This was the first meeting with new SIG coordinators Steve Martin and Mark Price, replacing Robert Sharshan, who retired as group coordinator after 10 years. It was announced that going forward new activities will be planned for ASIG beyond the traditional attendee presentations and video series. Some ideas being considered for new activities include group tours of relevant science facilities in Southern CA, attendance at regional public astrophysics meetings as a group and group participation in citizen science projects.

Astrophysics Special Interest Group held its February 18, 2022 meeting with 12 attendees. We decided to pursue "Life in the Universe" and "Dark Matter and Energy" as our near future meeting themes. These will follow the conclusion of our current themes of the science and engineering of space exploration and the astrophysics research following from Hubble observations. We also decided to move forward with planning a day trip for a tour of a relevant astrophysics related facility.

Please contact us for information or to make suggestions of activities that would interest you.

AstroSpace Update

March 2022

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

DESI – The Dark Energy Spectroscopic Instrument (DESI) is only about 10% of the way through its 5-year mission but has already produced the largest ever 3-dimensional map of the Universe. DESI is a multi-object spectrograph mounted on the 4-meter Mayall telescope on Kitt Peak in Arizona. Each part of the spectrograph is connected by a separate optical fiber to the focal plane of the telescope, and each optical fiber is placed by computer control to the location of a galaxy or quasar. Up to 5000 spectra can be taken at once. The distance of each object is measured by its redshift from the spectrograph. It takes less than 2 minutes to configure the fibers for the next observation. The positions for configuring are taken from a previous imaging survey. The goal is to observe about 1/3 of the entire sky, with an expected 35 million galaxies and 2.4 million quasars. This will allow astronomers to put together a history of the expansion of the Universe.

Isolated Black Hole Discovered – An isolated (not part of a multiple-star system) stellar-mass black hole has been discovered using microlensing, that is, the brightening and other effects of a distant star when its light is bent, according to relativity, by a massive object in front of it. The lensing occurred over a period of months and was observed with the Hubble Space Telescope and ground-based telescopes. The mass of the foreground object is about 7 Sun's masses, and it emitted no detectable light, ruling out objects other than a black hole. Its distance is about 5000 light-years.

Black Hole Flares – Researchers have had trouble making computer simulations of black holes that reproduce the flares seen as material falls in. A new simulation working at far finer resolution has finally produced the flares. Magnetic field lines breaking and reconnecting near the black hole's event horizon start the process that turns magnetic energy into near light-speed hot plasma particles, which then radiate photons of light that make up the observed flares. Such flares can clear material from near the event horizon, and then we wait for more material to fall in and repeat the process.

Mystery Radio Object – A team of radio astronomers has observed an object that emitted huge bursts of energy for about a minute 3 times per hour. No known astronomical object bursts in this time range. The best guess is that it is a neutron star or possibly white dwarf with a very strong magnetic field, but with a rotation rate differing from any known similar object. The strong magnetic field is implied by the observed high polarization in the radio signal. Its distance has been measured at about 4000 light-years. The object has since switched off, but it is being monitored to see if the radio bursts return.

Exoplanet Atmosphere – A team of scientists has analyzed the atmosphere of an extreme exoplanet. It is a hot Jupiter, that is, a gas giant so close to its star that it is hot, in this case about 5800°F. Observations were made with the CHEOPS space telescope and the La Silla Observatory in Chile. The planet is known as WASP-189b and is 322 light-years away. The atmosphere contains layers of differing properties, with vapors of iron, chromium, vanadium, magnesium and manganese. Also found is titanium oxide, which absorbs ultraviolet light similarly to how ozone does in Earth's atmosphere.

Warped Exoplanet – WASP-103b is an exoplanet that orbits so close to its star that its year is only 22 hours long. New analysis shows that its proximity to its star has gravitationally warped the planet's shape to roughly that of a rugby ball. The analysis was done on multiple transit observations that blocked a portion of its star's light, as seen by 3 space telescopes: CHEOPS, Hubble and Spitzer. The shape allows scientists to calculate the rigidity of the planet and it is similar to that of Jupiter. This was a surprise, because 103b's mass, 50% larger than Jupiter, should have increased its rigidity. Possibly heating from its star prevented additional rigidity. Another surprise is that 103b is slowly expanding its orbit, even though tidal forces on a closely orbiting planet should cause its orbit to shrink. More study is needed.

Possible White Dwarf Planet – Using ground- and space-based observations, astronomers have found evenly spaced clouds of planetary debris in a ring about a white dwarf star 117 light-years away. Such a structure would not remain stable unless there is a nearby planet gravitationally influencing it. The structure is in the region that was engulfed by the star when it was in its red giant phase, so the structure formed at or moved to its present location after the red giant phase shrunk to the white dwarf phase. More observational evidence is needed to confirm that there is a planet near the ring.

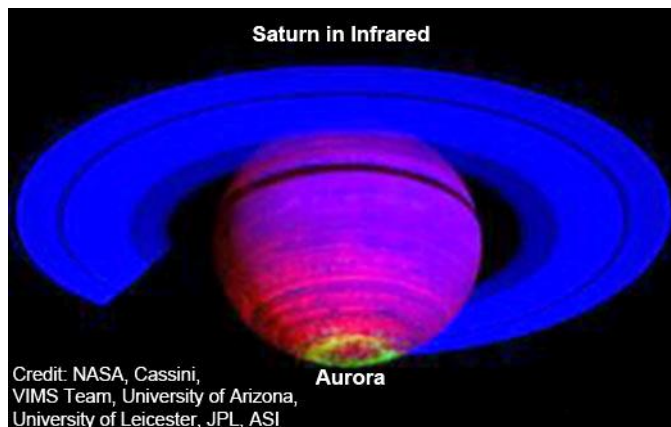
Another Proxima Planet – A team of astronomers used the Very Large Telescope in Chile to discover another exoplanet, the third, orbiting Proxima Centauri, the nearest star to our Sun. Known as Proxima d, it orbits about 10 times closer to its star than Mercury orbits the Sun. It takes only 5 Earth days to complete each orbit. This is too close to be in the habitable zone, that is, where temperatures would allow liquid water to exist on a planet. It is just ¼ the mass of the Earth and is thus the least massive exoplanet ever found using the radial velocity method of detection. The previously known planets orbiting Proxima take 11 Earth days and 5 Earth years to complete their orbits.

Quadruple Stars – The TESS space telescope's regular job is looking for exoplanets by slight dimmings of their stars when the planet passes in front (transits). But it is also good at finding multiple star systems when one star transits its companion star. The TESS team announced that they have found 97 quadruple star systems, nearly doubling the number known, though these are only quadruple star candidates until confirmed by other observations. Volunteer citizen scientists helped in discovering the quadruples. Multiple eclipsing star systems of counts other than quadruple were also found, including the first known sextuply-eclipsing sextuple system.

Widely Separated Brown Dwarfs – A team of astronomers has discovered a pair of brown dwarfs orbiting each other at the farthest separation of any such pair known. They are about 3 times the separation of Pluto from the Sun. Because brown dwarfs are less massive than ordinary stars, it is unusual for brown dwarf's gravity to hold pairs of them together at great distances. The pair is known as CWISE J014611.20-050850.0AB and is about 130 light-years from Earth. The WISE infrared space telescope discovered the object, but it was thought to be a single brown dwarf until other observations showed it was double.

Martian Past Climate – There is much evidence that water flowed on Mars and that a northern ocean existed about 3 billion years ago. How long these conditions persisted has long been debated. A new study using a computer simulation of atmospheric and surface conditions on Mars shows that water could have remained liquid for 500 million years longer than previously thought, even though temperatures became fairly cold. The simulation showed that rainfall rather than snow would persist in the area of the northern ocean. Ocean circulation would contribute to preventing the ocean from freezing. This would greatly expand the time that Martian climate might have been hospitable to life. An atmosphere with a bit of hydrogen, in addition to the carbon dioxide that now remains, would have warmed Mars and contributed to the lengthening of time with a liquid-water climate. The simulation showed that the Martian southern highlands would freeze long before the northern regions. Another study, based on images from the Mars Reconnaissance Orbiter, has found salt deposits left by liquid water that dried up, and has dated this by crater counts to have formed as late as 2 billion years ago, further extending the time of liquid water on Mars.

Saturn's Aurora – A team of scientists found that the cause of some of Saturn's aurora is different from that of the other planets in our Solar System. Winds within Saturn's atmosphere cause some aurora. The usual cause of aurora is powerful currents flowing down from the surrounding magnetic field. These Saturnian winds also cause movement in Saturn's magnetic field. This finally explains why measurements of the rotation rate of Saturn's magnetic field keep getting slightly different rates over the years. The other planets of the Solar System show rotation rates of the magnetic field that exactly match the rotation of the bulk of the planet's mass.



Comet Lunar Material – Scientists have made a new analysis of old data taken in 2009 when the LCROSS mission intentionally crashed a spent Centaur rocket into a crater near the Moon's south pole to determine the material splashed up. The new findings are that the splashed material was not volcanic, but probably material left by a comet impact. This was based on ratios of various elements seen in spectra of the splash. The lack of sunlight and solar wind near the pole preserved material there even though the impact may have been long ago.

Earth Trojan Asteroid – Trojan asteroids are most famous for those sharing Jupiter's orbit, either leading or trailing the planet by about a 60° angle, where the L4 and L5 gravitationally stable Lagrange points are. There are thousands of these known. However, most other planets in our Solar System also have Trojan asteroids, but in far smaller numbers. Earth had just one known, but a second has now been discovered. It was designated 2020 XL5 and is roughly 0.6 mile across. Computer simulations of its future position show that it will be gravitationally knocked out of the L4 Lagrange point area in about 4000 years. The eccentricity and tilt of XL5's orbit likely contribute to this instability. This also means it probably did not form near the Lagrange point but was captured in astronomically recent times. Any Trojan asteroid that has remained in its orbit since formation would be a good subject for a spacecraft visit, since its composition would tell scientists what the conditions were at that distance from the Sun during the time of planetary formation. So, astronomers will keep looking for more Trojans. The orbit calculator for the first several asteroids found in Jupiter's orbit suggested that the discoverers name them after heroes of the legendary war between ancient Greece and Troy; hence the term Trojan asteroid.

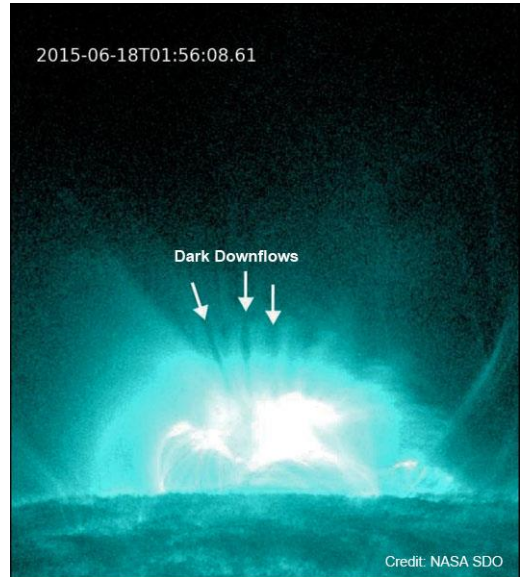
Asteroid Discoveries – A team of astronomers collected thousands of archived images from the Hubble Space Telescope and invited the public to become citizen scientists and scan the images to find asteroids that had intruded (photobombed). The streaks from asteroids had to be distinguished from streaks of other origin, such as cosmic rays and satellites. More than 1400 photobombing asteroids were found. Then the astronomers trained a computer program to distinguish asteroid streaks by learning from the citizen scientists' classifications of streaks in more than 30,000 images. This program searched more Hubble images and found about another 1000 asteroid streaks. An examination of these asteroid streaks by astronomers validated 1701 streaks as being definitely of asteroid origin. Of these, 670 were found to be known asteroids, and the remaining 1031 are now new discoveries. However, they will not go into the official asteroid database unless and until orbits can be calculated. Meanwhile the streaks themselves can be used to study size and distance statistics of asteroids.

Quadruple Asteroid – New data reduction methods applied to old data showed another moon orbiting the asteroid Elektra, making a total of 3 moons there. This is the only known quadruple asteroid. The estimated period of the moon is about 16 hours and its average distance from Elektra about 200 miles, with a somewhat eccentric (elliptical) and tilted orbit. Its size is estimated from its brightness to be 1 mile across.

Youngest Asteroid (or Comet) Pair – The asteroids 2019 PR2 and 2019 QR6 have similar orbits, and so are believed to be fragments of a larger asteroid that broke apart. There are many such fragments known. Often their paths can be traced back to when they were at the same place, and thus the time of the fragmentation can be determined. Recently this pair was traced back and found to have fragmented only about 300 years ago, making them the youngest such pair known. The record that was broken was at least 10 times this age. The larger of the pair is about 0.6 mile across, and the other about half that. They also have similar surface properties, again supporting that they are fragments of the same body. It is believed that most asteroids that fragment do so because they spin up too fast and come apart. Collisions can also create fragmentation, but probably much less frequently. Simulations of the newly discovered young pair did not match their current separation, but simulations of a fragmenting comet do fit. It remains to be explained why these asteroids are showing no outgassing behavior, as comets should.

Dark Features in Solar Flares – Since 1999 solar astronomers have occasionally seen dark features descending within flares rising from our Sun. A team of scientists analyzed downflowing features in images from the Solar Dynamics Observatory. That spacecraft takes 5 solar images every minute in 7 wavelengths of light. Contrary to previous theory, the dark downflows are not related to magnetic reconnection events, but instead are caused by fluids of different densities interacting. They are actually voids in the hot material of the flares.

Comet Tail – The Solar Orbiter spacecraft has, for the second time, flown through the tail of a comet. This time it was Comet 2021 A1 Leonard, and the previous time was Comet 2019 Y4 ATLAS. Both encounters were predicted in advance, so the spacecraft was commanded to take observations relevant to a comet. The new observations detected ions of oxygen, carbon, nitrogen, carbon dioxide, carbon monoxide, and possibly water. These ions were of cometary origin, because ions from the Sun would have higher charge than seen. Also observed were the comet's effects on the solar magnetic field. SOHO, STEREO-A and Parker solar spacecraft were commanded to observe Leonard's tail from a distance simultaneously with Solar Orbiter's observations.



Solar Storm – Analysis of ice cores from Antarctica and Greenland show that there was a powerful solar storm 9,200 years ago. Such storms produce high-energy particles that generate the isotopes beryllium-10 and chlorine-36, which remain in the ice cores until measured today. It is puzzling that the storm took place in a quiet stretch of solar activity, rather than at active times, when powerful solar storms seem more common.

Satellite Constellations – The International Astronomical Union has established a Centre to protect the dark sky from satellite constellations. The Centre will be hosted by the SKA Observatory in Australia and South Africa and the NOIRLab in Arizona. The purpose is to unite radio and optical astronomers to address the owners of satellite constellations to try to reduce those satellites' ill effects on astronomy and the night sky for humanity and wildlife.



Private Space Mission – The company Axiom Space has been given the go-ahead to send a privately organized mission to the International Space Station in late March. The 4 astronauts will launch aboard a SpaceX Falcon 9 rocket and Dragon spacecraft. They will spend 8 days at the Station and perform science, educational and commercial activities. They have trained at NASA, ESA (European Space Agency) and SpaceX. The mission commander is a former NASA astronaut, Michael López-Alegría.

Near-Earth Object Search Expands – The ATLAS program since 2015 has been using two 20-inch wide-field telescopes in Hawaii to search for near-Earth objects, particularly hazardous ones. The program has discovered 727 near-Earth asteroids and 66 comets, not to mention over 10,000 supernovas. ATLAS has now expanded its reach by adding similar telescopes in South Africa and Chile. They can now search skies farther south and when it is daytime at the Hawaii telescopes.

Another Look

Dave Phelps, March 2022

New moon March 2 and April 1;

Full moon Mar 18

American Indian names are Crow or Crust Moon, also Sap (maple) Moon.

Typically called the Worm moon; but also called in Old English the Lenten Moon

Spring Solstice: Sunday, March 20 at 8:33 am PDT

To my mind the most famous asterism in the night sky has to be the belt of Orion, apologies to Ursa Major. The three stars, Alnitak ζ , Alnilam ϵ and Mintaka δ are all about 2nd magnitude and well matched in color and luminosity visually. Also, the etymology of the names has a complex history with different names from throughout time and from all over the world; an example being our featured image from the **Dunhuang Star Atlas** over a thousand years old.

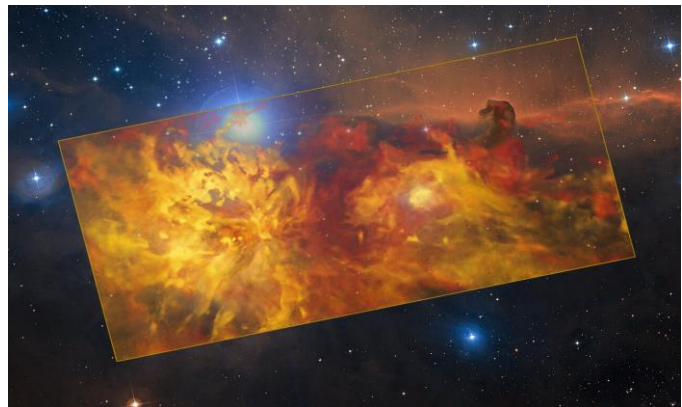
Alniham (middle) has the prettiest name, derived from the Arabic for String of Pearls. Alnitak (left) appears to be the Girdle and Mintaka (right) the Belt. Zeta and Delta are multiple star systems for you to search and Epsilon is a really big supergiant.

Years ago, I had license plates made with B33 and IC 434. These are the names for the Horsehead and the reflection nebula the Horsehead lives in. My truck was B33 and the trailer that held my telescope was IC 434. Of course, I nicknamed my 17.5" Dob the "Horse". What I remember striking me most was how large the Horsehead was in my eyepiece. The first time I looked, it filled the view of my old timey orthoscopic. Nowadays you astrophotographers out there do a wide field image of the Horse, 434 and Sigma Orionis. Credit this image to **WIYN Observatory Kitt Peak**

I tried to find an image of the Flame (NGC 2024) that would match what you will see in your eyepiece. We are fortunate that one of our local astrophotographers has allowed us to use one of his. I massaged it only slightly. Thank you, Alex Douvas.



Flame Nebula from Alex Douvas



This **ESO image** of the Flame is nothing like you'll see in your eyepiece.

ESO / Th. Stanke & ESO / Digitized Sky Survey 2 background

Now would be a good time to take your binoculars out again. The area of the Belt centered around Alniham is Collinder 70. The three brilliant belt stars center a loose sprinkling of white, blue-white, yellowish and orangish stars that may or may not be part of its own association. Pretty to look at. Inside Col 70 are three nebulae- IC's 423, 424 and 426; very diffuse objects, not per the atlases especially small, but if I ever saw them, I don't remember. I could not find any magnitude estimates so if you decide to challenge yourself, I suggest remembering the rubric...DADS. Dark adapted, Dark skies.

M78 (NGC 2068) is the brightest of a group of reflection nebula including NGC's 2064, 2067 and 2071. They are between the Belt and the Loop and reasonably visible at 8th magnitude. Check the APOD archives for several image of M78. You will see the rather large black divide, LDN (Lynd's) 1627, between the two main lobes of M78 in the image I cut from the **Sinbad database of the catalog of Lynd's Nebula**. We can see why Messier wanted to add M78 to his list of look likes but ain't comets. If you would like to see for yourself what is the official image of LND 1627 the link is:

<http://simbad.u-strasbg.fr/simbad/sim-id?Ident=%40826264&Name=LDN%201627&submit=submit>

So, who are these stars that make up the skeleton, as it were, of Orion: Betelgeuse, Rigel, Bellatrix and Saiph? Let's not forget the head star: Meissa. Betelgeuse is not the brightest star in Orion, that honor goes to Rigel, but its orangish color, size, slight variability and scientific significance make it very interesting. Just staying with the Arabian literature, Betelgeuse is either the hand or the arm.

Opposite from Betelgeuse is Rigel, a multi-star, blue-white system whose name is derived from the Arabic for foot (maybe knee). There are nearly a dozen listed references to Rigel in countries throughout history and the world from Australia, New Zealand to Norway. It is another star of great scientific interest.

Bellatrix is the other shoulder of Orion, another huge blue-white star with a diameter of 12 times our sun. I have always thought of her as a real beauty, and Bellatrix can be loosely translated to Amazons...not the e-tailer, the female warriors. You will also find that Bellatrix has histories from around the world, from Inuit to Chinese.

The last star of the Orion quadrangle is Saiph, commonly referring to the right knee or maybe Simitar, although one Arabian etymology gives a meaning of the Saif of the Giant. My favorite, I think, is from the Wardaman people of northern Australia who regard Saiph as the Guman digging stick used to make a canyon by Black Headed Python. (Wikipedia)

Meissa is the head of Orion, also in Chinese the "beak of the turtle". It is big, it is associated with what might be a supernova remnant, and it's surrounded by nebulosity. Worth a look.

I hadn't expected to discuss Herbig-Haro objects so soon, but it happens that NGC 1999, that mass of nebula just south of M42 contains the first two HH objects cataloged. The little dark spot in the center of the white splotch is not a dark nebula but (unproven) open space. Your atlas will plot IC's 427 and 428 as well as close at hand IC's 429 and 430. Once again, I wasn't aware that I was seeing such an interesting object, though only grayish and faint. Be sure to check **APOD** for January 27, 2022, for a closer look. This is a grand month to point your telescope at the area south of the Orion Nebula.

I am going to leave M42, M43 and the half dozen or more NGC's and IC's all around them for your own study. Have a happy time.

Let's slip back down into Lepus and check out M79. It was discovered over 300 years ago in early 1780 by Mechain, then added to Messier's list of comet-like nebula later that year. A nice globular, use a bigger scope to open it up a little. What's most interesting about it, however, is that it's an extragalactic globular cluster, resting in the dark of space all by its lonesome.

If you are into supernova hunting Lepus is rich ground with dozens of galaxies to search.

I quote from a book by Martha E. Martin (1907) "The Friendly Stars" which I copied from "Burnham's Celestial Handbook".

He comes richly bright in many colors, twinkling fast and changing with each motion from tints of ruby to sapphire and emerald and amethyst. As he rises higher and higher in the sky he gains composure and his beams now sparkle like the most brilliant diamond- not a pure white, but slightly tinged with iridescence.

Wow, I have never waxed lyrical about Sirius myself and I admit I have never seen any colors except a brilliant white that is hard to look at in an eyepiece. The one time I saw the Pup, back in the 80's; we had to move Sirius just out of the field of view to pick up the speck of light that is his companion. The Romans apparently saw a red/brass color to Sirius eliciting a number of studies and some fanciful theories.

Sitting as it does in the Milky Way, it's not surprising that Canis Major is loaded with open clusters and a few nebulae. Look for M41 just south of Sirius, big Cr 132 and smaller Cr140 down between the feet and Cr 121 between M41 and Epsilon, aka Adhara or the First of the Young Women.

I first met Clyde Tombaugh back in the 80's at RTMC. He was accorded semi-legendary status back then when he was still in his vibrant 70's. My friend John had him autograph his Sky-Atlas 2000, he was friendly, affable and easily approachable. He was a lovely man who still observed from his backyard 16".



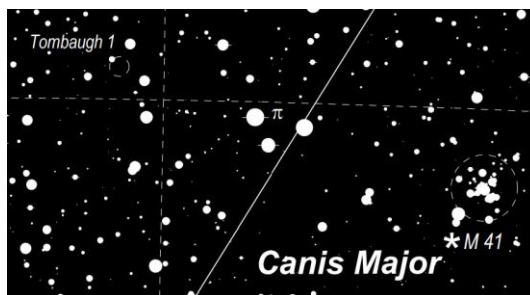
M78



South of Orion, credit
Vikas Chandar

Just as I found Barnard to be an interesting guy, so too did I find Tombaugh. For that reason alone, I spent my time searching for the 5 Tombaugh open clusters that he found on his astrograph's plates.

Fortunately, Tombaugh 1 is close at hand, if perhaps a little difficult to find on your atlas. Along the line from A to Δ (α to δ) Canis Majoris is a small triangular asterism which includes π . Put the left reticle of your telrad on π and M41 will be on the right edge. Put the right edge of your telrad on π and locate a line of four stars curving slightly south to north. Tombaugh 1 is right there, just to the left of the top two stars. Easy, huh, or you can use your Go-To. Choice is yours. Tombaugh 2 is only a few arcminutes away. RA and Dec can be found at www.stellar-journeys.org/TombaughTour.htm. I cut the chart from [Deep Sky Hunter](#).



Back in 1955 an Australian astronomer named Colin Gum working out of Mt. Stombo Observatory published a catalog of H-alpha regions in the Southern Hemisphere. We are fortunate that the first three Gum objects are close at hand spanning the line demarcating the constellations Monoceros and Canis Major. I refer, of course to NGC 2177, cutely named the Seagull Nebula. Gum 1 is the head of the bird, Gum 3 is the bright tip of the leading wing, NGC 2343 is a nice open cluster off the left wing, Cr 466 is also observable. I still have not identified Gum 2 to my satisfaction, maybe you can. This area is a treasure trove of nebula, clusters, emission nebula and HII regions. **APOD** has published NGC 2177 often, my favorite, I think, is October 21, 2018.



This image snatched from the video published on February 1 by **APOD** shows the moon 9 days after new on March 11.

Dark Skies

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
• SBIG ST-i Mono; Guide/Planetary camera with mechanical shutter				\$330
Price includes shipping and PP fees				
• 24mm ES eyepiece 82 deg AFOV Argon filled, original box				\$335
Price includes shipping and PP fees				

Advertisements - continued

For Sale contact Rick Hull hull3hull3@yahoo.com 949-636-2920 cell
• QSI 6120C OSC CCD camera with Mechanical Shutter \$ 1975 +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 \$2175, any OCA member may purchase it for \$1975 plus shipping. Please feel free to contact me with any questions.

For Sale contact Jason Oxman jason@oxmans.com 714-519-1896
• Space Shuttle "Columbia" mock up \$ 500

10' long X 6'6" tall X 5' wide
Needs some TLC
Needs some plywood repair
Needs a new coat of paint

This Space shuttle stood outside of Oxman's Surplus in Santa Fe Springs marking the store entrance for over 20 years. It was originally from the BOEING AIRCRAFT CO. in Long Beach, CA. Oxman's Surplus is no longer in business and the Shuttle needs a good home.



SIRIUS
www.ocastronomers.org



ASTRONOMER
The Newsletter of the Orange County Astronomers

Nonprofit Organization
U.S. Postage
PAID
Santa Ana, CA
Permit No. 1468

NEWSLETTER OF THE
ORANGE COUNTY ASTRONOMERS
P.O. BOX 1762
COSTA MESA, CA 92628

**DATED MATERIAL
DELIVER PROMPTLY**

RETURN SERVICE REQUESTED

CONTACT LIST

WEBSITE: <https://ocastronomers.org> Phone 949-266-9777 Starline 24-Hr. Recording: 714-751-6867 Anza Observatory: 951-763-5152

BOARD OF DIRECTORS

President
Vice President
Treasurer
Secretary
Trustee
Trustee
Trustee
Trustee
Trustee
Trustee
Trustee

Barbara Toy
Reza AmirArjomand
Charlie Oostdyk
Alan Smallbone
David Searle
Cecilia Caballero
Doug Millar
Sam Saeed
Helen Mahoney
Gary Schones
John Hoot

board@ocastronomers.org
btoy@cox.net
reza@ocastronomers.org
charlie@ocastronomers.org
alan@ocastronomers.org
dwsearle@gmail.com
ceci@ocastronomers.org
doug@ocastronomers.org
sam@ocastronomers.org
helen@ocastronomers.org
gary378@pacbell.net
jhoot@ssccorp.com

COORDINATORS

Anza House Coordinator
Anza Site Maintenance
Beginner's Class
Orange County Star Parties
Explore the Stars
Librarian
Membership / Anza Pads
Observatory Custodian / Trainer / Member Liaison
Outreach
Sirius Astronomer Editor
Telescope Adoption Program
WAA Representative
Webmaster

Manuel Baeza
Don Lynn
David Pearson
Steve Mizera
Bob Nanz
Karen Schnable
Charlie Oostdyk
Barbara Toy
Cecilia Caballero
David Fischer
John Hoot
Cecilia Caballero
Reza AmirArjomand

manugb33@yahoo.com
dlynn@ieee.org
p.davidw@yahoo.com
mizeras@cox.net
bob@nanzscience.com
karen@schnabel.net
charlie@ocastronomers.org
btoy@cox.net
outreach@ocastronomers.org
newsletter@ocastronomers.org
scopes@ssccorp.com
ceci@ocastronomers.org
webmaster@ocastronomers.org

SPECIAL INTEREST GROUPS (SIGs)

AstroImagers SIG
Astrophysics SIG
Dark Sky SIG
Youth SIG

Alan Smallbone
Mark Price
Barbara Toy
Doug Millar

alan@ocastronomers.org
mark@ocastronomers.org
btoy@cox.net
doug@ocastronomers.org