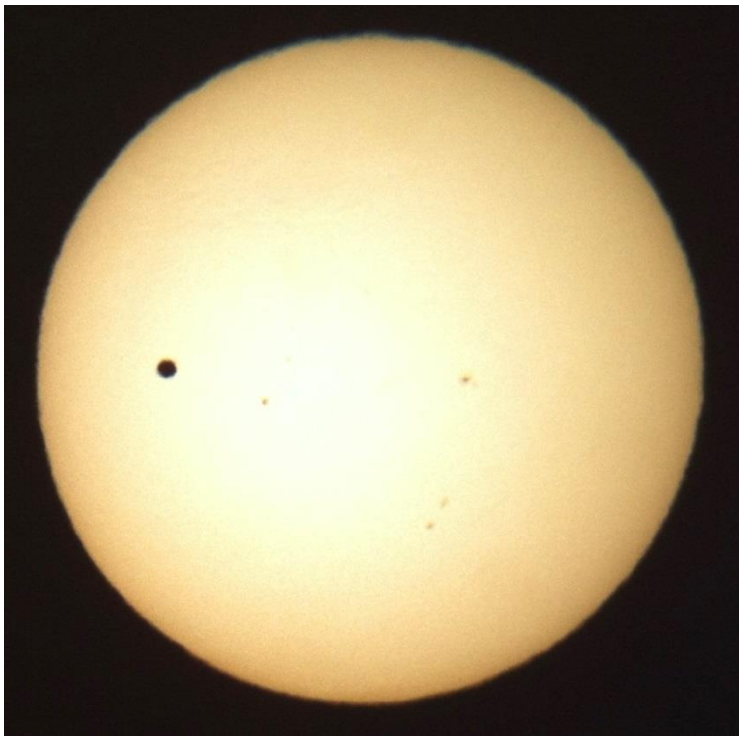
SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

November 2019 Free to members, subscriptions $12 for 12 issues **Volume 46, Number 11**



Transit of Venus from 2012 taken by Fredric Forster using an iPhone through a 5" Astroscan telescope from Edmunds Scientific. The image was taken without the use of filters.

Upcoming Events

Club Meeting - free and open to the public	8 Nov	7:30 PM at Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. The speaker will be Chris Butler from Griffith Observatory with a talk entitled "Our Little Corner of the Galaxy – the Earthlight Express"
	13 Dec	December meeting speaker is TBA
Anza star party	23 Nov 28 Dec	Members are encouraged to check the website calendar for updates on star parties
Local (O.C.) star party	23 Nov 21 Dec	
Outreach	Many	Please check the website calendar for the outreach events this month. Volunteers are always welcome
Beginner's class	6 Dec	7:30 to 9:30 PM at the Heritage Museum of Orange County at 3101 West Harvard Street in Santa Ana
Astro Imagers SIG	6 Nov 4 Dec	6:30 to 8:30 PM at The Urban Workshop in Costa Mesa
Astrophysics SIG	15 Nov 20 Dec	7:30 to 9:30 PM, at the Heritage Museum in Santa Ana
Youth SIG		Contact Doug Millar
Dark Sky Group		Contact Barbara Toy

President's Message

By Barbara Toy

It seems this autumn is a time of change on a surprising front…

In Memoriam – RTMC

Many of you may recall announcements that RTMC had been moved from its usual dates over Memorial Day weekend to September, and I know a number of members attended on the new dates. There have been new developments since then, specifically an announcement from the RTMC Board that 2019 was the last RTMC Astronomy Expo. If you want to see the announcement for yourself, it's posted on the RTMC website, http://rtmcastronomyexpo.org/.

RTMC Astronomy Expo, which started life as the Riverside Telescope Makers Conference, has been a major feature of the Southern Californian amateur astronomy world for decades – actually, 2018 was its official 50th year, so it started in 1968, the year after our club had its official start. The early days were long before my time as an active amateur astronomer, but I'm told that it started as an event where people who were interested in building telescopes could get together, share information, see what others were doing, and build a regional community of people who shared that passion.

I'm not sure at what point it became a regional star party as well as a celebration of telescope making, but its website says RTMC was held at Camp Oakes for over 40 years, and it seems likely that the star party aspects were well established as an important part of the event by the time it moved to Camp Oakes. Another aspect of the event that started early in its history was the swap meet, where attendees could sell off items they no longer needed and find pre-owned bargains.

Vendors were also known to have bargain prices on items they wanted to clear out of storage or that might have some cosmetic flaws – for many years, RTMC was known as a great place for bargain-hunters. It has also been a place where you could find parts you couldn't easily find elsewhere (one regular vendor in particular has specialized for years in selling parts he's collected from various pieces of damaged equipment).

RTMC has also been a great source of stories, particularly of hardship years – Memorial Day weekend turns out to be close enough to winter that there could be snow, but close enough to summer that some years saw heatwaves; other years were notable for windstorms, hail, or other episodes of weather drama. Fortunately, at least the years when I went, the sky was usually clear, though, of course, it had its periods of clouds (the bane of star parties).

RTMC weekends always had a roster of speakers on a variety of astronomical topics, with a keynote speaker on Saturday night. Even if they didn't stay for the keynote speech, most folks stayed for the raffles on Saturday and Sunday nights, which often featured really nice grand prizes (one year I was there the grand prize was a very large Meade LX200 telescope, I believe a 14 inch, which, as is my usual pattern, I failed to win. Helen Mahoney, one of our Board members and a past club president, won a classic LX200 in one of the raffles years ago that she still puts to good use). As an indication of RTMC's importance to the astronomical world, for many years, SAS had its annual meeting in Big Bear just before RTMC so people could easily attend both events.

More than anything, RTMC was a place to meet up with old friends, meet new people, and often put faces to people you might only have known by email or on astronomical forums. One of my particular pleasures at past RTMCs was getting to know some former members who had been important to the club before I joined and who I had heard about over the years, such as one of our past presidents who moved to Tucson, Wayne Johnson, and John Sanford, a major figure in OCAs earlier days, who had just retired and moved to Springville when I joined the club. John and I had become email buddies at some point after I joined the Board, but the times we spent together in the OCA booth at RTMC really made him a friend.

It's sad to be speaking of RTMC in the past tense. Unfortunately, problems that have built up over the years have been too much for this venerable institution, and the decision of Camp Oakes this last year to move the event from Memorial Day weekend permanently proved to be the final straw.

To those who have followed RTMC's fortunes, particularly over the last few years, the sad announcement that its 51st year is its last is not a total surprise. The world of amateur astronomy has changed a lot, particularly over the last ten years, making it much more challenging to put on an event like this. I'm not privy to any specifics from RTMC's perspective, but some changes are generally known and had to affect them, such as changes with some of the vendors that used to provide major support for this event. Oceanside Photo and Telescope has new owners and is focusing on its web-based business, eliminating its showroom and also its participation in events like RTMC. Meade Instruments, which for a while was probably the largest telescope manufacturer for the amateur market, at least in Southern California, went into a period of eclipse and there was a serious question of whether it would survive. It has now merged with Ningbo Sunny Electronics but, while its telescopes and other products seem to be making a comeback, they also no longer support events like RTMC as they did in the past. Celestron, another past regular sponsor, is now owned by Synta Technology, a Taiwanese company, and also seems to be limiting sponsorship of events like RTMC. These have not been the only defectors – I'm told that there weren't any astronomical vendors at this last RTMC other than the gentleman who specializes in telescope parts.

It may be that the world of amateur astronomy in general has changed to the point that regional star parties like RTMC no longer are needed in the same way they were in earlier days, when amateur astronomers were a lot fewer in number and didn't have access to many commercially produced telescopes or related equipment and so had to be much more creative to get the equipment they needed for viewing or imaging. I do hope that other regional star parties find ways through whatever challenges they are facing; it would be even sadder if RTMC proved to be the first of a string of failing star parties.

In spite of the sorrow of saying goodbye to an event that holds fond memories for many in the local astronomy community, amateur astronomy overall is healthy, and RTMC has certainly contributed to that health over the years.

Requiescat in pace, RTMC – and thanks for all you've done over the last 51 years!

OCA Election - Correction

Last month when I was writing about the OCA Board and election-related information, I said that ballots would be collected at the general meeting in December as well as January, 2020. My apologies – that was a mistake; we don't have the ballot box out for the December meeting, only in January, but you can mail your ballot in any time after the ballot is finalized in November and made available on the website. The deadline for mailing them is the day of the January general meeting or, as said last month, you can put yours in the ballot box at the January meeting.

On a closely related matter, Tim Hogle (one of our dwindling number of charter members), who has kindly undertaken to verify and count the ballots for the last few years, has agreed to handle that again this year for the club. Thanks for helping us out with that again, Tim!

And for the rest of you – we're still taking nominations for all Board positions through the meeting in November, so send your information to Alan Smallbone if you want to be added to the ballot!

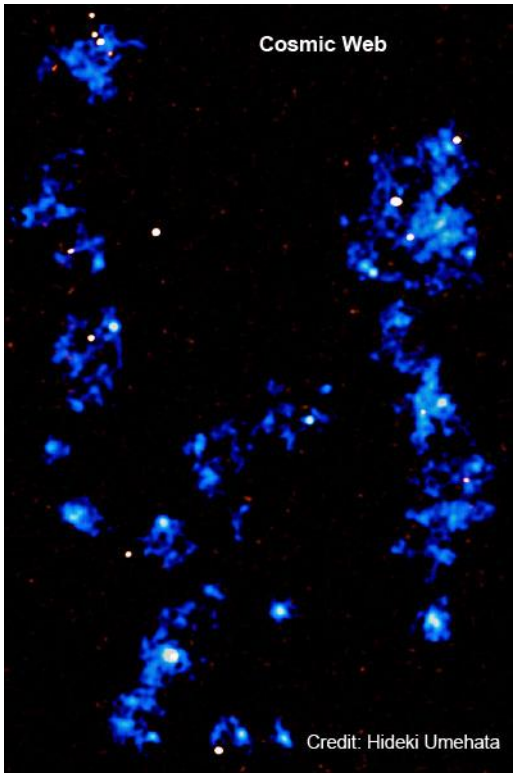
AstroSpace Update

November 2019
Astronomy and space news summarized by Don Lynn from NASA and other sources

Physics Nobel Prize – The Nobel Prizes do not have a category strictly for astronomy, so astronomers who qualify are awarded the Physics Nobel. 3 astronomers got the 2019 Physics award. James Peebles was recognized for his theoretical work regarding the cosmic microwave background (CMB) and cosmology. He was one of the 1st to predict that the Big Bang had to have produced the CMB, and he further did much work showing what we could learn about the early Universe from the properties of the CMB. His prediction of the CMB came in a paper he had written but not yet published by the time that Penzias and Wilson discovered the CMB. That pair later (1978) received the Physics Nobel for the discovery. Peebles' later theoretical work was used to show that the observed CMB properties imply that there is dark matter and dark energy. This award is perhaps for the most theoretical work ever, rather than for discovery. The prize was shared with Peebles by Michel Mayor and Didier Queloz for their discovery in 1995 of the 1st planet outside the Solar System (exoplanet) that orbits a Sun-like star. The only previously known exoplanets orbit a neutron star, and such are still rarities. Mayor and Queloz's 1st planet is 51 Peg b, a gas giant orbiting a naked-eye visible star in Pegasus, only 50 light-years away. Thousands of planets orbiting Sun-like stars have been found since. Mayor and Queloz opened the door on exoplanet astronomy. 51 Peg b was found by the radial velocity method, where wobbles in the spectral lines of a star fit the pattern of what is caused by the gravitational attraction of an orbiting planet causing wobble in the position of the star.

Leonov – Soviet cosmonaut Alexei Leonov died in Moscow at age 85. He was truly a pioneer and hero in exploring space. On the Voskhod 2 mission he became the 1st person to perform a spacewalk. It nearly ended in disaster when his spacesuit swelled and he was unable to fit back into the spacecraft. By dangerously lowering the pressure in his suit, he was able to re-enter the craft. The mission landed off course, and Leonov and fellow cosmonaut Belyayev endured 2 freezing nights in the wilderness before they skied out with a rescue party. Leonov also flew the Apollo-Soyuz joint American-Soviet mission. American astronaut David Scott and Leonov jointly wrote a book telling the history of the space race from both sides. He was also an artist and is credited with making the first artwork made in space, a sketch of sunrise from orbit made on the Voskhod 2 mission.

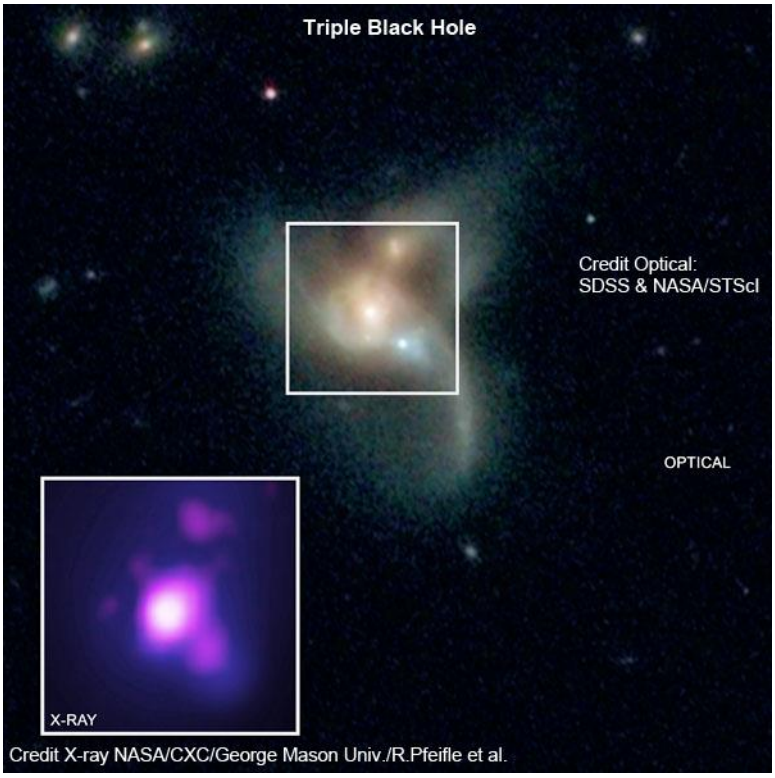
Cosmic Web – The Universe is permeated by a cosmic web of gas connecting galaxy clusters. But it has proved extremely difficult to image, since it is so rarified and usually not giving off or reflecting light. Light passing through a piece of cosmic web has imprinted upon it spectral lines of the web material, but this doesn't actually get us an image of the web. Astronomers have taken what may be the best image yet of the cosmic web in a small area of the sky where the web is so distant that the light left there a mere 2 billion years after the Big Bang. The reason this piece of web is visible is that it is being illuminated by nearby galaxies that are undergoing bursts of star formation and/or black hole activity. The images were taken with the Very Large Telescope in Chile. 2 filaments of web can be seen that are about 3 million light-years long. The light illuminating the web is actually ultraviolet light, but it is shifted to visible light or infrared by the expansion of the Universe. Since we can't observe ultraviolet, at least from ground-based telescopes, this technique does not work on closer parts of the cosmic web since light from close objects does not get shifted to visible light or infrared by expansion. A large ultraviolet space telescope would be required for nearby cosmic web, but that has not happened yet.



Galaxy Halos – The halos of hot rarified gas that envelop most massive galaxies have proved difficult to detect or study. The principal method has been to observe the effects on more distant quasar light that happens to pass through a halo on its way to us. A new method has been found. The effects of a halo can also be seen on radio waves from fast radio bursts (FRBs) that happen to pass through. From the amounts that different frequencies within the FRB are delayed during the halo passage, some properties of the halo gas can be determined. This has only been observed once, though astronomers hope to see it often in the future. What was learned from this 1st such observation: the burst traveled 95,000 light-years from a foreground galaxy on its way to us; the halo is surprisingly thin and lacks turbulence or any substantial magnetic field. Astronomers don't get to choose a particular galaxy halo with this method, since FRBs occur at random times and places all over the sky.

Gravitational Lens For X-rays – Huge concentrations of mass, such as clusters of galaxies, act as a gravitational lens and can magnify and brighten objects that happen to lie behind. This has been used to see in visible light detail of those objects behind which would be, without lensing, too small or dim. Now it has been done with X-ray light. It required characterizing the X-ray image of the foreground object and subtracting that to bring out a dwarf galaxy behind the Phoenix galaxy cluster. The magnification, which is about 60 times, allowed distinguishing 2 very active star-forming regions in the dwarf galaxy, one brighter than the other, apparently because it has younger brighter stars. The galaxy is so distant that its X-ray light took 9.4 billion years to reach us, while the Phoenix cluster light took 5.7 billion years.

Triple Black Hole – A triple supermassive black hole has been discovered. There are 3 galaxies colliding about the discovery, so presumably the 3 black holes were in the respective centers of the 3 galaxies. They are expected to eventually merge into one even more massive black hole. The collision is known as SDSS J084905.51+111447.2, a catalog number from the Sloan Digital Sky Survey (SDSS). It is about a billion light-years away. It was confirmed to be 3 black holes using observations in visible light, X-rays and infrared from ground-based and space-based telescopes. Known double and triple supermassive black holes are rare. Yet collisions of galaxies are not very unusual, and each collision should produce, for a time, a double (or more) supermassive black hole. So likely most double or triples are hidden in dust or gas clouds.



Counter-rotating Disks – New observations of galaxy M77 using ALMA (radiotelescope array in Chile) show that the supermassive black hole at its center has not one, but two accretion disks about it. Even more surprising, they are rotating in opposite directions. The inner disk is 2-4 light-years out and is rotating in the same direction as the black hole spins. The outer disk is 4-22 light-years out and rotating the opposite way. Astronomers involved proposed that the opposite-rotating disk could have been caused by gas clouds that fell or by a small passing galaxy. It is believed that counter-rotating disks will cause material to fall into the black hole faster than single-rotation. This may be the answer as to how many supermassive black holes grew to huge masses very quickly in the early history of the Universe.

Marsquakes – Mars InSight's seismograph has, since it was deployed last December, detected more than 100 shakings, but most are non-quake disturbances of some kinds, including wind gusts. 21 have been identified as having the shaking characteristics of marsquakes. Moonquakes and earthquakes differ in characteristics, in part because cracks in the Earth's crust are water filled and moon cracks are not. The 21 marsquakes show characteristics somewhat like Earth and somewhat like the Moon, but slightly more Moon-like. The frequency of small marsquakes (under magnitude 3.5) has been about what was expected, but there are fewer than predicted for larger quakes. Scientists don't know why that is yet.

InSight – Speaking of InSight, its heat probe, designed to pound itself up to 5 yards deep in order to measure the heat escaping from the core of Mars, is still stuck just over a foot into the Martian ground. But spacecraft controllers have a couple of plans: use the spacecraft arm to press soil against the probe to increase friction with the ground, and use the arm to pour loose soil into the hole also to increase friction. It has been established that lack of friction with the ground is allowing the probe to bounce back after every stroke pounding it down. The 1st plan was tried and movement of the probe by about ¾ inch was observed. Apparently pounding can resume. The probe must reach 2-3 yards deep to get meaningful data.

TDE – A supernova survey known as ASASSN spotted a galaxy whose core suddenly brightened, and further observations showed that the galaxy's central black hole is tearing apart a star and consuming it. This is known as a tidal disruption event (TDE). This has become the best observed TDE yet. Astronomers hope to learn the details of TDEs from these observations.

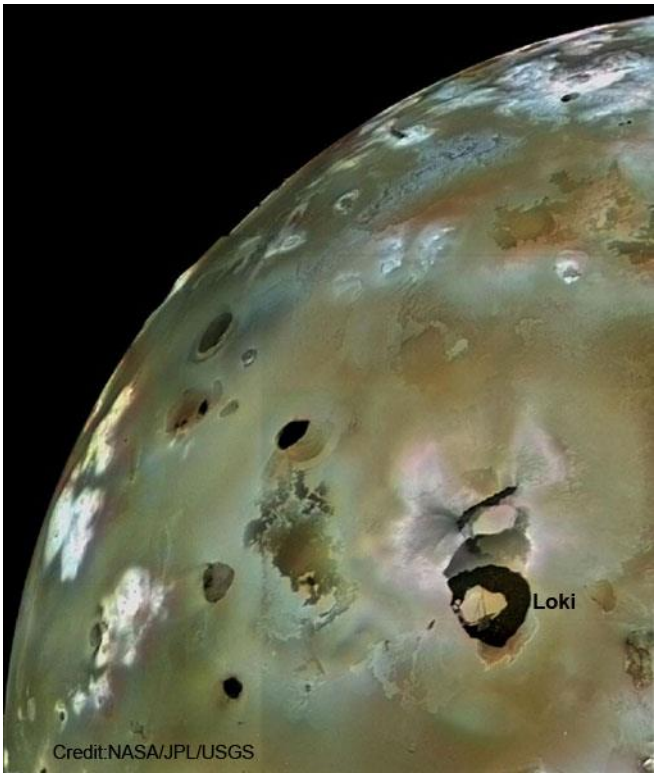
Pretzel – ALMA observations have revealed a pair of forming stars that are each encircled by a ring of material. The rings appear to interlock, forming a pretzel-like shape. This is in the Pipe Nebula, a dark nebula in Ophiuchus, also known as B59 and a few other designations. Matter is pausing in the rings as it accretes onto the 2 stars. Astronomers hope to learn details of how stars form by studying this pair.

Speedy Hot Jupiter – An exoplanet has been discovered by a transit survey located in Chile, and that planet has the shortest known orbital period about its star (its year) of any hot Jupiter: just 18 hours. Gas giant planets that orbit close enough to their star to be significantly heated by the star, such as this one, are known as hot Jupiters. (A rocky planet, not gas giant, is known with even shorter year.) This hot Jupiter is a bit over 1000 light-years away, and is known as NGTS-10b. The discovery is about twice the mass of Jupiter, but nearly the same diameter. Planets quite close to their stars should have tidal forces that slowly shrink the orbit, eventually tearing the planet apart, with the pieces falling into the star. Astronomers will study this planet to see if they can detect signs of orbital shrinkage, in order to verify theory. Estimates are that it will take 38 million years for this planet to be consumed by its star.

Saturn Moons – Astronomers announced the discovery of 20 more moons orbiting Saturn. This is based on observations made with the 8-meter Subaru Telescope in Hawaii. This telescope has a very wide field of view, and was able to capture dim objects orbiting far from the planet. The 20 are each about 3 miles in diameter, near the limit for objects at Saturn's distance that can be seen with this size of scope. 17 of the 20 orbit retrograde, that is, in the opposite direction to the planet's rotation. This is to be expected, since moons captured by the planet's gravity rather than forming with the planet are more likely to be in distant retrograde orbits. Each of the 20 take about 2-3 Earth years to orbit the planet and are thus in fairly distant orbits. The moons belong to 3 different previously-established moon groups. Each group is believed to consist of the broken remnants of a larger moon that broke up far in the past, since members of any one group have similar orbits. Saturn is now the king of moons, having 82 known, surpassing the record of Jupiter, which has 79 known moons.

Martian Climate – As Mars rover Curiosity has climbed from the lower parts of Gale Crater, it has seen the rocks shift from ones formed in a long-ago fresh water lake to rocks formed in evaporating salty ponds. Recent discoveries include cracks in a Martian rock that may have formed when a mud layer dried out. A nearby area contained deposits of various kinds of salt, mixed with sediment. The best estimate for this evaporating period is that it occurred 3.3-3.7 billion years ago. This is helping to pin down when Mars transitioned from a warm wet planet to a cold dry one.

Loki is a huge (about 120 miles across) pool of magma (melted rock) on Jupiter's moon Io. Up until the year 2000, Loki brightened and dimmed in a period of about 540 days fairly regularly. Volcanoes on Earth can act similarly. It is caused by the surface cooling and solidifying, then sinking and repeating. Then in 2000 Loki stopped the brightenings. Since 2013 Loki has been oscillating in brightness again, but this time with a period of about 475 days. Observations will continue to figure out why.



Merging Black Holes – The teams running LIGO and VIRGO (gravitational wave detectors) have previously announced 11 certain detections from the 1st 2 observing runs and 33 candidates for detections from its current run. Raw data from the 1st 2 runs has been made public. Scientists not associated with LIGO or VIRGO have developed computer programs that claim to better separate noise from data and applied them to the public data. One team has announced 7 more instances they found in the data that they believe are gravitational waves from merging black holes. The black holes had masses similar to those of previously announced mergers, about 20-40 times the Sun's mass. 2 of the 7 show unusual spin properties, so will prompt further analysis.

Instant AstroSpace Updates

Astronomers have discovered the **most distant known protocluster** (cluster still forming) of galaxies, such that the light we are seeing left there only 800 million years after the Big Bang. It is hoped that further study will help us understand how galaxy clusters develop.

Observations have found cyanogen gas in the comet now known as **2I/Borisov** ("I" for interstellar, meaning it is moving too fast to have come from anywhere in our Solar System). There is no danger to us from this poisonous gas, so don't panic like many did in 1910 when cyanogen was found in Halley's Comet.

A new theory has been presented to explain why **magnetars** (a type of neutron star) have extremely strong magnetic fields. Computer simulations of merging stars showed that can produce very strong magnetic fields, which can strengthen further to magnetar levels if the merged star then collapses to a neutron star during a supernova.

On October 10, a Pegasus XL rocket, launched from beneath a jet airplane, put into orbit the **ICON** spacecraft, which will study the Earth's ionosphere, where weather meets space weather.

How To Build Your Own Schmidt-Cassegrain And Why Not To

By Donald S. Lynn

How To Build It

More than 30 years ago I was attending the Riverside Telescope Makers Conference and Celestron was selling scrapped telescope parts at their booth. Probably cleaning out their factory of stuff that customers had broken and brought in to be repaired. I began wondering if I could buy a whole telescope piece by piece. The prices were so cheap that a whole telescope would not add up to much cost. So I bought a corrector plate with attached secondary mirror of an 8-inch Schmidt-Cassegrain, and began a long search for the rest of the parts.

I knew that the major manufacturers of Schmidt-Cassegrains make their optics near perfect by the final figuring of the secondary mirror. This counteracts any substantial imperfections in any of the optical components (corrector lens, primary mirror, or secondary mirror). So it would be best to get a matching set of the 3 optical components. But a full set is rarely seen in this type of sale. If a customer broke something, it's probably one of the glass pieces, so at best 2 of the 3 optical pieces will be intact and therefore for sale. But I had heard that the primary mirrors were pretty close to perfect spheres, because they are made by grinding and polishing machines designed to produce spheres, and because most grinding procedures tend to produce a nearly perfect sphere. So I thought it was safe to buy the corrector/secondary matched set without the primary. Of course I was wrong, but I didn't know it for decades.

Another year I found a primary mirror that I liked. It was a factory reject that had an obvious chip out of the edge, that looked to me like it would not affect the optical performance. The chip was even carefully indicated by marking pen, apparently by an inspector at the factory. It was not aluminized, but was completely polished to the best of my inspection.

Over the years I found and bought an empty tube, a fork-mount base, a focus knob, and the focusing ring and screw. I was especially impressed with the mount base, since it was manufactured during the years that Celestron used Byers gears, which are famous for their precision. I think I paid $25 for it. It was the most expensive part.

A friend who was upgrading her Celestron 8 to use a super focuser gave me the old focus mechanism. It was the only part I got for free.

After several years of not finding the remaining parts, I went to a dealer of used telescope parts and bought the corrector retaining ring and the primary mirror retaining ring. After that I was missing only some bolts, which I found in a hardware store. I now had parts that had lived in 8 different telescopes. That's not even counting the primary mirror, which apparently was never put into a scope.

Then I carried the primary mirror to Newport Glass Company, which coats mirrors with the reflective aluminum. The mirror-coating expert there saw that this was a factory reject mirror, and warned me that I really needed to get a matched set of optics. I told him I would take my chances, and to go ahead with the aluminizing. It cost fifty-some dollars.

Finally I was ready to assemble my telescope. I carefully cleaned and lubricated all the parts that needed such and put it all together. I then collimated the secondary mirror.

First light was a star test of the optics, comparing the pattern seen inside and outside of focus. It clearly had a fair amount of astigmatism. Either my primary was not a perfect sphere, or the secondary or corrector were not their perfect shapes. So I repeatedly rotated the corrector, along with the attached secondary mirror, with respect to the primary to see if I could improve the image quality. I found a rotation that had nearly perfect star test images. Two wrongs do make a right!

So what did it all cost? Probably about $130, including the mirror aluminizing, but I could be a bit wrong with that figure since I didn't keep records or receipts.

Bill Hall, observing that I had put together (telescope) body parts and brought them to life, started calling my scope the FrankenScope. Regardless of the derogatory name, I am happy with it. I have used it for several outreach star parties in addition to my regular star gazing.

Why Not To

1. I have not seen Celestron, or any other manufacturer, sell scrapped telescope parts for several years now. So the era of being able to buy a telescope part by part is probably over.

2. I got lucky that the primary mirror and the corrector/secondary assembly had nearly the same astigmatism, so they could be rotated to cancel. That probably would not happen if tried again.

3. I now have an obsolete telescope because it took so long to complete. The mount was built back when such telescopes were motorized only on the R.A. axis, without declination motor, and had no computer control. So I have to find objects in the sky the old-fashioned way, moving the scope by hand to the desired coordinates, without the aid of GoTo capability. I also have to polar align the R.A. axis, which is not necessary for computer-controlled telescopes. I don't mind; that's the way I learned to do it.

Images From Anza

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<tr><td>  </td><td>  </td></tr>
<tr><td>The view from upper pads towards the southwest. From David Fischer</td><td>It's a treat for our eyes now but how will our cameras like it if the cloulds drift overhead and block our view later ? Taken by David Fischer</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Image from Ian Grove showing a person setting up in the twilight on a very clear evening</td><td>Image of Milky Way with two private observatories in the foreground. This is also from Ian Grove</td></tr>
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OCA Loaner Scope Program

Telescopes are checked in and out only on one designated weekend every 3 months. The loan period is 6 months. Available scopes are listed on the club website and in the club newsletter. Reservations will be accepted until 7 days prior to the next pickup day. To reserve one, send the program director an email at scopes@ssccorp.com

The request should contain the desired scope's inventory number, the member's name, address, telephone number and email contact address. Pick up time and location will be sent to the borrower via email. Please bring proper identification and sign the club's loan agreement at the time of scope pickup.

NEXT SCOPE EXCHANGE DATES

January, 2020 – Returns **January, 2020 – Pickups**

Email: scopes@sscorp.com

From the Editor

Sirius wants photograph submissions from club members
We have sufficient submissions for remainder of this year. New submissions will be queued up for inclusion starting in January.

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

Due dates for submission of articles, pictures and advertisements

Issue	Due date
December	23 Nov
January	19 Dec
February	25 Jan
March	22 Feb
April	21 Mar

November's Guest Speaker: Chris Butler from Griffith Observatory

Topic is: Our Little Corner of the Galaxy – the Earthlight Express

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 Val Akins vlakins@comline.com

- Celestron piggyback mount for 35mm DSL cameras or finderscopes $20
- Orion Astro View 120ST f/5.0 Richfield refractor OTA with rings and dove trail attached $175

For Sale contact Dave Cook 2cookies@earthlink.net 949-689-0853

- Like new - SkyWatcher 100ED f/9 refractor with Celestron CG-4 mount, and numerous accessories
- The Scope comes with an aluminum hard case, a dual-speed 2-inch focuser, 8X50mm finder, 2-inch dielectric diagonal, 2 LET eyepieces, 4-inch Baader solar filter, a .85 reducer/flattener (which converts the 100ED to f/7.6), and a Canon DSLR EOS adapter
- CG-4 has motorized tracking drives in both RA and DEC. CG-4 mount includes an aligning sight scope

Asking $500, or best offer

UPCOMING TOTAL SOLAR ECLIPSE TRIPS

- December 2020 – Patagonia/Argentina*
  - 6 Day/5 Night Tour
  - "Glamping" at the observation site night before the eclipse
  - 2 Nights in Buenos Aires
  - 2 Nights in San Carlos de Baraloche
  - Best weather prospects along eclipse path
  - Price includes hotels, ~ ½ meals, ground and air transportation, technical support
  - Nearly 2 minutes of totality
  - Nighttime sky observing before eclipse day
  - Optional extension to the Patagonian ice field, Glacier National Park, Moreno Glacier
- April 2024 – San Antonio, TX*
  - 4 Day/3 Night Tour
  - 5 Star hotel accommodation in the famous Riverwalk tourist area (Alamo, etc.)
  - Daily breakfast, transportation to reserved site 20 km from centerline (4 min 15 sec totality)
  - Celebration banquet following the eclipse
  - Optional added days in San Antonio available
  - Transportation to/from eclipse site, daily breakfast, early equipment setup on site with security

*** Led by 30 year OCA Member Joel Harris**
Veteran of 21 Total Eclipses/Tours
90%+ Success Rate Seeing Totality

TWILIGHT TOURS

For more information, go to: www.twilighttours.net

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