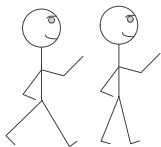
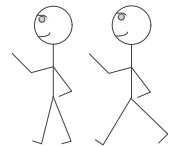




This is NGC7635 – the Bubble nebula from John Castillo. Taken in September 2008 using narrow band filters on STL11000M camera and TOA-130f refractor from a site in Whittier, CA.



## In-Person Club General Meeting



Our monthly general club meetings at Chapman University are scheduled to resume as of December 9. More information is in the President’s Message.

## Upcoming Events - free and open to the public

<b>Beginner’s class</b>	Friday, 2 December at 7:30 to 9:30 PM This is session 4 of the class. It covers how people see and perceive images – the science behind the telescope. Class materials can be downloaded from OCA website.	ONLINE
<b>Club Meeting</b>	Friday, 11 November at 7:30 to 9:30 PM "What's Up?": Chris Butler from OCA Main speaker: Dr. Victoria Grinberg from European Space Agency and the talk will be "X-raying the Winds of Giant Stars"	ONLINE
<b>Open Spiral Bar</b>	Saturday, 12 November 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
<b>Star Parties</b>	Saturday, 26 November at the OCA Anza site ??? Irvine site dates are yet to be determined	

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

# President's Message

By Barbara Toy

I'm happy to report that this month I can announce a significant advance on restarting some important pre-Covid activities. The bad news is that it comes with a significant new challenge to work out, but first the good news:

## **In-Person Meetings to Start at Chapman in December**

We have finally been able to finalize our contract with Chapman University, so we have access to Chapman Auditorium again for our general meetings. The first month we will be able to use our usual location there for our general meeting is December, and our current plan is that we will have our first on-the-ground meeting at Chapman on December 9, 2022. Actually, as mentioned in the past, the meeting will be a hybrid, with those who want to attend in person attending at Chapman and those who want to continue meeting online attending via Zoom, and we plan to continue indefinitely with these hybrid meetings.

Tim Hogle will be our speaker in December, giving a talk on Voyager, a project he devoted most of his career to (the talk he gave us on Voyager years ago was truly memorable, and I expect this one will be as well). Since he's local, he'll be giving his talk in person at Chapman, the first time we've had an in-person presentation since February 2020, over two and a half years ago – that alone will make this a memorable meeting. And it will be the first time we'll be testing our hybrid system with a live speaker at Chapman going out over Zoom to those who are attending remotely.

We were able to arrange access to the auditorium just before the October meeting, and a small group of us (Alan Smallbone, John Hoot, Charlie Oostdyk, Sam Saeed and me) were in the auditorium for the meeting. There have been a lot of changes since we were there last, and we had some problems with compatibility of equipment and figuring out how the Chapman equipment works now. We ultimately were successful (by "we" I mean mainly Alan and John, with input from Reza remotely), but there are some other tests that John, in particular, wants to run with other equipment options before the December meeting. We won't have access to the auditorium in November, as Chapman has booked it for one of their own events, but we can have access to another location to run additional tests during the November meeting that hopefully will allow the December meeting to go forward smoothly.

## **Bad News for the General Meetings: Minors Aren't Allowed**

In the process of setting up the new contract with Chapman University to allow us access for our meetings, we learned that they now have a very firm policy that groups such as ours using their facilities absolutely CANNOT have minors attending unless the group has insurance that would provide coverage for Chapman (as well as the group) for any claim of sexual abuse of any minor in the course of or related to any of the group's activities. Given the problems that groups such as the Boy Scouts have had with sexual abuse of minors, their concern is understandable.

We are trying to find an insurance policy that will meet their requirements, that will provide coverage under terms compatible with our activities and that we can afford. The initial policy our broker sent us information on seemed geared for an organization centered on activities with minors, more like the Boy Scouts than what we do, and would require us, among other things, to run formal background checks on all of our volunteers, and have regular training sessions and other activities that would not only be a great expense to the club but would really discourage people from volunteering at all.

For now, our agreement with Chapman is that we have access to the facilities, but we CANNOT have any minors attend our meetings at their campus. This can change in the future, but only when we find an insurance policy that Chapman approves as providing the coverage they require.

Chapman University has been extraordinarily generous to us over the decades we have been meeting there, and the last thing we want is to abuse that generosity. Anyone who has been paying attention to the many news stories in recent years of findings of long-term abuse of minors from religious organizations (the Catholic Church has been a prominent but not the only example), youth groups (not just the Boy Scouts), athletic organizations, and others who have had young people regularly entrusted to their care can understand Chapman's concern.

For the record, in case there is any doubt on the subject – we do not and never have condoned any sexual abuse of minors (or anyone else) related to any of our activities. During the years I've been involved with the club, I've never heard of any instance or even suspicion of sexual abuse related to any of our activities. If we became aware of any such conduct, it would have to be reported to the appropriate authorities in the jurisdiction where it occurred. If any of you become aware of any such abuse, please report it immediately to the police or other appropriate authorities – if it's related to the club in any way, please report it to a Board member as well, but it's most important to get the information to the authorities who have the expertise and resources to investigate it properly and provide the protection the affected minor might need.

I think our club's activities are significantly different from those of the organizations that have figured in the news in this area, particularly as young people attending our events or participating in our activities do so with their parents. Even so, sadly, there remains some level of risk. Hopefully we'll be able to find insurance that properly assesses our particular level of risk and gives us terms that reflect that.

Until we can resolve this challenge though, I am very sorry to say that minors – young people under 18 years of age – WILL NOT be allowed to attend our in-person meetings at Chapman.

### Orange County Star Parties:

Things are progressing with the Orange County Star Parties – the contract with OC Parks is now final and I understand that the hosts are working out dates. Stay tuned – we'll get the dates posted when we get notice of them.

### OCA Board Elections:

Time is running out to get your nominations in for the OCA Board – to put in your nomination, please send an email to Alan Smallbone (alan@ocastronomers.org) with your contact information, including your name as you would like it shown on the ballot, and advising him that you want to be put on the ballot. That's all that's needed, but the deadline for you to get that sent to him is the end of the day of the November general meeting, which is Friday, November 11, 2022.

As mentioned last month, you have to have been a club member in good standing for a year to run for a Trustee position, or for Treasurer or Secretary. If you want to run for President or Vice President, you also have to have served on the Board for at least one year at some time. If you're putting in a nomination for President or Vice President, please include when you served on the Board to make it easier to verify.

We hope we'll be seeing some new names added to the ballot this year – please do send in your nominations!

And may you have wonderful viewing nights as we head closer to winter...

© Barbara Toy, October 2022

## Response to COVID-19 Crisis

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

Meeting in person:	Astrophysics SIG, Anza star parties, and <b>monthly club meeting</b>
Meeting via Zoom:	<b>Monthly club meeting</b> , Beginner's Astronomy class
Coming soon:	Orange County Star Parties
Cancelled until further notice:	AstroImaging SIG
Check with Coordinator:	Outreach events

Carpooling OC to Anza      contact      Gene Kent      [kenthouse@cox.net](mailto:kenthouse@cox.net)      714-604-8396

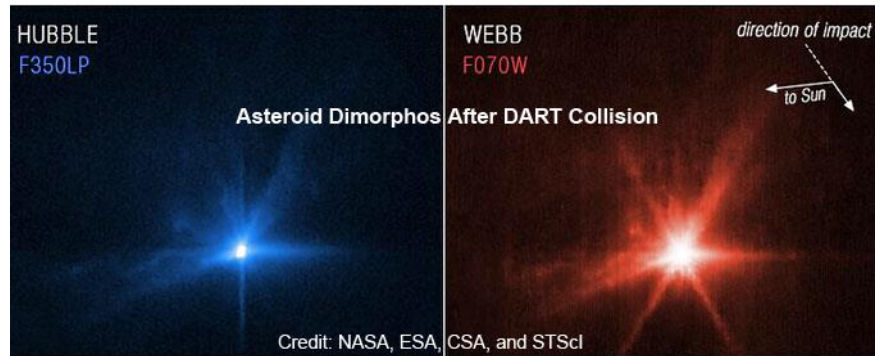
I'm Gene Kent, a long time OCA member. I live in Tustin, CA. I'm looking to find someone to share the drive to and from Anza. I have a Chevy Trail Blazer. It will hold all the astronomy stuff for 2 people. I usually set up on the ball field below Anza House. If you have a pad or an observatory, I can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

# AstroSpace Update

November 2022

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

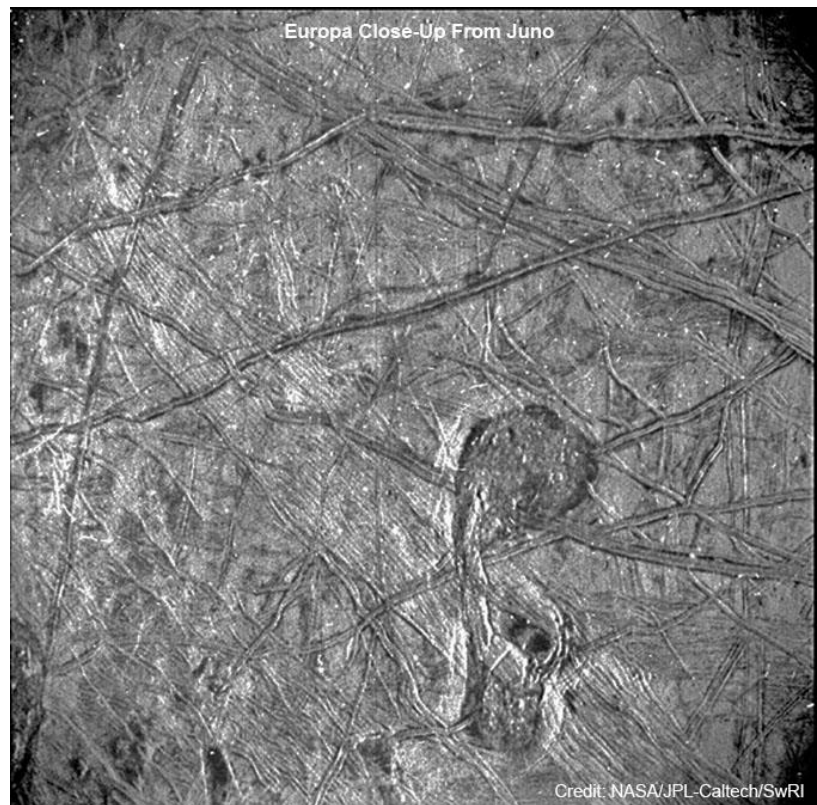
**DART** – The DART spacecraft successfully collided at 14,000 mph with asteroid Dimorphos in a test to see if a spacecraft collision could change the orbit of an asteroid. Dimorphos and its companion asteroid Didymos are not going to strike the Earth, but scientists wanted to know if the collision technique could be used to divert an asteroid when in the future one is found to be a danger to Earth. Before the spacecraft collision, the pair of asteroids orbited each other every 11 hours and 55 minutes. After collision, the orbital period



changed to 11 hours and 23 minutes, showing that spacecraft collision is a viable method to divert a dangerous asteroid. This change in orbital period was larger than most estimates made before the collision, which shows that spacecraft collision is more effective than expected in diverting an asteroid. Dimorphos was imaged after the collision by a tiny spacecraft known as LICIACube and by the Hubble and Webb Space Telescopes and many ground-based telescopes. The images showed substantial debris thrown off the asteroid by the DART collision. Further study will show, among other parameters, the sizes of particles ejected, the effectiveness of transferring spacecraft energy to an asteroid, and how much material was ejected. This was the first time that the Hubble and Webb telescopes have observed the same object simultaneously. LICIACube is the size of a shoe box and piggybacked on DART until separating 10 days before impact, so it could fly by Dimorphos almost 3 minutes after impact. In late 2024 the Hera spacecraft will launch to study in detail the effects of the DART collision on Dimorphos.

**Impacts on Mars** – NASA announced that the InSight Mars lander’s seismograph has detected vibrations caused by meteorite impacts 4 times. The Mars Reconnaissance Orbiter later took images of the impact scars left by these. Their distances from the seismograph ranged from 53 to 180 miles. The 4 impacts produced Marsquakes of magnitude 2.0 or less. Now that scientists know what the vibrations from such impacts look like, they hope to find more of them in archived InSight data. Determining the size and frequency of such impacts will help refine the age estimates of features on Mars, because those age estimates are made by counting impact craters of various sizes.

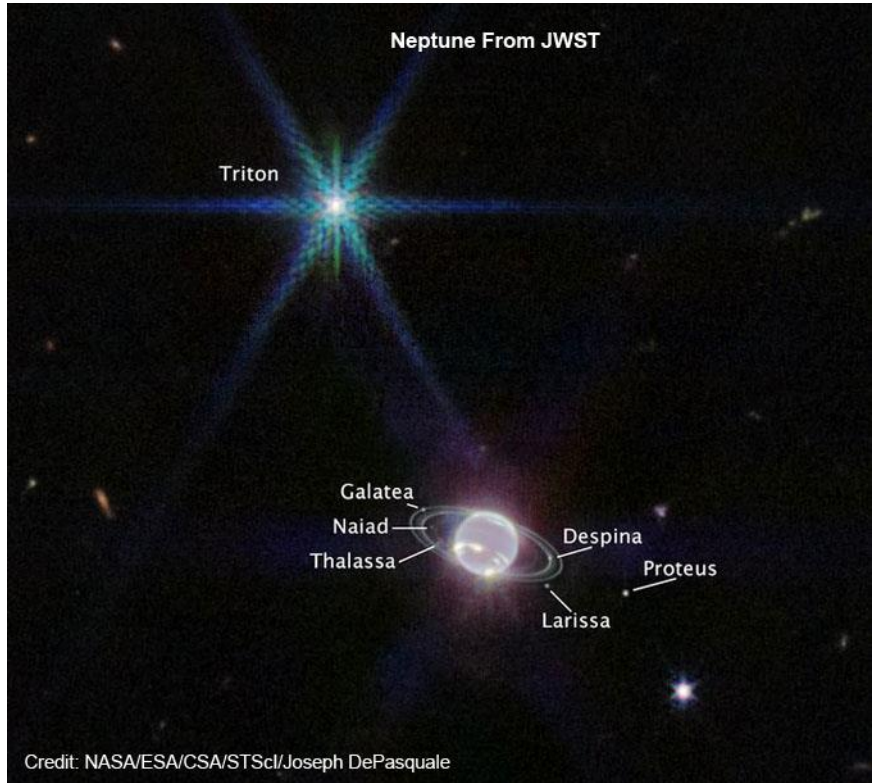
**Europa** – Juno’s primary mission was to study Jupiter, but during its extended mission, the spacecraft has altered its orbit to encounter some of Jupiter’s moons and rings also. Juno recently completed a flyby of Europa, which resulted in the first detailed images of that moon since the Galileo spacecraft imaged it about 2 decades ago. The new images will allow scientists to see if Europa’s surface has changed in 20 plus years. Some astronomers believe that salty water from an under-ice ocean could be leaking onto the surface, altering it. Juno used not only its camera to image Europa, but also its star tracker, normally used to determine spacecraft orientation, by putting it into a mode that just images. Some images were taken during Europa’s night, using light reflected off the planet: Jupiter shine. Juno flew by Ganymede last year and is scheduled for Io in the next 2 years.



**Moon's Poles** – A study of the size, distribution and age of impact craters on the Moon indicates that the rotational poles have wandered somewhat over billions of years, but only by about 10 degrees in latitude. The wandering was caused by the movement of mass by impacts which then moves the Moon's rotational poles slightly. This affects which polar areas have been shaded from sunlight for billions of years and are therefore likely to harbor water ice deposits. Future work will also take into account mass shifts from volcanic activity.

**Neptune Imaged** – NASA released the first infrared images of Neptune taken by the James Webb Space Telescope (JWST), showing the atmosphere, moons and rings in great detail. Some of the features in the images have not been seen since Voyager 2 visited the planet in 1989. 7 of the 14 known moons were apparent, as was a band of clouds about Neptune's south pole.

**Asteroid Sample** – Analysis of the sample of asteroid Ryugu material brought back to Earth by the Hayabusa2 spacecraft showed that it contained hydrogen and nitrogen isotopes that did not match that typically seen on Earth and in meteorites. The scientists involved believe that the material better matches material that formed in the outer Solar System, beyond Jupiter. Because the Hayabusa2 sample was in a sealed capsule when it entered the Earth's atmosphere, this sample is the most pristine asteroid sample. So, it is the best evidence that some asteroids formed in the outer Solar System. Scientists believe that some outer Solar System asteroids, such as Ryugu, get scattered into the inner Solar System by the gravity of the giant planets.



**Magellanic Corona** – Computer simulations show that the Magellanic Clouds, satellite galaxies to our Milky Way, should be losing material faster than they actually are, due to the gravitational attraction of the Milky Way during close Magellanic passes. However, simulations with a hot ionized gas corona about the Clouds better match the material loss. A new study searched for such a hot corona, by looking for its effect on the ultraviolet light from 28 distant quasars whose light passes near the Clouds. The hot corona was confirmed, extending more than 100,000 light years from the Large Cloud. The Hubble Space Telescope and archived data from the FUSE spacecraft were used in the study.

**Colliding Jet** – A group of citizen scientists and astronomers discovered a black hole shooting a jet at a nearby galaxy. The black hole is in a galaxy known as RAD12 that lies a billion light-years away. Although RAD12 has been observed since 2013, new observations by a radiotelescope in India revealed the jet hitting the other galaxy. Such jets normally appear in pairs, oppositely directed. It is not clear why a second jet has not been seen in this case. This is the first time a jet has been seen to collide with a large galaxy.

**Spiraling Stars** – Astronomers have been studying a star cluster known as NGC 346 in the Large Magellanic Cloud and found young stars spiraling toward the cluster center. It appears that the stars are following a spiral of gas that is feeding star formation. The study used the Hubble Space Telescope and the Very Large Telescope in Chile. Both the motion of stars in the plane of the sky and their radial motion were measured to give a 3-dimensional picture of the stars' movements. Gas motion was also measured. Astronomers in this study hope to observe this cluster with the Webb Space Telescope to see if dimmer stars follow the same pattern as the brighter stars that this study was able to observe.

**Extremely Short Period Binary** – A cataclysmic variable is a pair of orbiting stars, one of which is a white dwarf that gravitationally steals gas from the other. At irregular intervals the gas that fell onto the white dwarf ignites as a fusion bomb. They must have short orbital periods in order to be close enough to steal gas. A new discovery, known as ZTF J1813+4251, is a cataclysmic variable with a 51-minute orbital period, the shortest yet known. The pair is also an eclipsing binary, making the measurement of the orbital period easy. The discovery lies about 3000 light-years away in Hercules. Theory had predicted that when a cataclysmic variable has stolen most of the hydrogen, it would start stealing the helium layer beneath, and the orbital period should shorten. It appears the new discovery is in this transition to stealing helium.

**Dust Rings** – The James Webb Space Telescope observed a pair of stars, one of which is a Wolf-Rayet star (number 140 in the Wolf-Rayet catalog) and found that it has at least 17 expanding rings of dust about it. The explanation is that the pair orbits each other eccentrically every 8 years, and every time they approach closely their stellar winds interact and blow out a dust ring. The pair is 5000 light-years away. Previous ground-based images had shown only 2 dust rings. Webb’s spectrometer determined the composition of the dust rings. A Wolf-Rayet star is a massive star nearing the end of its life and blowing away huge amounts of mass as a stellar wind. Some other Wolf-Rayet stars emit dust, but no others emit rings like this one.



**Brightest GRB** – On October 9, the brightest gamma-ray burst (GRB) ever seen was observed in a galaxy about 2 billion light-years away, which is relatively close for a GRB. It appears to be in the class of long GRBs, which typically last for minutes, and are believed to be caused by the collapse of a massive star at the end of its life. We see it as a GRB only if one of the jets that form during the collapse happens to be aimed at us. Long GRBs have an afterglow in many wavelengths of light other than gamma rays, so all kinds of telescopes immediately pointed at this GRB to observe the afterglow. The burst ionized some of the Earth’s upper atmosphere, disturbing radio propagation in it. The afterglow in X-rays was more powerful than ever seen before. A supernova explosion is often seen a few weeks after such a GRB, when the GRB afterglow fades to a level dimmer than the supernova, so astronomers are watching for that.

**Milky Way Ripples** – It has been known for some time that the Sagittarius Dwarf Galaxy collided with the Milky Way about 6 billion years ago. This collision may have stirred up star formation that included the formation of our Sun. A new study found a rippled distribution of velocities of stars in the Milky Way that is left over from that collision. Those ripples were found by searching data from the Gaia spacecraft.

**Small Exoplanets Found** – Super-mercuries are exoplanets somewhat larger than our Solar System’s smallest planet, with large iron cores, like Mercury. They are fairly rare, with only 6 of them known until now. But the star system HD 23472 was found, using the radial velocity technique, to have 2 super-mercuries. It also has 3 super-Earths, that is, rocky planets somewhat larger than Earth. Those 3 have substantial atmospheres.

**Maarten Schmidt**, the astronomer who proved that quasars are very distant, and therefore extremely inherently bright, has died at age 92. His discovery was made by measuring quasar redshift using the Palomar 200-inch telescope. The first quasar that he measured, 3C273, became the farthest known object at that time. He also proved that star formation is fed by denser interstellar gas.

**Hubble Boost Study** – The Hubble Space Telescope is slowly dropping in altitude, as are all low-Earth-orbit spacecraft, due to drag from the very thin atmosphere there. To counteract this, some of the Hubble service missions used the Space Shuttle to push the telescope a few miles higher. No method of boosting Hubble now exists. NASA just signed a contract with SpaceX to study how an existing rocket could be adapted to boost Hubble. Without a boost, experts expect the telescope to fall to Earth in the mid-2030s. If the study finds a way, the life of Hubble could be extended beyond this.

**MOM Concludes** – India’s Mars Orbiter Mission (MOM) has run out of fuel, concluding a very successful 8-year mission. This far outlasted the design for a 6-month mission. Its Indian name is Mangalyaan, which means “Mars craft” in Sanskrit. It studied surface features and the atmosphere of the Red Planet.

**Solar Observatory Launched** – China launched its first dedicated solar space observatory, named ASO-S, aboard a Long March-2C rocket. It will study how the Sun’s magnetic field is related to energy emissions. It will observe the Sun’s middle corona region in ultraviolet. After the 3-6 month commissioning phase, observed data will be made public.

**CAPSTONE Recovery** – The CAPSTONE spacecraft was designed to test the unusual highly elliptical orbit planned for the future Lunar Gateway. Unfortunately, in September CAPSTONE began tumbling and lost contact with Earth and ran low on power because the solar panels were not oriented to the Sun. Spacecraft controllers have since been able to stop the tumbling and hope to return it to operation. The problem was caused by a stuck thruster valve.

# Another Look

Dave Phelps, 2022 November

On November 8<sup>th</sup>, the full Beaver Moon will undergo the last eclipse of 2022. In the Pacific Time Zone, the eclipse will start for us (penumbral) at 0002 hrs. Totality is at 0259 hrs and eclipse end at 0556, almost 6 hours of eclipse.

Other names for the November moon are Digging/Scratching Moon, Freezing Moon, Frost Moon and Whitefish Moon. Celtic and Old English names are Mothers' Moon, Bright Moon, Hare Moon, and Grass Moon.

New moons for November are Oct. 25 and Nov. 25.

It has been my honor over my lifetime to have had associations with some astronomy Titans. Msgr Ronald Royer has spent a lifetime developing new astrophotography techniques, chasing total solar eclipses and making thousands of variable star observations as a senior member of the AAVSO.

Leslie Peltier, the sine non qua, also contributed thousands of variable star observations from his famous "Merry-Go-Round" observatory. I have spent many nights at the 18" telescope at Ford Observatory on Mr. Peltier outside Wrightwood, now under the aegis of the Los Angeles club.

One of my proudest possessions is a little blue postcard with the picture of a slightly tubby man looking up through a telescope. Walter Scott Houston wrote a deep sky column for Sky and Telescope for 46 years. I met Twinky years ago at a meeting of the Riverside Astronomers. He was a delightful person. Why the postcard? He wrote me to tell me how much he enjoyed my column on Barnard's ring that I wrote for the PVAA'S Nightwatch.

It was typical of Walter to challenge his readers in his "Deep Sky Wonders" column. Someone always responded and Walter would include them in later articles. Two of his challenges were about globular clusters around M31 and counting naked eye stars in the square of Pegasus.

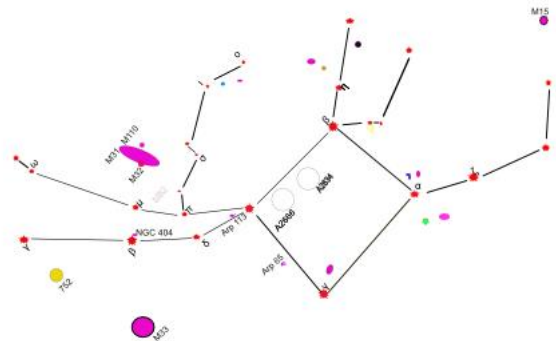
"Within the area of this Square Argelander counted only about 30 naked-eye stars, but in the clearer sky of Athens Schmidt saw 102."

Star Names and their Meaning, 1899,

**Richard H. Allen**

"The poetic steed with beamy mane,  
whose hoof struck out from earth"  
The fount of Hippocrene, and many more,"  
Pegasus from The Constellations

**William Cullen Bryant**



I have never taken up the challenge to count stars in the square of Pegasus. Houston cites several accounts from his correspondents. In one a correspondent reports 38 stars, in another, a correspondent took special care in his preparations and reported seeing down to magnitude 8.3. Perhaps even more stunning, he writes that there are 100 deep sky objects within reach of the larger amateur telescope within the square. Sadly, Scotty isn't here for our revolution in astrophotography, but I am sure he would appreciate the instrumentation and techniques in use today.

An interesting place to start this month is two degrees south of Alpheratz, Alpha  $\alpha$  Andromedae, is NGC 1. You will need a 12" or larger scope to see detail on N1; it is a face on 13<sup>th</sup> magnitude spiral. I've never looked for it, but the images show faint spiral arms and a brighter nucleus. NGC 7840, the last item in the NGC catalogue is just over the boundary into Pisces about 20 degrees further south. Houston, using the references he had at the day, decided that NGC 7840 was an error, and that NGC 7839 was a faint >15<sup>th</sup> galaxy. Current references name NGC 7839 as a double star.

We have one Messier, three Caldwell objects, one Arp object, and a couple of galaxies Burnham thought we should look at in Pegasus. We also have two Abell clusters and a slew of double and multiple stars in Pegasus.

Up near the top of the square are two Abell galaxy clusters: Abell 2666 and Abell 2634. The clusters are far flung and it's not easy to pick out individual members, though each has an anchor galaxy that we can find. Abell 2634 has NGC 7720. N7720 is a 12th magnitude elliptical with a very close background galaxy giving it a double appearance. Abell 2666 also has a large elliptical, NGC 7768, also 12th magnitude with a scattering of smaller galaxies around it. Images you can use as finders can be found on the internet. APOD has a particularly nice Abell 2666 in March 2017 and Simbad has a terrific NGC 7720 with scattered galaxies all around.

George Abell has two catalogues named after him. He used the Palomar sky survey plates to identify galaxy clusters of a particular size and red shift. His later catalogue is of planetary nebula and was also compiled from the Palomar plates with additions from observations of his own and others.



*NGC7814 from Adam Block/Mount Lemmon SkyCenter/University of Arizona*



*NGC7448 from Sloan Digital Sky Survey*

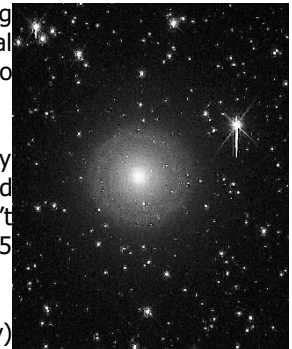


*NGC7449 from Sloan Digital Sky Survey*

NGC7814 is also known as number 43 on the Caldwell list. It looks like the Sombrero, though not as bright at 11th magnitude. You can find it in the left-hand corner of the square about 2 degrees from Algenib, Gamma,  $\gamma$ , meaning a wing tip. It has decent dimensions, 5' across and half that thick.

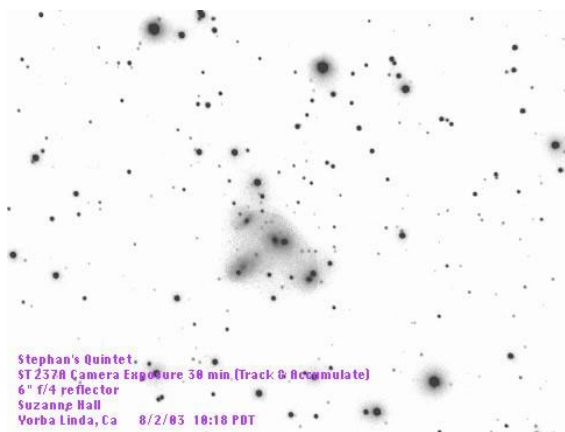
Move next to the other side of the square to Alpha,  $\alpha$ , Markab, meaning Saddle. At 2.5 degrees, a medium Telrad circle from Markab, you will find NGC 7448, a rather small tilted spiral odd enough to find itself #13 in Arp's catalogue. Its bright at 11th magnitude but, wonder of wonders, it is right next to a cluster of galaxies of 12th and 13th magnitude, dominated by NGC 7463. You may also be able to put NGC 7464 and NGC 7465 in the same field. N7463 was named a galaxy of the month. Go to the Webb Deep Sky page for a finder chart.

NGC 7479 is number 44 on the Caldwell list. It is 11th (almost 12th) magnitude with wild sweeping arms and a frenetic nucleus. It is also just a degree away from Palomar 13, 13th magnitude and a real ghost. Look up the APOD 2003 Christmas image of Pal 13. That bright star is 7th or 8th magnitude so it would be easily visible in your finder.



Up by the left knee of Pegasus are several deep sky objects made famous over the years. Start by finding Eta  $\eta$  Pegasi. Before you head up to NGC 7331 and Stephan's Quintet, move to your east and look for NGC 7217. It is at 11th magnitude, but it is such a tightly wound spiral you probably won't see a trace of the arms. Check out the image taken by OCA astronomer Chuck Edmonds back in 2005 as an example of what I mean. [https://ocaastronomers.org/user\\_images/ngc-7217/](https://ocaastronomers.org/user_images/ngc-7217/)

West of Chuck Edmonds's beautifully imaged NGC 7217 is the NGC 7331 group including (probably) Stephan's Quintet consisting of NGC 7317 through NGC 7320. NGC 7318 is an A and B which brings the galaxy count up to 5.



*Left: This awesome image of Arp 213 / Stephan's Quintet was taken by Suzanne Hall of the OCA back in 2003. I massaged the image slightly to bring out the nebulousity around the galaxies.*

*Right: The image of NGC 7331 and its companion galaxies NGC's 7337, 7335 and 7340 can be found in the OCA gallery. It was taken on November 26, 2013 and is unattributed.*

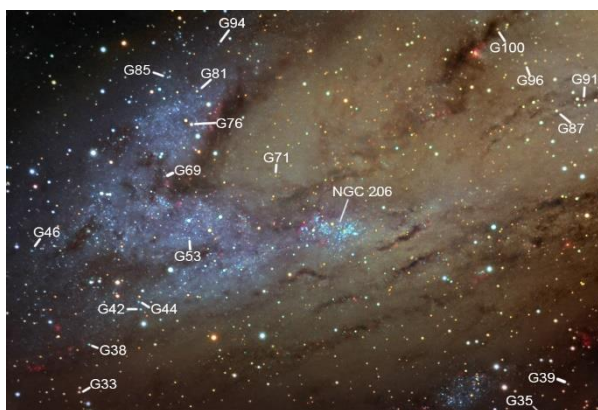
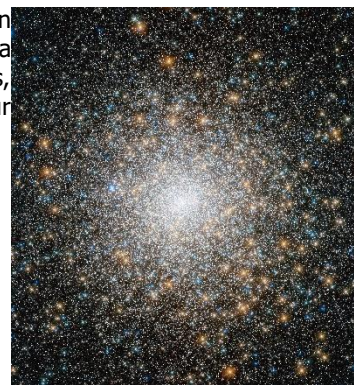


Stephan's Quintet.  
ST 2378 Camera Exposure 30 min. [Track & Accumulate]  
6" f/4 reflector  
Suzanne Hall  
Vorba Linda, Ca 8/2/05 10:18 PDT



M15 is awesome. It is almost visible to the naked eye, it is 6<sup>th</sup> magnitude and a fuzzy star in your 7x50's, pretty decent in your 4" APO, and blows out in a 13.1 Dob. Scientifically Its a beast. That bright nucleus is a collapsed core of thousands of stars. It has blue new stars, golden older stars and a planetary nebula. Checkout the Hubble link then go look at in your eyepiece.

Credit:NASA,ESA<http://www.spacetelescope.org/images/heic1321a/>  
<http://www.spacetelescope.org/static/archives/images/large/heic1321a.jpg>,  
 CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=29625944>  
<https://esahubble.org/images/heic1321a/>



*This image of M31, M32, m110 and NGC 206 was taken last month at the Dark Sky Festival in JoshuaTree by Rick (Speedy) Gonzalez. Rick is a member of the Temecula ValleyAstronomers and is, as you see, a very accomplished amateur astrophotographer.*

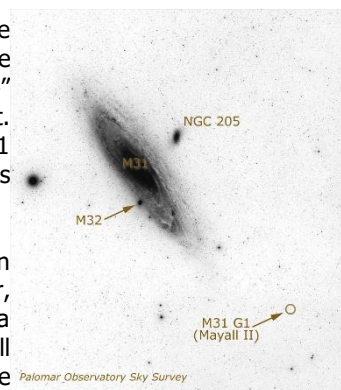
<https://skyandtelescope.org/online-gallery/globular-clusters-in-m31/>

Another query that seemed to interest Scotty was the number of globular clusters around M31 that could be seen visually. He had correspondents who were able to identify a couple with instruments as small as a 6" Newtonian. One gentleman with a 12.5" homemade Newtonian was able to observe all 15 that had been cataloged at that time.

Early last century Edwin Hubble and Walter Baade compiled a catalog of 250 possible globular clusters around M31. The suspects were cataloged with HB numbers. Now the globulars are simply noted with a G(#) and a magnitude. There are plenty of web pages that will show the location of M31 globulars. A good one to start with is the link to: [Imgur: The magic of the Internet](#). Also check out [Cosmic Challenge: Globular clusters in M31 - Phil Harrington's Cosmic Challenge - Articles - Articles - Cloudy Nights](#) and <https://skyandtelescope.org/sky-and-telescope-magazine/extragalactic-globular-clusters/>



I have never looked for G1, NGC 224-G1, also known as Mayall II. It is the brightest of the extra-galactic clusters and the first found by Nicholas Mayall and O.J. Eggen in 1953 on a plate from the Schmidt. Your 8" can find it but probably as a fuzzy dot. The specs tell us that the 14" can resolve .33". G1 is .28" so your everyday 14" Schmidt-Cass should spread it out a bit. Steve Gottlieb of Sky and Tel. has compiled an Excel spreadsheet of the 75 brightest M31 globulars. You will find it at [M31GC-Brightest75.xls \(live.com\)](#), By the way, Gottlieb gives a dimension of 36" to G1.



Another astronomy hero and friend of mine is Joe Neu. Joe lives up in Idyllwild and has been an amateur astronomer his whole life. Joe worked for Coulter Instruments up until the founder, Jim Jacobson died. Joe's favorite galaxy is NGC 4565, a spectacular edge on galaxy in Coma Berenices. We have our own beautiful edge-on galaxy in Andromeda. Its NGC 891 and Caldwell 23. Its 10<sup>th</sup> magnitude and almost 14 minutes-of-arc long. [Chuck Edmonds & Bill Hall](#) have both produced excellent images of NGC 891. Control-Click on their name to be taken to the OCA website.

Our other Caldwell object is NGC 752, Caldwell 28. It is a big sprinkling of bright stars, some naked eye bright. It's an old cluster, easily seen with binoculars, 7x50's are good for this one. When I pointed the 17 at it, it blew right through it.

There is a fun galaxy to look for next in the same neighborhood. Go to second magnitude Beta  $\beta$  Andromedae, Mirach, which means the Girdle. Easily making the same field as  $\beta$  is NGC 404, an 11<sup>th</sup> magnitude face on spiral that can be difficult unless you move  $\beta$  out of your eyepiece. It's fairly big, almost 4x4 minutes. Take your time, I would like to see any image you take.

You are going to enjoy NGC's 752, 892 and 404. Starting at  $\beta$  and moving along the left to Gamma  $\gamma$  Andromedae, Almach, Arabian for desert lynx.  $\gamma$  is a beautiful, bright double star of golden and blue colors. It is not that far from Alberio, so you can check them out together.  $\gamma_B$ , the smaller, blue companion is also a multiple star system with a 5<sup>th</sup> and 6<sup>th</sup> companions and even a couple orbiting  $\gamma_C2$ . This is also interesting because Almach is your finder for NGC752 and NGC891. While in the area you can slip across the boundary line into Perseus and find M34, another open star cluster with interesting components. I remember two bright stars shining out of its middle.

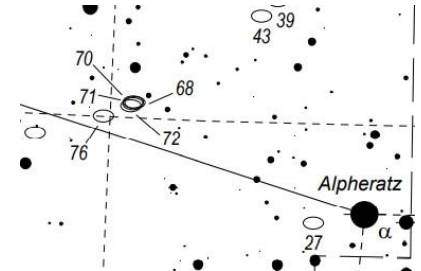
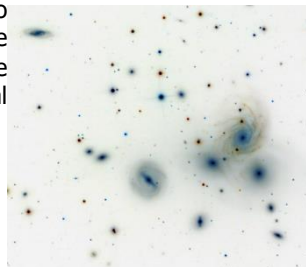
On the other hand, the left hand of the "Hevelius" Andromedae is defined by the naked eye stars  $\iota$  Iota,  $\kappa$  Kappa,  $\lambda$  Lambda and,  $\omicron$  Omicron. These stars are your finder for NGC 7662, Caldwell 22 and nicknamed the Blue Snowball, its 8<sup>th</sup> magnitude, but tiny in your smaller telescope, belying its nickname. This image was taken by another OCA astrophotographer, Arnie Roser. Copy and paste his address to find his image or just Ctrl-Click on the hyperlink.

<https://ocastronomers.org/wp-content/uploads/2019/01/n7662-01.jpg>



Harlan Arp (d. 2013) compiled the *Atlas of Peculiar Galaxies* a catalog of unusual galaxies. He was trying to provide other astronomers with images that would help them study galaxies and their evolution. The atlas is especially useful when looking at odd and interacting galaxies, like the two examples in Andromeda.

Arp 113 is the NGC 68 group close to Alpheratz on the line to delta  $\delta$ . NGC 68 is the anchor to Arp 113. It's 12<sup>th</sup> magnitude while N70 thru 76 fall into the 13<sup>th</sup> magnitude. NGC 68 is the elliptical at the bottom right of the group. NGC 70 is the spiral above it and the third member if the triangle is NGC 71.



Dark Skies  
Dave Phelps

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

## 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](mailto:newsletter@ocastronomers.org) .

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

<u>Issue</u>	<u>Due date</u>
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](mailto: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	<a href="mailto:rongrace2@cox.net">rongrace2@cox.net</a>	
<ul style="list-style-type: none"> <li>• Orion StarShoot AutoGuider</li> </ul>			further reduced price	\$ 200

For Sale	contact	Rick Hull	hull3hull3@yahoo.com	949-636-2920 cell
<ul style="list-style-type: none"> <li>• QSI 6120C OSC CCD camera with Mechanical Shutter</li> </ul>			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	
<ul style="list-style-type: none"> <li>• Denkmeier Binoviewer II</li> </ul>			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	
<ul style="list-style-type: none"> <li>• QHYCCD PoleMaster Camera Adapter for Losmandy GM811xx Mount, IEQ30/IEQ45 # 020038 3 Pieces, Bright red finish, no scratches</li> <li>• Bushnell Red Dot Finder 1X30RD with mounting rail, Green &amp; RED variable intensity LED. 1:1 magnification, end caps, precision, like new</li> <li>• Bushnell type Red Dot Finder made by Comunite 1X30RD with mounting rail. Almost exactly like the Bushnell, Green &amp; Red variable intensity LED. 1:1 magnification, end caps, precision, like new.</li> </ul>				\$ 30  \$ 30  \$ 20

Contact Bill Prats [b.bill.p@gmail.com](mailto: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	
<ul style="list-style-type: none"> <li>• Pad lease for LP-12 in Lower Pads section and the pier upon it</li> </ul>				\$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.

**SIRIUS**  
www.ocastronomers.org



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The Newsletter of the Orange County Astronomers

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