



NGC281, commonly called the "Pac Man" nebula, imaged through narrow band filters (H-alpha, OIII, SII) using a QSI683 camera and Borg 71mm refractor. This was done by David Searle in November 2020 at the club's Anza site.

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

- **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 Jan at 7:30 to 9:30 PM The topic this month will be the science of perception and how we see through the telescope	ONLINE
Club Meeting	Friday, 8 January at 7:30 to 9:30 PM "What's Up?": Alex McConahay from RAS Main speaker will be Dr. Marcel Pawlowski from Leibniz-Institute for Astrophysics whose talk will be "Dark Matter and the Dance of Dwarf Galaxies"	ONLINE
Open Spiral Bar	Saturday, 9 January 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 of our activities. All in-person club events remain cancelled through at least the end of this year. 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	Cancelled indefinitely
Orange County Star Party	Cancelled indefinitely, until allowed by Orange County Parks
Outreaches	Cancelled indefinitely
Beginners Astronomy Class	Cancelled indefinitely, please contact Dave Pearson to attend Zoom classes
SIG Meetings	Cancelled indefinitely, depending in part on availability of facilities and when meetings could go forward safely. Some may schedule Zoom events.

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

From the Editor

Sirius wants photograph submissions from club members

We need submissions for this year. I will also pull some from the OCA members images section on our website but those will be at my discretion. If you would like your picture on the cover, please send it to me along with a brief description of the subject, where the image was taken, and the equipment used.

New Column features things we made

Now gathering submissions to start the column. Please see page 7 for information.

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>
February	23 January
March	21 February
April	20 March
May	24 April

President's Message

By Barbara Toy

Years often don't go the way we expect as we celebrate entering a new year. Memories not being as accurate as the written record, I looked back at the President's Messages I wrote in December and January last year for a reminder of our concerns as we were entering 2020. I found some belly-aching about the December 2019 star parties getting rained out (two were scheduled that month) with hopes that there would be fewer star parties affected by rain in 2020, concerns about the dirt roads around Anza (we got a lot more rain near the end of 2019 than we've had in 2020), and major upcoming projects included completion of the unfinished portion of the website and installing a new control system for the Kuhn telescope before the aging hardware failed.

Then Came Covid-19...

Although there were reports of Covid-19 coming out of China by December, 2019, we had no notion at the beginning of 2020 that it was going to have such a severe impact on our own society and the world as a whole, and also on our club and its activities. In retrospect, it seems a bit quaint that weather was the main factor of concern affecting the success of star parties – we certainly had no idea that they would have to be cancelled indefinitely due to the virus as of last March.

Although having to cancel all of our in-person club activities caused a lot of inconvenience, to put it no higher, there have been quite a few positives coming out of our experiences responding to the pandemic. One has been our Board meetings, which have been such a success via Zoom that we expect to continue meeting that way indefinitely, even after the pandemic is a fading memory. It's easier for club members to attend as well via Zoom than in person, so feel free to attend if you'd like to see how we deal with the various issues that come up in the management of the club – please contact Alan Smallbone if you'd like to attend a particular meeting.

Shifting our general meetings to Zoom took a lot of work, mostly by Reza AmirArjomand, our Vice President and Webmaster, but they have been going forward smoothly, Reza has continued to find us excellent speakers, and has also been able to get us speakers who normally wouldn't be able to attend our in-person meetings in Orange because they are too far away – a real benefit of virtual meetings. Things have been going so well with the Zoom format that we expect to incorporate aspects of the virtual meetings into our regular meetings once we are able to hold them again in person. We're not sure yet how this will work in practice, but it would be nice to keep the ability to have distant speakers, and to allow members who are out of the area to attend.

Ceci Caballero, our current Outreach Coordinator, continues to experiment with virtual outreach events, with great success, and it seems that our future outreach efforts are likely to continue to offer virtual programs as well as our more traditional viewing party events once we're able to do those again.

Although we've had some unexpected benefits from what we've done to respond to the pandemic, the safety of our members was our main concern when we were faced with dealing with it and the related governmental directives along with finding the best ways to continue at least some of our activities under those conditions. It remains our main concern. We know a lot of our members are in high-risk groups, and even those who would not generally be considered at high risk could have a bad response to the disease if they became infected. Speaking from personal experience, even a mild case of Covid-19 is much more debilitating than the flu and can leave long-term problems. We're hoping that very few of you actually get the disease, and that nobody gets the disease through any club-related event.

As I write this, two vaccines have been approved, and we're all hoping they will help bring the pandemic to an end quickly. Realistically, though, it will probably be at least six months before that happens, and we could be dealing with limitations due to Covid-19 through most of 2021.

Particularly with the vaccine becoming available in the next few months, I hope that all of you are keeping yourselves safe and following all the protocols to minimize your risk of getting the disease – and that you are able to get access to one of the vaccines soon.

2020 Projects

I mentioned that, back at the beginning of 2020, two projects we wanted to complete in 2020 were getting the rest of the new website working and upgrading the control system for the Kuhn telescope. In spite of everything else going on, we did make progress on both of these in 2020.

As to the website, we now have the ability for new members to pay for their memberships via PayPal, and Charlie Oostdyk has obtained the software he needs for the website to interface with his records so he can get the "Members" section functional and allow other types of fees to be paid through the website. Unfortunately, responding to Covid-19 has caused him a lot of additional work in his day job, which has limited the time he's had available to finish this project, but we're expecting that these remaining functions of the website will be in place soon.

As to the Kuhn, we weren't quite quick enough with getting the new system, and the telescope has been out of action for several months because we did have a catastrophic hardware failure. However, thanks to a lot of hard work by John Hoot, the new control system is now installed, and we hope to start training Star Members who actively use the telescope (with masks and proper social distancing) in the next few weeks. The new system uses the motors that were installed with the last upgrade, which are still working well, which made the installation easier. It's based on current technology, and the company we got it from, SiTech, actively supports it. This is a nice change from our past system, which was a DOS program and not supported through most of the time we had it (though, fortunately, it generally did what we needed it to do).

OCA Election

Just a reminder – the OCA election ends at midnight after the January general meeting, which is on January 8, 2021. If you are a member in good standing and have provided us with an email address, you should have received a link so you could vote electronically. If you don't recall receiving that email, please check your emails from the first two weeks of December and, if it isn't there, please check your spam filter. John Hoot coordinated setting this up, and you can contact him for further assistance if you're unable to find it (scopes@ssccorp.com).

If you prefer not to vote electronically, or aren't able to for some reason, paper ballots will work, too. You should have received a copy of the ballot in the December Sirius Astronomer, and you can download a copy from the website. If you have a problem getting a copy, please contact Alan Smallbone or Charlie Oostdyk. If you use the paper ballot option, please follow the instructions on the ballot itself regarding where to send it and putting your name on the outside of the envelope used to send the ballot. And, whether you vote electronically or by mail, you can only submit one ballot per member.

Winter Solstice Conjunction...

2020 is attempting to go out on a more positive note by giving us a very nice, close conjunction of Jupiter and Saturn on December 21st. From the emails and shared pictures so far (this is written before the actual conjunction), a number of our imagers, and probably others, are following it closely and imaging it as the two planets are getting closer. I expect there will be a lot of folks observing and imaging it on the 21st, though I think watching them come closer together in the days leading up to the event makes it even more interesting.

I don't know who dubbed this event "the Christmas Star," but that name has definitely been circulating in the non-astronomical community, with the result that a number of folks who don't normally pay attention to what's going on in the sky became very interested in seeing this event. Several contacted me in hopes that we were having a viewing event for the conjunction, which isn't an option given the ongoing spike in Covid-19 cases, but I basically told them where the planets were in the sky, when they should look for them (including on nights leading up to the conjunction), how to recognize them, and suggested strongly that binoculars would be a better option than trying to acquire a telescope for the event. One emailed back, very excited, to let me know that she had found the planets a few days before they were at their closest, so she would be able to watch them as they got closer night by night. Hopefully the others found them as well...

And I hope all of you who wanted to see it or image it had clear skies on the 21st and that you totally enjoyed the view!

And may we have many more pleasurable astronomical events in 2021!

© Barbara Toy, December 2020

AstroSpace Update

January 2021

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

Worse Arecibo News – I reported here last month that 2 cables supporting the receiving equipment suspended above the radio dish antenna at Arecibo, Puerto Rico, had snapped and the radiotelescope was declared too unsafe to repair, and would therefore be demolished safely. Before the demolition plan was completed, and before any such work was begun, on December 1 a further failure occurred in the support system. The entire 900 tons of suspended equipment swung down, still attached to some support cables, and smashed into the dish. The tops of the reinforced concrete support towers snapped off. Personnel were present in the control room overlooking the dish, but there were no injuries. This is a sad loss to astronomy. Arecibo, among other discoveries, found the first binary pulsar, the first millisecond pulsar, and the first exoplanets, as well as making the only radar images of many asteroids.



Dark Matter Mystery Solved – In 2018 and 2019, astronomers reported finding 2 small galaxies that appeared to have little if any dark matter. This is very unusual, since essentially all galaxies whose dark matter has been measured have far more dark matter than ordinary matter. Further study of one of them, designated NGC 1052-DF4, using the Hubble Space Telescope and a ground-based telescope, shows tidal tails extending from it. This indicates that a close encounter with another galaxy gravitationally disrupted it. The observations imply that NGC 1035 is the guilty party, not NGC 1052, of which DF4 was thought to be a satellite galaxy. However, the core of DF4 is relatively undisturbed. The new study also found that the pattern of globular clusters about DF4 supported a past close encounter. Computer simulations of such an encounter show that it would gravitationally strip most of DF4's dark matter halo first, then the outer starry parts of DF4, and lastly the core of DF4. Mystery solved: DF4 likely formed in the midst of a halo of dark matter, like every other galaxy, but was stripped of the dark matter by a close encounter with a more massive galaxy.

Very Young Jets – A team of scientists has discovered some of the youngest known jets being emitted from a supermassive black hole at the center of a distant galaxy. The jets were detected by radio, using the Jansky Very Large Array radiotelescope in New Mexico. The jets were not seen in archived observations from about 20 years ago. Continued observations will allow astronomers to see how jets develop and what their influence is on the surrounding galaxy.

X-ray Bubbles – eROSITA (X-ray space telescope) has discovered a pair of structures located just above and below the center of the Milky Way. The northern structure, but not the southern one, had been detected before. The pair resembles the similar structures seen in gamma rays, known as Fermi bubbles, discovered a decade ago, but are larger and have lower temperature. Likely the newly discovered structures were caused by a massive release of energy from the galaxy's center at some time in the past. The source of that energy could be a huge burst of star formation or an outburst from great amounts of material falling into the supermassive black hole.

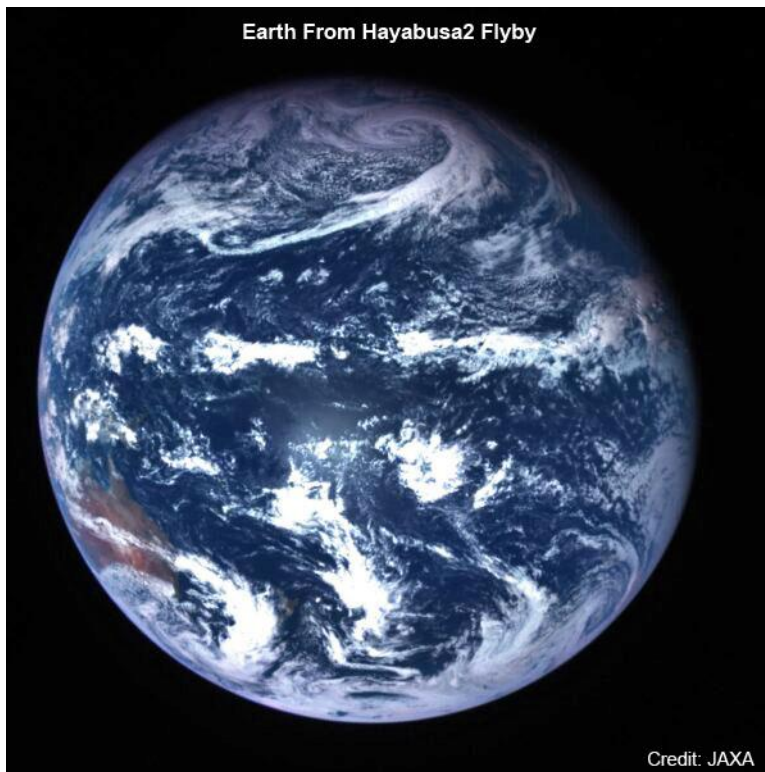
Captured Stars Found – A team of astronomers, using positions, velocities and composition of stars from 2 huge star surveys, has found about a thousand stars near the center of our Milky Way that must have been captured during a collision with a smaller galaxy about 10 billion years ago. They nicknamed the smaller galaxy Heracles. Another team announced a similar discovery recently, based instead on studies of globular clusters. Their colliding galaxy was nicknamed Kraken. It is not known if these 2 collisions are one and the same. Further study may tell.

Most Distant Galaxy – A team of astronomers using the Keck Telescope in Hawaii took a spectrum of a galaxy seen in Hubble Space Telescope images that was thought to be very distant. The redshift found in the spectrum showed it to be the most distant galaxy known. Its redshift is 10.957, which indicates its light took 13.4 billion years to reach us. We are seeing the galaxy as it was merely 0.4 billion years after the Universe began with the Big Bang. Due to expansion of the Universe, its current distance is much larger than 13.4 billion light-years.

Juno (Jupiter orbiter) has shed light on an issue that was raised by the Galileo Jupiter atmospheric probe 25 years ago. That probe found the atmosphere that it descended through was much hotter and drier than the planet was believed to be. The best explanation was that the probe happened to hit one of a few atmospheric hot spots. However, Juno has found that Jupiter is full of hot spots, including the northern equatorial belt, a band wrapping entirely around the planet.

Lunar Sample – The Chinese space agency has landed another probe on the Moon, this one named Chang'e-5. It is solar powered, and is designed to achieve its mission in a single lunar daytime, which lasts 14 Earth days. It indeed completed in this time its major goal of drilling and scooping lunar material into a sealed container and rocketing the sample to Earth. This is the first lunar sample returned since a Soviet mission in 1976. The landing area, near the mountain Mons Rümker, was chosen because it is a very young lunar surface, so gives scientists a sample of much younger age than any others. That area was flooded with lava only 1.2 billion years ago. The mission has other scientific capabilities, including a spectrometer and a ground-penetrating radar.

Asteroid Sample – Japan's Hayabusa2 spacecraft sped by the Earth in early December and dropped its sample capsule off to land in the Australian desert. The reentry was even seen from the International Space Station. Hayabusa2 had collected 2 samples, one from the surface of asteroid Ryugu and the other from within a crater punched in the surface by a small bomb thrown at the asteroid. The latter sample should allow scientists to see what asteroid material was like when it formed more than 4 billion years ago, and compare it with the other sample that has been space weathered for most of that time. After landing and retrieval, the capsule was found to be correctly sealed, allowing even gas from the asteroid to be recovered. Weighing the capsule indicated that the samples weigh 5.4 grams. Stated goal of the mission was to retrieve at least 1/10 gram, so this was far exceeded. Meanwhile, the spacecraft itself is on its way to flyby another asteroid in about 6 years, and a rendezvous for lengthy study of a 3rd in about 11 years. NASA's OSIRIS-REx mission will return a sample from another asteroid in 2023, so comparison with Hayabusa2's sample will be made then.



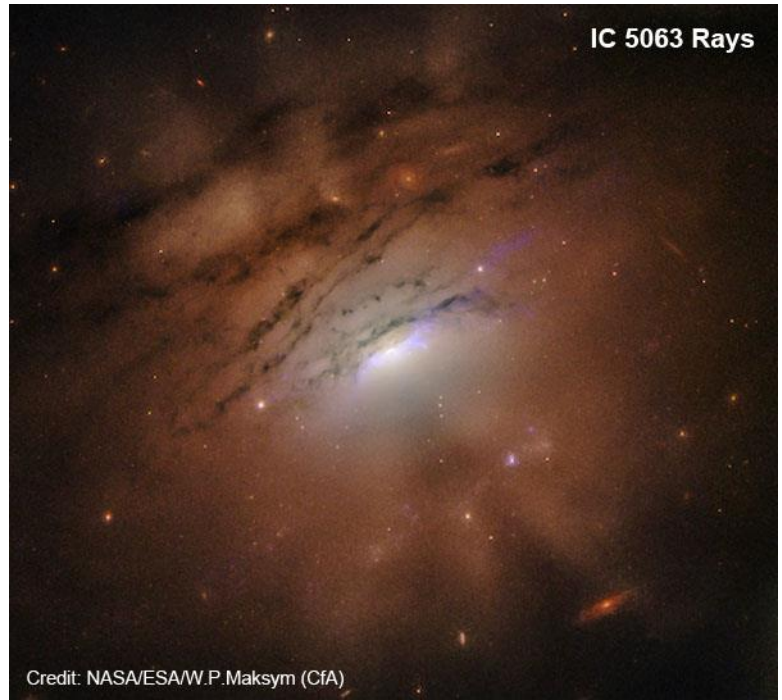
Voyager Discovery – The Voyager 1 & 2 spacecraft, launched 43 years ago, continue to make discoveries. They have for the first time detected cosmic ray electrons in interstellar space that were linked to emissions from the Sun. Electrons moving near the speed of light were detected first, followed by somewhat slower electrons, and then a shock wave roughly a month later. All came from a coronal mass ejection (CME). Such CMEs are charged particles and electromagnetic energy expelled by the Sun. The electrons initially travel at about a million miles per hour, but are accelerated to nearly the speed of light (670 times greater) by the shock wave.

Sun's Fusion – Most of the nuclear fusion going on in the Sun is the proton-proton chain. In it, 8 protons (which are hydrogen nuclei) smash together in a series of collisions and produce a helium nucleus while releasing 2 protons. Neutrinos are given off during this process, and neutrino detectors on Earth have been seeing since 2014 the right sort of neutrinos to verify this chain is actually happening. But theoretically about 1% of the Sun's energy should be produced by the CNO fusion cycle, which involves carbon, nitrogen and oxygen, not just hydrogen and helium. For the first time, neutrinos of the sort given off in a CNO cycle in the Sun have been detected, verifying that this cycle is indeed happening in the Sun at the theoretical rate. Stars that are hotter than our Sun should be producing more of their energy by the CNO cycle.

Data Release – The Gaia space telescope team has delivered its Early Data Release 3, which contains magnitudes, 3-dimensional positions (3rd dimension values as parallaxes) and 2-dimensional proper motions for nearly 1.5 billion stars. Additionally, the full Data Release 3, planned for the first half of 2022, will have variable star data, temperatures, and extinction and reddening from interstellar material for a similar number of stars, and also a huge number of asteroids. The Early release is complete (that is, contains all visible stars) between magnitude 12 and 17, and includes many stars to magnitude 21. No stars brighter than magnitude 3 are present because they overload the telescope. Typical precision of position measurements are within 0.00002 arc second, and of brightness measurements within 0.0003 magnitude.

Galaxy Rays – Researchers found in a Hubble Space Telescope image rays of dark and light emanating from galaxy IC 5063, which is 156 million light-years away. It is reminiscent of crepuscular rays seen in some cloudy sunsets. The newly-found rays are produced by the glow of the accretion disk surrounding the galaxy's central black hole shining around dense patches of nearby material.

Milky Way Center's Distance – The best measurement of our Sun's distance from the center of the Milky Way galaxy has been for decades 27,700 light-years. A new measurement now sets that distance at 25,800 light-years. The new work was done using an array of radiotelescopes scattered across Japan. The positions and motions of 100 nearby stars were measured, and from this their orbits about the center of the galaxy were calculated. These measurements will continue, which should reduce the uncertainty in the distance to the galaxy center.



We Made It Ourselves

Amateur astronomers have always needed to be resourceful and creative to pursue this interest. In the old days there were few commercial makers of astronomy gear and even fewer of software relevant to this hobby so we made what we needed or shared our skills with others who had complementary abilities. Even now the hobby doesn't create a large marketplace for manufacturers so there may not be the right parts to put together the exact setup that we want, leaving us the choice of changing what we want or making something ourselves to complete it.

These projects aren't limited to things we make from scratch and they may be small projects or big ones. We include creatively used commercially bought products that we modified for our purposes but exclude things that we had done for us professionally.

To stimulate our memories, let's set up some categories:

- Structural: Observatories (those built by ourselves or with friends), piers, observing patios, etc
- Mechanical: Telescope mounts, tracking systems, adapters to put optical train onto mounts, observing chairs, efficient ways of transporting our astro-gear, etc
- Optical: Lenses, mirrors, entire telescopes, radio antennas and radio receivers for those who do some radio astronomy
- Electrical: Rigs for supplying power to our astro-gear when AC is not available, other ideas ?
- Software: Spreadsheets, system control software, contributing code or testing effort to Open Source projects such as PHD2, image processing software, image analysis software, etc
- Other stuff that doesn't really fit in these categories

My request of the readers is to send me (newsletter@ocastronomers.org) a brief description of astronomy related things that they made themselves or with the help of friends. These will be summarized in a future article and subsequently this column will feature short write-ups of some of these DIY projects which may inspire more of us to make useful things.

To serve as examples, here are a few things I made in the past: Barn door tracker (this was my first mount), Bahtinov masks sized for my telescopes, pier adapter (made with help from my neighbor), mounting adapters for red dot finders and guide scopes for setups that didn't already have a means of attaching them, wind screen for my pad at Anza.

Update: We have a couple submissions now. Let's have some more and then we start the column.

OCA Scope Loan Program Becoming "Adopt A Scope"

By John E. Hoot, Scope Program Director

With Covid-19 and a surge in telescope donations to the Club, we have decided to experiment with a new method of getting scopes to our members safely and effectively. I call it the Adopt A Scope program. It is modeled on the way animal rescue shelters operate. Instead of adopting a cute puppy, OCA wants you to give a lonely telescope a new home. Under the new program model, many of our scopes will be up for adoption. Simply purchase the scope at a ridiculously low price and take it home. If it wets the carpet or cannot be house broken within 6 months, you can bring it back in working order and we will refund your money less a fee of \$15 dollars for handling. Otherwise, it is your scope forever!

Select a scope from the list below and contact me at scopes@ssccorp.com to schedule a time to pick up your scope at the club's storage facility, contact free, at South Coast Self Storage, 3480 W Warner Ave, Santa Ana, CA 92704. If you currently are hosting a rental scope and wish to adopt it, please email me to negotiate a price.

Adopt A Scope Inventory

INV#	Type	Size	Mfg	Model	Accessories/Notes	Price
1	Mac	3.5"	Meade	ETX90	90mm f15 Maksotov Alt/Az Goto table top fork mounted telescope. Runs off batteries or 12VDC, Dec Clutch permanetly locked.	\$60.00
2	Newtonian	4.5"	Meade	DS2114ATS	4.5" Newtonian reflector or a single fork mount Goto telescope with tripod. It operated of 8 D cells, or 12VDC	\$60.00
8	Cassegrain	8"	Hand made		A hand made 8" cassigrain telescope with an AltAz telescope. A nice visual instrument.	\$25.00
19	Mac	2.25"	Meade	ETX60	A 60mm f5 achromatic Alt/AzGOTO telescope in a table top fork mount. Comes with tripod and accessories.	\$35.00
24	Reflector	4.5"	Meade	4504	A 4.5 inch Newtonian reflector mont on Goto German Mount with tripod. An OK visual instrument. Not suitable for astrophotography	\$50.00
26	Dobsonian	8"	Celestron	Starhopper	Celestron 8" Newtonian Reflector in a Dobsonian mount	\$100.00
32	Newtonian	4.5"	Meade	DS-114AT	4.5" Newtonian reflector or a single fork mount Goto telescope with tripod. It operated of 8 D cells, or 12VDC	\$60.00
35	Newtonian	4.5"	Meade	DS-2114	4.5" newtonian reflector or an Alt/Az single fork mount Goto telescope with tripod. It operated of 8 D cells, or 12VDC	\$60.00
49	Dobsonian	4"	Orion	Dobonian	Table Top Dob - Easy to use	\$35.00
51	Split Fork	16"	Meade/Home	DS16	Equatorially Mounted 16" Newtonian Reflector on a fiberglass custom Split fork mount. The mirror has a a small chip on the edge of the mirror that has been blacked. The mount can be motorized, or the OTA can be converted to a Dobsonian.	\$100.00
53	SCT	4.5"	Celestron	NexStar 114GT	4.5" Newtonian reflector or a single fork mount Goto telescope with tripod. It operated of 8 D cells, or 12VDC	\$60.00
54	Newtonian	8"	Orion	Atlas 8" Goto	8" f6 Newtonian OTA on Orion GOTO German equatorial mount with tripod	\$200.00
56	Newtonian	6"	Celestron	???	6" refractor on a manual GEM with tripod	\$45.00
57	Refractor	102mm	Explore Sci	AR102&LXD55	102mm f6.6 refractor on a Meade LXD55 Goto GEM Mount. A good starter astrophotgrapy setup and wide field visual scope setup. Computer control software is avaiable for free	\$175.00

The Kuhn Telescope Is Back In Service

By John E. Hoot

As you may know, early this year the 20 year old computer that controlled the Kuhn telescope failed. The computer was still running MS-DOS and used custom controller cards that required the, now obsolete, ISA standard. Furthermore the creator of the control system passed away some years ago.

Clearly it was time for a modern system with ongoing support and modern electronics. At the same time, we wanted the upgrade to have as little impact on the telescope design and operator interface as possible. These objectives would minimize the retraining required of Star members. After looking at what was available on the market, we chose to go with Sideral Technologies (SiTech) micro stepping controller. SiTech has been making brush motor controllers for a decade and has a good track record in the telescope building community. They have recently expanded their offerings to include high speed 3 phase motor controllers and stepper motor controllers.



The retrofitted Kuhn 22" Telescope



The New Controller in The Drive Base

The SiTech micro stepper system is compatible with the motors already installed on the Kuhn. Furthermore, modern integrated circuits allows the whole controller to fit in a 4x6 inch box that interfaces directly with any Window PC via a standard USB connection. This eliminated the need for a whole PC dedicated to moving and pointing the telescope.

Just as the Hubble Space Telescope improved with every servicing, so has the Kuhn. While we were at it, we replaced the operator's PC with a modern fanless, quad core micro PC running Windows 10 Pro edition, that includes 4 GB of RAM and a 128 GB solid state disk drive. This one computer now runs a dual monitor installation on the control desk. The scope is still controlled by "TheSky" on the left hand monitor, and the right hand monitor is for running web browsers, auto guiding software, and other utilities.

That's right! The Kuhn is now an ASCOM compatible telescope. It has a USB hub in the telescope drive base where it will accept input from guide cameras. This gives it the ability to close loop track with 1 arc second accuracy. PHD2 auto guiding software is already installed. This popular open-source program, maintained by club member Bruce Waddington, allows long exposure astrophotography with the Kuhn or its piggy-back refractors. The telescope is also in the process of being modeled with a T-Point like system to improve its pointing and tracking accuracy.

I am happy to report that the retrofit is complete and was a complete success. The Kuhn is back! As soon as we can safely get together again, Star Members can make arrangement with Barbara Toy, to take a refresher certification session so they again enjoy this wonderful club resource.

I am looking forward to the resumption of Star Parties with the new and improved scope.

Jupiter – Saturn Conjunction Images

Tom Bash



Composite by Dave Kodama with moon added for size reference



Wally Pacholka



Ray Stann




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	David Hobbs	david_hobbs714@yahoo.com	
<ul style="list-style-type: none"> • 20" F5 Research grade early Coulter mirror and secondary mirror • Primary mirror is 2 3/4" thick, Secondary is 4" x 5 5/8" 				\$2800

For Sale	contact	Ron Choi	rongrace2@cox.net	
<ul style="list-style-type: none"> • Orion StarShoot AutoGuider • Orion Mini 50mm Guide Scope • Baader Planetarium Classic Ortho 6mm eyepiece • Hotech 1.25" SCA Laser Collimator (Dot) 				reduced price \$ 220 reduced price \$ 50 reduced price \$ 40 \$ 60

For Sale	contact	Dave Cook	949-689-0853	
<ul style="list-style-type: none"> • Televue 5X Powermate 				\$ 175
<p>The Televue 5x Powermate is different from a traditional Barlow lens because it has a 4 element lens design (Four Glass Elements) that delivers full field sharpness with virtually no aberration. The Televue 5x Powermate will outperform any Barlow lens because the additional lens elements within the Powermate body.</p> <p>I purchased this Powermate new (\$218), did an on-telescope test, and found that the magnification was too much for my my f/10 Celestron SCT. I am now using the 2.5 Powermate, which is more ideal for my telescope. This 5X powermate would probably be ideal for small telescopes or short focal length Newtonian telescopes.</p> <p>This Powermate is in its original Televue box, and looks brand new in every way.</p>				

For Sale	contact	David Fischer	Leyes-Fischer@cox.net	
<ul style="list-style-type: none"> • ATS Portable Pier, 8 inch diameter • 52 inch height • Excellent condition • Detachable aluminum shelf and eye-piece holder • No pier adapter (top plate) is included – these are specific to the user's mount 				\$1,500
				

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Anza Site Maintenance
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Mount Wilson Star Parties
Librarian
Membership / Anza Pads
Mount Wilson Trips
Observatory Custodian / Trainer / Member Liaison
Outreach
Sirius Astronomer Editor
Telescope Loaner Program
WAA Representative
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SPECIAL INTEREST GROUPS (SIGs)

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Dark Sky SIG
Youth SIG

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