SIRIUS ASTRONOMER

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The Newsletter of the Orange County Astronomers

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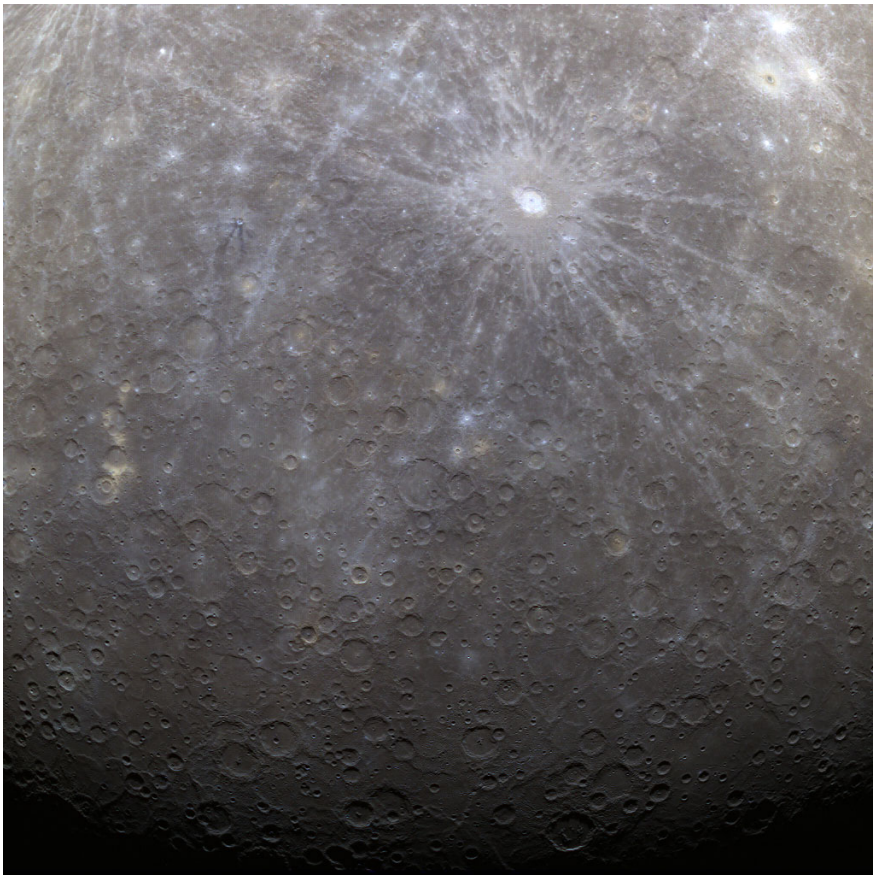

This image of the crater Debussy (near top center) and surrounding area is the first image obtained by the MESSENGER spacecraft as it entered orbit around the planet Mercury on March 17th. MESSENGER is the first spacecraft to orbit Mercury and only the second spacecraft to visit the innermost planet (the first was Mariner 10, in a series of flybys in 1975). Look for Mercury in the evening sky this month, to the west in the vicinity of Jupiter.

OCA CLUB MEETING

The free and open club meeting will be held April 8th at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. This month, Dr. Manoj Kaplinghat will discuss 'Dark Matter In Space And Under Our Feet'.

NEXT MEETINGS: May 13, June 10

STAR PARTIES

The Black Star Canyon site will be open on April 30th. The Anza site will be open on April 5th and 30th. Members are encouraged to check the website calendar, for the latest updates on star parties and other events.

Please check the website calendar for the outreach events this month! Volunteers are always welcome!

You are also reminded to check the web site frequently for updates to the calendar of events and other club news.

COMING UP

The next session of the Beginners Class will be held on Friday, April 1st at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana. Next month the class will be offered on May 6th.
GOTO SIG: TBA
Astro-Imagers SIG: Apr. 19th, May 17th, Jun. 21st
Remote Telescopes: TBA
Astrophysics SIG: Apr. 15th, May 20th, Jun. 17th
Dark Sky Group: TBA

Around OCA

By Barbara Toy

OCA Observatory Custodian and Member Liaison

Although, as I write this, winter seems to be doing its best to stage a comeback with yet another cold storm, spring should truly be here by the time you see this, with warmer nights for viewing as well as warmer days. We are all hoping that we are now entering a period of good viewing and imaging weather. Unfortunately, last year had more than its fair share of cloudy nights around the new moon, and the affinity of bad weather for new Moon weekends was particularly strong this winter, so many of us feel shortchanged on time with the winter constellations. Although we're now saying goodbye to Orion and its friends for the season, if you're up late enough, or get up early enough, you should start seeing them again in late summer.

The Messier Marathon

I don't know how many people at the Anza site participated in the Messier Marathon during the March Anza Star Party, which was a bit early for optimal MM conditions, but I know there were at least a few. Unfortunately, the night featured high clouds moving across the sky all night, and some periods when everything was blotted out. Even when it was somewhat clear, there was enough thin high cloud that dim fuzzies were even dimmer and fuzzier, often to the point that the fuzziness merged with the general local haze and therefore pretty much vanished. In the case of galaxies, this meant we could often only see the the cores, with only a hint that there might be something around them. At one point when I was looking at the Pinwheel Galaxy (M33), which fills the 40 mm eyepiece on the Kuhn telescope, the only way I was able to identify the faint haze across the field of view as part of the galaxy was because I had seen it before under better conditions. In short, it was a disappointing night for viewing or imaging, and a challenging night for finding all of the Messier objects, but we did have at least two people, Jim Benet and Ron Zukowski, who found 104 and 106 objects out of the possible 110, respectively.

In past years, "old timers" like Don Lynn would star hop their way through the Messier Marathon. I don't know if anyone tried that this year, but the weather conditions would certainly have made that more challenging than usual. My own star hopping skills are on the rudimentary side, as affordable goto systems came into the market before I became so frustrated with trying to find objects that weren't near something bright that I could find naked-eye or easily through the finder that I either developed that skill or gave up, so I have deep respect for those who really can star hop their way to difficult objects.

Whatever technique you used to do the MM, if you did it, please give or send me your Messier Marathon form so we can give you your genuine OCA Messier Marathon certificate for 2011. You didn't have to do it at Anza during the official Messier Marathon, and you didn't have to do the whole night – half marathons are fun too. Please make sure that your name is on the form, along with information about the telescope or other equipment that you used, and whether you used star hopping to find the objects or a goto or computer controlled system.

The good news about this last Messier Marathon is that the conditions were better than they have in past years, when we were clouded out completely, or had rain or snow. Nevertheless, we are all hoping for a better set of conditions for the next Messier Marathon, next spring.

Outreach Program

Last month, I talked about our Outreach Program at some length. As an update, Jim Benet has formally brought the school-related outreach program to a close with Daylight Savings Time; with daylight lasting an hour longer, the sky gets dark too late for young kids to get much time for viewing and still get a good night's sleep, so the schools generally don't set any outreach events after Daylight Savings starts and, for the same reason, we don't have many set in the fall before Daylight Savings ends. This means that our school program is compressed into a short period between early November and early March, for the most part, and some nights are inevitably lost because of the holidays and bad winter weather. This is why we tend to have so many outreach events set during this period, sometimes four or five per week, though Jim tries to spread them out as much as possible.

During other times in the year, we tend to do more outreaches in the local parks and other venues. The schedule is not as intense, but these events are every bit as satisfying as the events in the schools, and every bit as fun, as well – and we do need volunteers to make them successes, just as we do during the school year. So, please keep your eye on the calendar, get on Jim Benet's mailing list, and volunteer for any of the programs you can get to – and thank you for your help!

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TOP TWENTY THINGS AN ASTRONOMER SHOULD SEE

6 The Southern Sky

By Helen Mahoney

If you've been an amateur astronomer for many years and think you have seen everything, there are a couple of things you can do: get a much bigger telescope, or go to the opposite hemisphere.

When I first got interested in astronomy as a child, I remember hearing about Alpha Centauri. It was exciting to learn that, at a little over four light years from earth, it was our closest neighbor, and much like our own sun. But I could not see it, as it was only visible from the Southern Hemisphere. Over the years I heard of how Alpha along with Beta Centauri were the "pointers," pointing to the Southern Cross. (The fact that Alpha Centauri was actually a binary star, with an associated small star called Proxima a little closer, did not diminish its mystique.)

From our home in Long Beach, there is only a small percentage of the sky that is below the southern horizon—but what great stuff lies beyond that horizon! In addition to the Southern Cross, Alpha and Beta Centauri, and the Magellanic Clouds, there is the Jewel Box, the Tarantula Nebula, the Coal Sack, the Carina Nebula (with massive star Eta Carinae at its heart), and the Omega Centauri star cluster (which from Anza we get a tantalizing glimpse of just above the southern horizon).

Tarantula Nebula (Don Lynn)

The Jewel Box is a cluster of stars near the Southern Cross with many different colors, including pale blue and red supergiants. The Tarantula Nebula is a star-forming region in the Large Magellanic Cloud. The Coal Sack is a dark nebula that looks like a hole in the Milky Way. The Carina Nebula resembles the Orion Nebula, but much bigger. It looked to me in binoculars like M 42 looks in an eight-inch telescope. Similarly huge is the magnificent star cluster Omega Centauri—naked eye visible, and spectacular in binoculars.

My first opportunity to visit the Southern Hemisphere came in 1986 when we decided to go to New Zealand and Australia to see Halley's Comet. It was raining when we arrived in the "land of the long white cloud." The seasons were reversed. We had left in early spring, and arrived twelve hours later in the fall. It was a couple of days later, at the home of my now good friend Noel Munford when the clouds cleared, and I got my first look at the new sky. Noel got out his eight-inch telescope. "Where are the Magellanic Clouds?" I asked. I expected him to point his telescope toward them, but instead he pointed to two glowing clouds in the sky, the largest covering over five degrees (the diameter of ten full moons). I had no idea they were so large and beautiful.

It was in April, and Orion was high in the sky…but upside down. The crescent moon was facing the wrong way. The stars in the north were rising and setting from right to left, while those in the south were spinning clockwise around the South Pole. The movement of the celestial objects was so foreign to me. It took a couple of days for my brain to finally understand what I was observing. And then it hit me—there was no more horizon, where the sun and stars disappeared to go to sleep. Rather, there was a continuum of stars, and the earth was floating and spinning in the middle of it. That realization alone made my trip to the Southern Hemisphere worth it.

I have had the great fortune to be in the Southern Hemisphere five times, the most recent of which was our trip to see the South Pacific in July 2010 to see solar eclipse. On that trip, we got up before dawn most mornings to catch the Magellanic Clouds high in the sky. One morning, another astronomer pointed out the Andromeda Galaxy. Then, he pointed toward Sagittarius, within the Milky Way, and said, "You've just seen four naked eye galaxies!"

Each trip to the Southern Hemisphere has been full of new and exciting things to see and people to meet, as well as the fantastic astronomical encounters. My husband Doug says that when you visit the Southern Hemisphere, you see "strange places with a strange sky, and only the hint of familiarity on the edge of it." It is definitely a mind-expanding experience. ■

AstroSpace Update

April 2011
Gathered by Don Lynn from NASA and other sources

Most distant mature galaxy cluster – A cluster of galaxies initially spotted by Spitzer (infrared space telescope) has been determined through observations by many ground-based telescopes to be the most distant mature galaxy cluster known. The few more distant clusters known all appear to be still in the process of forming. The newly found cluster is so distant that we are viewing it as it was when the Universe was only 3 billion years old (when the light left there to reach us now), less than ¼ of its current age. Most of the constituent galaxies were not forming new stars, but were composed of stars already about 1 billion years old. Further observations in X-rays showed that the cluster has captured and heated a cloud of tenuous gas. Reduced star formation and possession of hot gas are characteristics of mature galaxies. Galaxy formation theory says that mature galaxies at this early time should be rare. Further observations of very distant galaxy clusters will be made to see if such are actually rare.

Quenching active black holes – Astronomers have known for some time that something turns off the growth of supermassive black holes found at the centers of galaxies. Disagreement remains on what the something is. Observations with the Gemini Telescope have captured a large-scale outflow from the quasar (active black hole) in the galaxy Markarian 231 that appears to be blowing away the gas and dust on which the quasar is feeding. The galaxy is about 600 million light-years away in Ursa Major. Although its mass is uncertain, estimates are that it has a mass in stars about 3 times that of the Milky Way, and its central black hole is estimated to have a mass of about 3 times that of the supermassive black hole in the Milky Way. Small-scale outflows from active galaxies had been observed before, but none sufficiently powerful to suppress further growth. Markarian 231 was already known to have collimated jets from its quasar, but the new observations exposed a broad outflow extending in all directions for at least 8000 light-years around the galaxy's core. The gas was found to be streaming away from the galaxy center at speeds of over 600 miles/second (1000 km/s). This outflow is removing gas from the nucleus at more than 2.5 times the star formation rate. The speed could be attained only by energy from the black hole, as stars cannot propel material at such speeds. Although the outflow is sweeping away the gas and dust, it is having no effect on the stars of the galaxy.

Chandra (orbiting X-ray observatory) has discovered evidence that neutron stars contain superfluid protons, a bizarre, friction-free state of matter. Superfluids created in labs on Earth exhibit remarkable properties, such as climbing upward and escaping airtight containers. When they're made of charged particles, superfluids are also superconductors, allowing electricity to flow with no resistance. The observations were of the neutron star in the supernova remnant Cassiopeia A, showing that it has cooled by 4% over a 10-year period. Calculations show that only a superfluid could lose heat that fast. It had been theorized that the few protons that are not crushed into neutrons by the great pressure in a neutron star would form a proton superfluid. The pressures required to form a superfluid at high temperature are too great to have ever tested this theory in a lab. This is the first observational evidence that a superfluid occurs in neutron stars.

Sunspot minimum explained – Solar scientists have been puzzled by the extended disappearance of sunspots for most of 2008-2009. A new paper claims to reveal why this happened. For years solar physicists have known about the Sun's "Conveyor Belt", a system of plasma currents that move near the surface toward the poles, then dive deeper to return to the equatorial regions. At the end of a sunspot cycle, the remnants of sunspots are pulled under, reanimated while moving in the Conveyor Belt, and pop to the surface as the next cycle of sunspots. It was known that the Conveyor Belt sped up during the late 1990s. A new computer simulation of the interior of the Sun shows that the speed up resulted in a shorter time for sunspots to be reanimated, too short in fact, resulting in far fewer sunspots. The Conveyor Belt has since slowed back to its usual speed, but too late to support a strong sunspot cycle. The new simulation also agreed well with the magnetic field strength measured. The long sunspot minimum has resulted in these effects: the Sun's magnetic field weakened, the solar wind subsided, cosmic rays penetrated the solar system in greater numbers, ultraviolet light (associated with sunspots) emitted by the Sun was reduced, Earth's upper atmosphere (heated partly by the Sun's ultraviolet) cooled, and atmospheric drag on satellites and space junk was reduced.

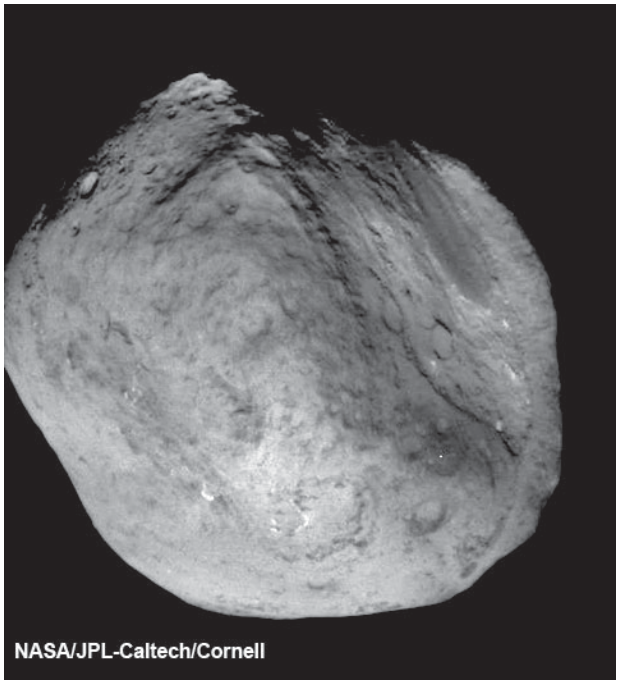
Dark matter – The Herschel infrared Space Observatory has discovered how much dark matter it takes to form a new galaxy. Clumps of dark matter gravitationally collect gas and dust needed to make galaxies. With too little dark matter, a developing galaxy fails to form. With too much dark matter, gas doesn't cool efficiently to form one large galaxy, resulting in lots of smaller galaxies. The right amount is about 300 billion times the mass of our Sun. Herschel imaged massive star-forming galaxies located 10 to 11 billion light-years away, so we saw them as they were early in the history of the Universe, when they were still forming. The amount of dark matter for the observed galaxies was calculated from the degree of clustering of the galaxies. From this they found that large galaxy formation was most successful around the 300 billion mass mark for the dark matter.

Mars Reconnaissance Orbiter (MRO) has reached the 5-year mark in its mission at Mars. It has transmitted more data to Earth than all other interplanetary missions combined, 131 terabits and counting. MRO met all its science goals in its initial 2-year mission. The spacecraft is still in excellent health. It has produced daily global Martian weather maps, taken 18,000 high resolution images (can see a desk-sized object) that combined cover the area equivalent to Alaska, taken about 37,000 medium resolution images (can see building-sized objects) covering about 2/3 of Mars, mapped minerals on more than ¾ of the planet, monitored atmospheric temperature and aerosols, and taken 8600 swaths of ground-penetrating radar to find underground layers.

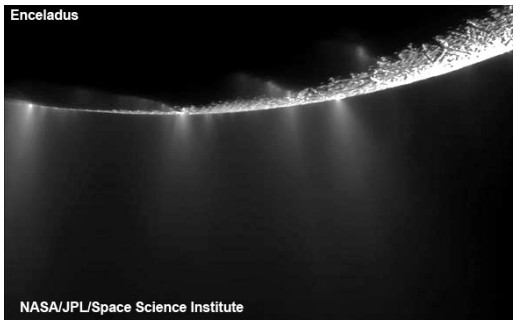
Martian carbonates – Rocks on Mars blasted out from far underground by crater-making impacts are providing evidence of one way that Mars's atmosphere has become less dense than it used to be. Much evidence exists that liquid water existed on Mars billions of years ago, and that would have required a much thicker atmosphere back then. The newly examined rocks are carbonates

found in Huygens crater, where rocks were blasted from miles deep. Apparently younger rocks overlie the carbonate, so it can be detected only where larger impacts have punched through those younger rocks. The spectrometer on MRO found calcium or iron carbonate near clay minerals. Both clay and carbonates probably formed in abundant water. Carbonate formation removes carbon dioxide from the atmosphere. Other evidence of substantial carbonates has been previously found at Leighton Crater, about 600 miles (1000 km) away. If these 2 places are representative, that is, if carbonates underlie much of the planet's surface, then a substantial portion of the early atmosphere could have been removed by the formation of carbonates. MRO will continue to see how widespread the carbonates are. In 2013 the MAVEN spacecraft will be launched to Mars to investigate how gas is stripped from the top of the atmosphere into space, another possible cause for the loss of Martian atmosphere.

Martian ice – Observations from MRO and Mars Express have revealed potential subsurface water ice deposits in areas closer to the equator than those found before. So there may be substantially more subsurface ice on Mars than previously thought. The new observations were of seasonal dry ice frost on pole-facing slopes in tropical regions. Calculations showed that a cold source had to be buried below these areas at depths of 1-3 yards (1-3 meters). Sources of cold other than water ice were ruled out. The study team believes that the subsurface ice could be remnants of the last ice age on Mars. More thermal measurements of seasonal temperature variations will be made to derive more precise depths of the subsurface ice.


NASA/JPL-Caltech/Cornell

Stardust-NExT (comet mission) returned 72 high-resolution images from its flyby of comet Tempel 1 on Febuary 14 at a distance of about 111 miles (178 km). This is the same comet that Deep Impact spacecraft smashed into a few years ago, and observed what kind of debris was thrown off. The goal of revisiting the comet was to see what changed in one orbit about the Sun, to image sides of the comet not seen by the previous visit, and to image the crater left by Deep Impact. That crater was found to be rather subdued, in fact barely visible. It had a lump in the middle, apparently because much of the material that splashed out fell back in a heap. The subdued outline is believed to indicate that the surface material is more fragile than thought. It was admitted that the Deep Impact spacecraft team had a betting pool on the size of the impact crater, so it was important to them that the crater was found and measured. Areas were found in images where the terrain had receded several yards (meters), apparently having melted away during the last passage near the Sun. Some areas had interesting terrace shapes, probably meaning that the material had formed in layers. Stardust also took data on comet particles striking the spacecraft. They came in bunches rather than being more randomly distributed. About a dozen particles even pierced the first particle shield of the spacecraft, but none penetrated far enough to cause damage.



Cassini (Saturn mission) – Heat output from the south polar region of Saturn's moon Enceladus is much greater than was previously thought possible, according to a new analysis of data from Cassini. Infrared measurements indicate 15.8 gigawatts of heat emitted, approximately 2.6 times the power output of all the hot springs in the Yellowstone region of Earth, or about 20 times that of a typical power generation plant. This is roughly 10 times the power calculated to be available from tidal forces and natural radioactivity. The theorists are going back to the drawing board. One possibility is that there is a subsurface ocean, and that allows more flexure of the moon's shell than predicted during tidal stresses, turning more tidal energy into heat. It is also possible that the tidal heating oscillates in strength, and we hit a strong point in time.

Exoplanet orbiting the star Beta Pictoris has been reimaged, and it moved, as expected, due to its orbital motion. This star was the first to have its dust disk directly imaged, back in 1983, and was one of the first few exoplanets directly imaged. Beta is a young 12 million years old, and is 63 light-years away. The new observation has enabled a better estimate of the planet's mass, which is now believed to be in the range of 7-11 times Jupiter's mass. The temperature is estimated to be 1100-1700 °F. (600-900 °C.)

PAMELA (cosmic ray orbiting instrument) has found that protons and helium nuclei, the most abundant components of cosmic rays, differ slightly in their distribution of speeds. Essentially all theories of cosmic ray production predicted the same speeds for protons and helium nuclei. Possible explanations are that the protons and helium nuclei are accelerated to their speeds by different processes, or that more than one source for either exists. The best theory for the source of cosmic rays had been within the magnetic fields inside supernova remnants.

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Participating in the National Park Service Astronomy VIP (Volunteer in Park) Program

By Paul Kreitz

I came across a business-card sized advertisement in the December, 2009 issue of Sky and Telescope inviting interested persons to apply for a role as an Astronomy Volunteer at one of a number of designated Dark Sky Parks within the National Park System. I followed the link they referenced in the ad (http://www.nature.nps.gov/air/lightscapes/astrovip/) , filled in and submitted an application, and eventually found myself assigned to the program at Badlands National Park in South Dakota.

My first reaction to that assignment was something like "Darn, why couldn't we go somewhere interesting?". After spending a little time in the Badlands, that changed to "Wow, isn't it great that we came to the Badlands!" Badlands is one of over a dozen National Parks and National Monuments across the country participating in the Dark Sky Parks program. The primary criterion for participation is that the Park has a truly dark sky, with light pollution a very small fraction of what we experience in urban Southern California. Badlands certainly fits that criterion! On moonless nights we could clearly see the Milky Way, in all its glory, from horizon to horizon, glowing in the north northwest, through Cygnus, and extending well past Sagittarius to the southeastern horizon. I have seldom seen the Milky Way so clear and extensive!

I had been prepped by Ranger Larry Smith in advance of our arrival as to what our typical day would comprise. I looked at the list of activities and said to myself "Ah, he has padded the schedule to document that we are putting in a full 32 hours for the week". 32 hours per week is the commitment as a volunteer in order to receive free housing and a "stipend" towards the cost of meals, etc. I was wrong. We did all of the tasks on Ranger Larry's list and then some.

My typical day as an Astro VIP started at 2:30 in a work room at the Visitor Center, checking the Internet for what's up tonight (Iridium flare? ISS flyby? Anything else extraordinary?), printing out sky maps for tonight's program, and checking the Clear Sky Clock web site for what tonight's visibility would be. A bit before 3:00 we carried equipment outside the Visitor Center for a "Sun Fun" program. We had a 40mm Coronado SolarMax mounted on an Ioptron SmartStar MiniTower tracking mount, plus a SunSpotter solar image projector and various other examples of solar activity. These included "solar beads" which change color from ivory to various pastels when exposed to ultraviolet light, and a "Radiometer" which has four vanes inside a partial vacuum bulb which spin faster or slower depending upon how much radiation they are receiving from the Sun. We typically had between 100 and 200 visitors stop by the Sun Fun between 3:00 and 4:00.

Between the 4:00 end of Sun Fun and 5:00 we would cool off from the hour in the hot July afternoon, and finish any other Internet preparations for tonight's program. From 5:00 to 7:00pm we manned the Visitor Center information counter. That was one of the activities I thought Ranger Larry had included in his list as time-fillers. Wrong. Manning the desk was actually a very enjoyable activity, providing lots of opportunities to interact with visitors in a non-astronomy mode. We did often include a "Don't forget the Astronomy Program at the amphitheater tonight!" as a part of that interaction. I particularly enjoyed checking children's work in their "Junior Ranger Program" booklet, then swearing them in as Badlands Junior Rangers, and presenting them with their genuine gold-colored plastic Junior Ranger badge,

After shutting down the Visitor Center at 7:00, we took about an hour for dinner, then headed over to the Amphitheater to set up for tonight's program. The arrangement here was one factor that sets Badlands apart from other parks participating in the program. The Amphitheater is a newly built (2006) outdoor facility consisting of seating for about 160 persons, plus a huge (20+ feet tall) rear-projection screen on the outside of a very large storage and equipment room. We had a Celestron C11, a Celestron C6, an Orion 12" Intelliscope, and a Meade 16" Lightbridge, all mounted on Wheely Bars or another type of rolling base. We simply rolled the scopes out, one to each corner of the Amphitheater seating area and dropped down the stabilizing legs to set up the

scopes. No unloading from a vehicle or lifting of OTAs was required. While visitors were gathering for the 9:00 showtime we greeted them, gave them fliers talking about protecting our dark skies (fighting light pollution), and sky maps printed from the www.skymaps.com web site. I tried to chat with as many visitors as time permitted about the program, what they had done in the park so far, what they wanted to do, etc.

At 9:00 Ranger Larry started his program, consisting of a welcome talk, a little information about upcoming activities in the park the next day, a few safety warnings (best not to step on the Prairie Rattlesnakes, they don't take kindly to that), and a "What state are you from?" tour of the entire seating area, followed by a PowerPoint presentation mixing a little Badlands information with a good bit of astronomy information and a strong push for protecting our dark skies by reducing light pollution. A number of Wally Pacholka photos of Badlands locations with the Milky Way overhead are featured in this presentation. After getting to know me better he polished and inserted into his program 3 or 4 slides that I designed focused on Jupiter, its proximity due to its closer than normal opposition this year, and where the 4 Galilean Moons would be that night. He would call upon me to present those slides.

We would have a 10 minute or so intermission at the end of the presentation, during which time those who couldn't stay for the viewing portion of the program could gracefully depart. After the intermission, Larry did a tour of the night sky with a green laser (he used one of mine because it was a good bit brighter that the Park Service pointer) identifying constellations and giving some background of the myths behind some of them. The VIPs present would use the intermission and sky tour time to get the scopes that required it oriented and aimed at a starting object for viewing. We tried to check with each other and avoid having three scopes looking at Jupiter at the same time, not always with total success. Viewing went on until the last visitor had no more requests, usually around 11:15 or so. Larry claims that he has stayed at it until 2:00 am, but the latest we were there during my time was about 11:45. We did that program 4 days a week; Friday through Monday. Tuesday, Wednesday, and Thursday was our "weekend" when other park Rangers did evening programs focused on the geology, culture, and history of the area. The park is adjacent to the Pine Ridge Lakota Indian Reservation, in fact the "South Unit" of the park is within the Reservation and administered by the tribe. It also is in the center of the historic Homesteading area, where Homesteaders could take title to 160 acres of land for $18, if they lived on it and demonstrated improvements they had made.

My primary activity with OCA for years has been participating in Jim Benet's Outreach program. I believe that that participation prepared me very well for the activities at Badlands. We had at least two Astro VIPs at any given time, and usually three. Two of the first three VIPs that I worked with were retired Professors of Astronomy, one from Texas and the other from Michigan. I thought "Gee, Paul, have you gotten in over your head?" These fellows clearly knew much more that I about the physics of astronomy. I soon concluded that my Outreach experience with OCA prepared me just fine for the duties of an Astro VIP at Badlands. Hardly any visitors wanted to know what a parsec is, but many wanted to know how many stars are in the Great Cluster in Hercules or how far away is the Ring Nebula or how powerful is that telescope. My involvement at Badlands may help to make my participation in OCA outreaches better also.

The administrators of the NPS Astronomy VIP program try to put inexperienced persons, such as myself, into parks with an established program. My requirement was for a park offering full hookup RV sites for housing, so that we could take our motorhome to live in. Those requirements converged at Badlands, which is how we were assigned there.

My wife Mary Eileen decided that she didn't want to sit around doing nothing all day while I was busy, so she volunteered to assist at the Visitor Center. She worked the same four days that I did, but earlier in the day. In addition to 2 – 4 hours at the information desk each day she responded to many Internet inquiries for information about the park, "graded" Junior Ranger booklets mailed back to the park by visitors who didn't have time to finish them during their visit, and a variety of other "back room" tasks that needed doing.

We spent a total of 10 weeks at Badlands, wrapped around a two week trip to Hawaii to celebrate our 50th Wedding Anniversary with our family. We both thoroughly enjoyed the experience, so much so that we are planning to go back next year, though for a shorter period of time – probably 6 weeks. I strongly encourage any OCA members who have some time available (at least 4 consecutive weeks for most parks) during the summer and enjoy interacting with visitors with little astronomy background other than curiosity to look into this program. The best starting point I know of is the starting point that I used: http://www.nature.nps.gov/air/lightscapes/astrovip/. The person you most likely deal with there is Teresa Jiles. Feel free to tell her that Paul Kreitz sent you

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Explore the Stars

Spring through autumn is the period a different outreach event takes place, Explore the Stars (ETS). This is a multi-club activity, and the current coordinator for the program is Bob Nanz, who is with the San Diego Astronomy Association. The dates for this program are shown on our calendar and, among other benefits, going out for this event gives you a chance to get to know some members of other clubs.

ETS takes place at Observatory Campground on Palomar Mountain, and is a joint program with the local rangers. It's attended by people camping at any of the campgrounds on the mountain, people who stay over for the program after finding out about it while at the observatory, or who come up the mountain specifically for the program. The rangers have all lights in the campground turned off on ETS nights (that is, both Friday and Saturday nights of ETS weekends), so the viewing conditions are generally excellent. Saturday evenings are the busier of the two nights ETS has the site on its weekends, and they usually start off with a potluck for the volunteers, followed by a talk in the campground amphitheater and then general viewing through the volunteers' telescopes. When the members of the public leave, the volunteers who are there with their equipment have the rest of the night for their own star party. Camping at Observatory Campground is free on ETS nights for volunteers who bring a telescope and participate in the program.

The program is a lot of fun, and if you're interested in volunteering, please contact Bob Nanz at bob@nanzscience.com.

Animal Life at Anza

Spring is a great time at Anza – the hills are green, wildflowers are coming out, the temperatures are rising from the chill of winter but don't yet reach the extremes of summer. It's sometimes hard to remember that there are dangers in the midst of all this that necessarily go with using a rural site. As with so many things, a bit of prevention can save a lot of hassle and pain.

Southern California is rattlesnake country, and that is a significant concern in rural areas such as the area around our Anza site. Baby rattlers are hatching and, even though they're small, they can be as dangerous as adults because they can't control the amount of venom they release in a bite and tend to release it all. If you see a snake, regardless of the size, it would be best to give it a wide berth (unless you have the expertise to identify it as a harmless snake – we have a lot of those on site, as well) and to let one of the board members on site know about it, or Don Lynn, who is the Anza Site Coordinator. It's also a good idea to keep to the marked paths and roads, and to stay out of the bushes, especially after dark when it's harder to see any critters that might be around.

Rattlers aren't the only local fauna that can cause problems – there are Black Widow spiders, red ants, scorpions, and other creatures that can be venomous as well as field mice, rats, coyotes, and so on. There are also a lot of animals that most of us consider non-threatening – ground squirrels and rabbits, for instance – but they're all wild animals and can bite or cause other problems if they feel threatened. Most stay out of the way when there are people around, but it's a good idea to keep food in rodent-proof containers, keep tents closed up and check any sleeping bags, shoes or clothing you leave outside for tenants before using them. It's also a good idea not to put your hand, foot or other portion of your anatomy in any hole, crevice or other location you can't see into before checking to be sure there isn't anything there that might feel the need to defend itself.

We haven't had anyone on our site bitten by a snake, spider or other poisonous creature at Anza yet, and we'd like to keep it that way, so please exercise a bit of caution when you're out there to avoid unfortunate run-ins with the local habitat. And, while this all might seem to indicate that there are serious safety issues out at Anza, that's really not the case – just a bit of caution is all that's needed, and that shouldn't get in the way of your enjoyment of the site and your viewing or imaging at all.

So, here's hoping for healthy, happy – and clear! – viewing conditions this spring and summer!

FOR SALE: TeleVue 5mm Radian Eyepiece, $125.00. Contact Bill Llano at 714-255-0845 or BELMARDUK@EATHLINK.NET

FOR SALE: 5x8X4 foot, 3500 limit load, enclosed trailer with 15inch wheels, removable top, carpeted floor with 4 tie downs, and 12 volt winch that raise/lower tail gate or pulls in anything on wheels. Trailer specifically designed to transport large dobsonian telescope. $1000. Equatorial telescope tripod for 10-15 lb optical tube assembly, build-in polar align finderscope, slow motion manual axis controls and counter weight. $80. Contact Dave at 949-492-5342

FOR SALE: Skywatcher 80mm f/11 refractor with equatorial mount and electronic drive; red dot finder; 2 Plossl eyepieces; diagonal; moon filter; accessory tray and 2x Barlow, $75. 4.5 inch f/4.7 Newtonian with table top equatorial mount and slow motion cables; 2 eyepieces; 6x30mm finder telescope and barlow lens, $50. Val Akins (949) 382-1869 (call anytime or leave message)

Western Amateur Astronomers Board Meeting Notes

by Tim Hogle

This year, as for the past several years, the Western Amateur Astronomers (WAA) Board of Directors held their winter business meeting in February at John Sanford's Starhome Observatory in Springfield, nestled in the foothills of the southwestern Sierra Nevada. For those of you who have recently joined the OCA and may not be familiar with either WAA or John, John was a prime mover and several times president of OCA for over a quarter century before retiring and moving to Springfield a few years ago. Springville (near Porterville) has become something of a growing enclave of serious amateur astronomers, primarily because of John.

WAA is an umbrella organization of astronomy clubs, primarily in the western US, of which OCA has been a long time member and supporter. As an umbrella organization, WAA's purpose is to promote communication between astronomy clubs for their mutual benefit, to give awards for recognition of outstanding achievement in the world of amateur astronomy and to promote astronomy in general.

WAA's most well known function is annually awarding the prestigious G. Bruce Blair Medal to an individual who has made truly outstanding contributions to amateur astronomy. This year the recipient for the award will be Scott W. Roberts, former Meade Corp executive, Meade 4M community leader, and current president of Explore Scientific. The award is for his many years of promoting astronomy outreach.

The Blair Medal has a history back to 1954 and recipients are listed on the WAA web site at http://www.waa.av.org. It includes four OCA members - John Sanford Msgr Ron Royer, Chris Butler and Bob Buchheim - and nominees (of which Scott is one) in its list of very well-known individuals. This year's award is to be presented at the Riverside Telescope Makers Conference in May, as has come to be the normal venue.

WAA will again have an information booth at RTMC this year, probably near the snack bar. Stop by and say hello. For more info about WAA, log on to the Web site shown above. ■

Horsehead Nebula from Yorba Linda by Bill Hall, 1/21/2011

Planet formation – The Subaru Telescope in Hawaii has imaged 2 more young stars with their disks, and these images show disk detail closer than ever before to stars. One image is of the star AB Aurigae, which is about 1 million years old. The disk has double rings that are tilted from the equatorial plane, a void of material between the rings, and a center that does not coincide with the star. These irregularities suggest that at least 1 giant planet is affecting the disk structure. The other image is of star LkCa 15, which is several million years old. This is the 1st direct image of the gap in its disk. This gap implies a giant planet is sweeping up material from the disk. High resolution images such as this are important to allow astronomers to understand the details of how planets form.

Voyager 1 (outer planet mission) has been commanded to roll to new orientations for the first time since 1990. The 2 Voyager spacecraft are traveling through a turbulent area known as the heliosheath, which is the outer shell of a bubble around our solar system created by the solar wind. This wind is composed of ions blowing radially outward from the Sun at a million mph. Last June Voyager 1 detected that the solar wind speed in the direction away from the Sun had dropped to zero, and that reading has continued since. The spacecraft science team believes that the wind does not just stop, but instead turns sideways. In order to test this theory, the spacecraft has to turn, along with its solar wind instrument, to other orientations. Hence the new commands to roll. 6 different orientations are being used over a week's time, and this pattern will be repeated every 3 months. Analysis of the measurements may take months. The solar wind's outward flow has not yet diminished to zero at Voyager 2's location, but that is expected in the next few years.

STEREO (twin solar space telescopes) have as their primary mission to explore in 3 dimensions the makeup of our Sun. But in between solar images, they have been observing far more. The pair has observed the interaction of solar mass ejections with the atmosphere of Venus, the stripping of a tail of a comet, atomic iron in a comet's tail, Corotating Interactions Regions (where fast-flowing solar wind catches up with slower wind), monitored variable stars, discovered 122 variable stars, and even detected an exoplanet.

Messenger (Mercury mission) is going into Mercury orbit March 17, after 6 years, more than a dozen trips around the Sun, 6 gravity slingshot flybys at 3 planets, and 16 trajectory-correction maneuvers. The initial orbits will take 12 hours each and have a minimum altitude of 124 miles (200 km). Messenger is the second Mercury mission ever, the first being Mariner 10 more than 30 years ago. Although more than 90% of the fuel has been used after the orbit insertion rocket burn, plenty remains for years of orbital corrections.

Discovery (Space Shuttle) made its last flight into space February 24 - March 9 before being retired and sent to a museum, probably the Smithsonian. It delivered a new module, called the Permanent Multipurpose Module (PMM), the Express Logistics Carrier 4 (an external platform to hold large equipment), and critical supplies to the International Space Station (ISS). PMM can support microgravity experiments in areas such as fluid physics, materials science, biology and biotechnology. Shortly before launch astronaut Steve Bowen replaced Tim Kopra on the crew following a serious bicycling injury to Kopra. Bowen became the 1st astronaut to ever fly 2 consecutive missions. The flight was the 133rd for any Shuttle, the 39th for Discovery, and the 35th Shuttle mission to build and maintain ISS. Among the cargo taken to ISS is the first human-like robot in space, designated Robonaut or R2. The dexterous robot includes a computerized torso, head and 2 arms with 5-fingered hands. It does not have legs yet. It is designed to accomplish many of the same upkeep tasks astronauts do every day aboard the station. Eventually it may be positioned outside ISS, avoiding the need for routine spacewalks by live astronauts.

It is expected that R2 will be unpacked by the end of March, at which time ground controllers will begin testing it, first on simulated tasks using a mockup panel of switches and controls. It may be months before checkout is completed and R2 will be assigned real tasks. R2 senses forces, so feels when it has gripped objects. Unpacking R2 is a low priority task, and so is scheduled to be done by the ISS crew after the Shuttle crew returned to Earth. The only urgency is to get the packing foam removed from R2 before the next trash dump from ISS. President Obama, excited about the possibilities of a robot in space, asked the Shuttle commander Steve Lindsey if they had unpacked R2. "Come on guys, unpack the guy. He flew all that way and you guys aren't unpacking him?" Obama remarked. Lindsey replied, "The poor guy has been locked in that foam for about 4 months now. Every once in awhile, we hear some scratching sounds from inside and maybe 'Let me out, let me out' but we're not sure." I think Lindsey was joking, but …

Decadal Survey – Every decade a panel of experts is convened to recommend where the US should spend its planetary science budget for the next 10 years. There are always more good proposals than money, so it is a matter of prioritizing. The panel this time was faced with some of the severest budget constraints. Their conclusions were that the highest priority for flagship (expensive) missions remained as planned with the Mars sample mission (called MAX-C) and the mission to Jupiter's moon Europa, but that both were going to cost more than available funds. Rather than allow these to take money away from the small mission budgets, the panel recommends descoping the flagship missions, that is, reducing their features. It was pointed out that descoped missions can be fabulous successes, such as Voyager and Magellan. If either MAX-C or Europa cannot be substantially reduced in cost, the next priorities for flagship missions are a Uranus orbiter, a Venus orbiter/lander, and an Enceladus orbiter. The Discovery program of small missions should continue with a planetary spacecraft every 2 years, and the New Frontiers program should continue with a medium-cost mission twice per decade. Highest priorities for New Frontiers missions are a comet sample return, an Io orbiter, a Saturnian atmosphere probe, a network of lunar landers and orbiters, and a lunar south pole sample return.

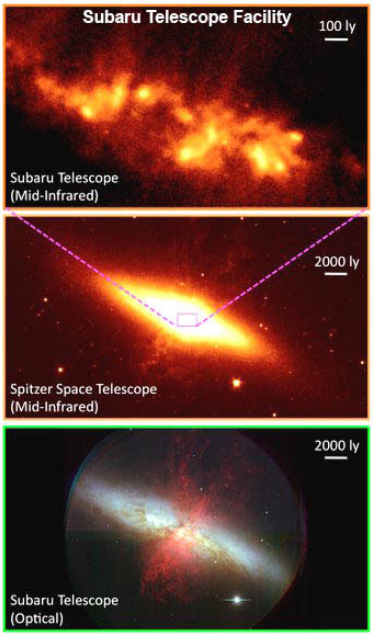
Glory (aerosol and solar energy monitor) failed to reach orbit upon launch by a Taurus rocket from Vandenberg in California in early March. It suffered a failure of the payload shell, similar to that of the previous Taurus rocket launch (for the Orbiting Carbon Observatory), even though the system had been redesigned to prevent a repeat. NASA appointed a board to investigate.

Earth's core – It has long been known that the length of the Earth's day fluctuates by about 1 millisecond seasonally, due to movements in the Earth's atmosphere and oceans. It has also long been known that larger changes, a few milliseconds, occur over longer time periods, decades or longer. These have been shown to correlate with changes in motion of molten iron in the Earth's outer core, as calculated from magnetic changes measured at the surface. The day-length changes also correlate with the average of global atmospheric temperature. A new study attempted to determine if core motion directly correlates with average atmospheric temperature, and it appears that it does. It is not known what mechanism would allow the core movement to change the atmospheric temperature; theories that have been put forth do not seem to transfer enough energy to the atmosphere. It seems extremely unlikely that the atmospheric temperature would be able to cause core movement. Clearly further study is needed to explain this correlation.

Life from space, or maybe not – A paper authored by a NASA scientist (Richard Hoover) claims to have found fossil bacteria in a rare class of meteorite. NASA issued a statement that they cannot support the paper, due to inadequate review of the paper before publishing, a claim that the editor of the publishing journal vehemently denies. Perhaps too vehemently. It was published in the Journal of Cosmology, which has been under attack by some mainstream scientists for their unorthodox content and procedures. So if you saw mention of this paper on one of the numerous blogs or newspapers that picked up on it, I have to recommend being skeptical until and unless the claim is verified by experts.

Instant AstroSpace Updates

New high-resolution infrared images of the starburst galaxy **M82** taken by the Subaru Telescope in Hawaii show that the galaxy's superwind is being ejected from multiple sites. The superwind has been known for some time, and is composed of dusty gas that is blown outward for hundreds of thousands of light-years.



The **Pan-STARRS PS1** telescope on Maui discovered 19 near-Earth asteroids on the night of January 29, the most asteroids ever discovered by 1 telescope in 1 night. The data actually contained 30 near-Earth asteroid candidates, but difficulties with follow-up, principally due to weather, allowed only 19 of them to be confirmed.

A team of astronomers observing using infrared a young star in Chamaeleon have found a smaller companion (brown dwarf or planet) that appears to be carving out a gap in the stellar disk. This is the 1st detection of a **planet-sized object** in the disk around a young star, though a few have been found about old stars.

A new study of one type of carbonaceous meteorites has found that they contain **ammonia**. Falls of meteorites could have been a substantial source of ammonia or nitrogen found on Earth. A study of isotopes of **chromium** in a range of meteorites showed that the Earth's chromium must have undergone a process early in its history that enriched Earth's core with lighter chromium isotopes. The process is known as "core partitioning".

Another **Cepheid** variable star that stopped, or nearly so, its pulsating has been found, and it is HDE 344787. Polaris and a few other Cepheids have done this, but why is still a mystery.

The Very Long Baseline Array radiotelescope, with antennas stretching from Hawaii to the Virgin Islands, has made the farthest **direct distance measurement**, putting the galaxy NGC 6264 at 450 million light-years, with uncertainty of no more than 9%. The previous record was 160 million light-years.

A new **spectrograph** called HARPS-North is scheduled to be installed next year on the 3.6-meter telescope in the Canary Islands, and will be used to confirm candidate planets found by the Kepler spacecraft. It is a duplicate of the highly successful HARPS spectrograph used at the European Southern Observatory in Chile.

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