SIRIUS ASTRONOMER

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The Kuhn observatory at OCA's Anza dark-sky site is seen after a late winter storm, March 16.

(photo credit: Dave Radosevich)

OCA CLUB MEETING

The free and open club meeting will be held Friday, April 11th at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. This month, Robert Quimby of Caltech will discuss important findings from the Texas Supernova Search

NEXT MEETING: May 9th

STAR PARTIES

The Black Star Canyon site will be open on April 26th. The Anza site will be open on April 5th. 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 4th at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.

GOTO SIG: TBA (contact coordinator for details)

Astro-Imagers SIG: Apr. 15th, May 20th

EOA SIG: Apr. 23rd, May 28th

Astrophysics SIG: Apr. 18th, May 16th

Dark Sky Group: TBA (contact coordinator for details)

President's Message

By Barbara Toy

As I write this in mid-March, wildflowers have burst out all over the hills around Elsinore and along the route to Anza, and the rains have apparently not quite ended for the season – Dave Radosevich sent a picture of Anza taken on March 16, covered with snow (he said it was cold). It's nice to see the hills turn green, even if that means potential fuel for wildfires when everything dries out in the heat of summer, and even if it means more weed clearance at Anza…

Our Messier Marathon in March featured a period of clouds that stopped most observing activities for an hour or so, but then they cleared and a few hardy souls made it through the night and were still working on the last objects when the sun rose. I'm sorry to say I wasn't among them – but we had a busy night in the club observatory until around 2:00, and our visitors included several people who were seeing the Kuhn in operation for the first time. It was a fun night, and a few participants have already given me their Messier Marathon sheets. If you haven't turned yours in yet, please do, so we can get you your official OCA Messier Marathon Certificate.

Anza Site Update

We are finally at the point in what has turned out to be an extremely lengthy process to develop the northwest portion of our Anza site where we are submitting a grading plan for the first phase of the development to Riverside County for approval. This phase is located above Mars Hill and to the left of the Lower Pad area as you look up the site from Anza House. We haven't determined the final mix of observatories and pads in this area yet, as this will partly depend on who's prepared to build at this point.

Once the County approves the grading plan, with any amendments that the officials feel are necessary, the next step is to get an estimate for the cost of grading this first section. The area is small enough that we don't need to get a full soils report (which would be very expensive), but we will need compaction tests.

Once we have the estimate, we plan to contact the people on the Pad Interest List and Observatory Interest List to see who is prepared to move ahead with plans to build in this new area. This grading is to allow construction of member observatories and pads rather than for the benefit of the general membership, and it wouldn't be fair to the rest of the membership to use general club funds for this, especially now when our funds have been depleted by the recent work on Anza House and the club observatory. If the club "fronted" the costs for grading this section, it would drop our reserves to unacceptably low levels – we can't afford that, even if the payment is made in the expectation that the club would be reimbursed later as licensees built pads and observatories in that area.

Grading is a real part of the cost of constructing pads and observatories at Anza, and the Board decided a while back that the fairest approach to all concerned is to have it borne proportionately by the pad and observatory holders on the level that is being graded. For the grading of this new section to go forward, the costs will have to be paid up front by those members who are prepared to build their observatories or pads at this point. If we don't get enough initial participants to fill the area to be graded, and the initial participants end by paying more than their proportionate share to get the grading done, they would be reimbursed by those who obtain licenses to build later – those who wait won't get out of paying their fair shares of the grading costs. The club, by the way, has already paid a substantial amount for drafting the master plan for the site, getting it approved, getting the aerial survey that was needed for an accurate grading plan, and then for the grading plan itself and getting that plan approved.

If you are interested in building a pad or observatory in the new area and are not yet on the Pad or Observatory Interest List, please contact me to be put on the either or both of the lists. Being on the lists doesn't mean that you are making a commitment to build at this point, but it does indicate that you are interested and establishes your priority if we have too many people seeking licenses for the number of sites available. Of course, the final plans for the pad areas and for each individual observatory will have to be approved by the Board before construction on them can begin once the grading is completed.

This has been a much longer process than anyone on the planning committee expected and it's exciting to finally be reaching the point that we can move some dirt and see the beginning of actual construction!

Explore The Stars

With spring comes the start of the 2008 season of the "Explore the Stars" (ETS) program at Observatory Campground on Palomar Mountain. This is a monthly event that has been held from April or May through October for at least the last 10 years,

and is a joint outreach project of several local astronomy clubs and the Forest Service, with support from Scott Kardel at Palomar Observatory. These sessions are for anyone on Palomar Mountain, and they start off with a presentation on an astronomical topic at the campground amphitheater, followed by a viewing session through telescopes brought by volunteers. The people who come are a diverse lot – some come as visitors to the Observatory and learn about the ETS session there, many are people who happen to be camping on the mountain, often there are Scouts and other groups, and some people drive up specifically for the program and drive back home afterward.

Camping in Observatory Campground in the area where the astronomers set up is free for ETS volunteers, which makes this a really excellent bargain. The Saturday night program usually starts with a potluck for the volunteers at six o'clock – ideally, people arrive early enough that they can set up before the potluck, but sometimes set-up continues as the potluck is going on, interspersed with eating. The volunteers usually go to the presentation in the amphitheater (some stay behind as security for the equipment). This is around 7:00 or 7:30, and then everyone heads back to the telescopes for the public viewing session. Most of the visitors leave after a couple of hours, and then the volunteers have their own star party, which can last all night if they choose.

Explore the Stars Program begins April 5th!

One of the reasons this such a good event is that the Rangers turn off all the lights in the campground for ETS nights, so the sky is very dark and steady. Observatory Campground is not far from Palomar Observatory, and shares the same skies that caused the observatory to be built there in the first place, so it's a great place for viewing. There isn't any power available at the campground for telescopes, so you need to bring batteries if you need power for your equipment, but that's a small inconvenience.

For the volunteers who can make it out there Friday night, there is a smaller public viewing session, followed by whatever viewing (or imaging) you want to do for yourself. I've never been fortunate enough to be there on a Friday, but I understand that it's a lot of fun for those who make it – more laid-back than on Saturday, and with more private viewing time as there aren't as many members of the public to attend the viewing session. Camping is free for ETS volunteers on Friday night as well as Saturday.

Bob Nanz is the current coordinator for the program, and can be reached at bob@nanzscience.com or 760-751-3992. He has also set up an email group for ETS volunteers, to help coordinate the different sessions and get updated information to everyone: expstars@yahoogroups.com. The Saturday dates for the 2008 season are: April 5, May 3, June 7, July 5, August 2, August 30, September 27 and October 25. Bob is looking for speakers for the amphitheater presentations as well as volunteers to bring their telescopes – if you're interested in making a presentation, he would be delighted to hear from you. Please also let him know in advance if you are planning to come as a volunteer for any of these sessions, to help him plan to be sure he has enough volunteers each night, and so he can send you word if there is any change in plans.

If you haven't the ETS program yet, you really should – it's a lot of fun and a great way to show the sky to people who otherwise might never have a chance to see how much can be seen under dark skies. It also gives you a chance to meet people in other clubs, and do some viewing under excellent skies. If you get up there early enough, you can also tour Palomar Observatory, possibly under the guidance of a club member who happens to be a docent for the observatory.

RTMC

It's not too early to start thinking about this year's RTMC Astronomy Expo, which is held Memorial Day weekend at Camp Oaks near Big Bear. In particular, it's not too early to think about volunteering to help with the OCA booth at RTMC.

Usually, our booth is managed by the club librarian, and acts as a fundraiser for the club's library as well as providing information about our club and a place where club members can congregate and meet up with other members. This year, Karen Schnabel won't be able to attend RTMC herself, but she's doing her best to get things organized in advance so the booth will be up and running. Based on her experience in the last few years, she has decided that it would not be cost-effective to take a lot of books to RTMC and attempt to sell them this year. We think that we will be selling something at the booth, we're just not sure what yet. Even if we don't have anything for sale, we want a club presence at RTMC, with information available about the club and its activities.

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AstroSpace Update

April 2008
Gathered by Don Lynn from NASA and other sources

WMAP (cosmic microwave background [CMB] satellite) – How can you top the results announced in 2003 from WMAP that included confirmation that dark energy exists, the most precise age of the Universe, precise percentages of ordinary matter, dark matter and dark energy in the Universe, and confirmation that inflation of the Universe took place in the first trillionth of a second after the Big Bang? The 5-year results of WMAP were just announced, and they include: Precise measurement of neutrinos at the time the CMB was release (380,000 years after the Big Bang), that the first generations of stars took from the 400 million year point to the 900 million year point (after the Big Bang) to ionize the gas in the Universe, and constraints that rule out some versions of Inflation Theory and support others. The measurement of neutrinos agreed well with the prediction that the production of helium in the first few minutes after the Big Bang should have produced neutrinos in abundance. The new WMAP results show that at the time of the CMB release, the Universe consisted of 10% neutrinos, 12% ordinary matter, 63% dark matter, 15% photons, and negligible dark energy. Because everything except dark energy is diluted by the expansion of the Universe, and because of interactions between these, the Universe today consists of less than 1% neutrinos, 4.6% ordinary matter, 23% dark matter, 72% dark energy, and negligible photons.

Mars water – In late 2006 it was announced that images taken by spacecraft orbiting Mars showed deposits in gullies that had not been there in images taken a few years earlier. This was interpreted as evidence that liquid water occasionally flows on the planet. Further study of these gullies by the higher resolution Mars Reconnaissance Orbiter and new computer simulations of material flowing in such gullies have shown the deposits were more likely caused by dry powder avalanches than by liquid water. The simulations showed that dry avalanches produce more accurately the shapes seen in the high-resolution images. However they showed that flows of mud as thick as molasses could also produce the shapes seen, so water is not entirely ruled out. Further work will be done simulating other Martian gullies with new deposits, particularly ones with less slope, to see if this result generally applies.

On the other hand, analysis of the shapes of fans of material in craters on Mars shows that they were created by huge floods of liquid **water**. There are about 10 of these fans with distinctive stair step shapes known, each where a channel leads into a crater. Experiments with models (real sand and water, not computer models) showed that floods were the only way to produce the step shapes. The floods would be more than weather could have ever produced on Mars, even when the atmosphere was thicker in the distant past, so had to have been caused by sudden releases of underground or dammed water. There are no similar stepped fans on Earth, but there are some on Titan, where they must have been caused by floods of liquid methane and ethane (too cold for water there).

Evidence gathered by the rover Opportunity has been presented in the past showing that a shallow lake once stood where the rover was. Further study of Opportunity data shows that the water was quite acidic and extremely salty. Only a handful of known Earth micro organisms would survive in the lowest of salt levels found. So the **chances of life** surviving in the highest salt levels, much less the acid, are not good. Scientists have concluded from this that the best place to look for evidence of life on Mars on future missions would be underground or regions older than what the rover is examining.

Opportunity has spent recent months observing a bright band of rocks around the inner wall of Victoria Crater. Scientists previously hypothesized this material might preserve a record of the ground surface from just before the impact that excavated the crater. But inspection suggests that the layer was the top of an **underground water table**. Martian exploration continues with the landing May 25 of Phoenix near the north polar cap, and then with Mars Science Lab, a rover about 4 times the weight of the current rovers, due to launch next year.

Cassini (Saturn mission) has measured gaps in high energy electrons near the orbits of the tiny (1-2 mile) moons Methone and Anthe. Moons generally create such a gap by sweeping up the electrons, but the gaps were too large, indicating that there are rings or ring arcs (partial rings) in the moons' orbits sweeping up more particles. Several other Jovian and Saturnian moons are known to have such rings or ring arcs, which are usually caused by meteoroid impacts on the moon tossing up material that then forms the ring. That similar rings are seen at nearby moons, such as Janus and Epimetheus, and not seen at Methone and Anthe, indicates the ring particles must differ in size or other characteristics. Scientists would really like to observe the new rings in order to determine their composition, and therefore infer the composition of the source moons.

Cassini made on March 12 its 1st of 4 planned flybys this year of the moon **Enceladus**, approaching as close as 30 miles, and actually flying through the plume of material thrown off by the geysers on the moon. The plume was encountered at about 120 miles high and a speed of 32,000 mph. It was determined beforehand that this would pose no more danger to the spacecraft than previous flights through the thinner rings of Saturn, since the particles are sufficiently small. The Cosmic Dust Analyzer and the Ion and Neutral Mass Spectrometer instruments were able to sample the particles in the plume, determining their density, size, composition and speed. Enceladus is 310 miles across, and its geysers throw material out at about 800 mph up to a height of about 450 miles. Some of the material drifts away and forms the tenuous E-ring about Saturn. The best yet images of both polar regions were taken, showing that the north differs markedly from the south. The north is a much older surface, pitted with craters with different stages of disruption and alteration by tectonic activity and probably from past heating from the interior. The planned August flyby will get even better images of the fractures in the south that include the geysers and the October flyby will again sample the geyser plume.

Analysis of data from Cassini's close pass by the moon **Rhea** showed evidence for a **ring** around it. Although many moons have rings around their planet at their orbit, this is the first ring around a moon itself. The evidence included particles detected, magnetic measurements, and an absence of electrons. Computer simulation shows that a ring around Rhea could persist for long time periods. It is believed that the ring consists of particles the size of pebbles up to boulders, and dust, which may extend farther than the larger particles. The ring could have been formed by a collision with a comet or asteroid in the past. Images of the area have not showed any ring, but further attempts will be made.

Study of Cassini observations of Saturnian moons shows that the **dark spots** on the moons Hyperion, Iapetus, Epimetheus, Dione and Phoebe and the F-ring seem to have the same spectrum. But no other place in the solar system has the same material. So far chemically bound water and probably ammonia have been identified in the spectrum. Theorists are working overtime trying to figure what the material is, where it came from, and how it spread to these moons.

Messenger (Mercury mission) images taken during the January 14 flyby of Mercury show several craters with dark halos and one crater with a shiny floor. There are some craters on our Moon with dark halos, but not nearly as distinct as the ones newly found on Mercury. It could be that the gravity of the planet, more than twice that of the Moon, causes the dark material to fall closer to the crater, concentrating the effect. 2 theories have been presented to explain the halos: that there is a dark layer somewhat below the surface over large parts of the planet, and impacts causing craters of the right depth splash the dark material out; that impacts in the right kind of material cause melting followed by solidification into dark glassy material, such as is found at some impact craters on Earth. No one has a clue what the bright material on the floor of the one crater is. Mariner 10, the only other spacecraft to visit the planet, saw a few bright crater floors, but none as prominent as this. It looks like ice, but the surface temperature at the time the image was taken was measured to be about 750 F. Spectrometers on Messenger observed the crater, as well as others, and when the data are analyzed, the mystery of what the bright material is may be solved. Then scientists get to explain how it got there.

Moon mapping – How do you map the polar regions of the Moon in much greater detail than was obtained from the best previous mapping, made by the Clementine lunar orbiter many years ago? Send a mission to Barstow. Seriously. The Goldstone radar near Barstow produced a map of the Moon's south polar region with 50 times better resolution. Findings included: the area near Shackleton Crater is much more rugged than thought, and the polar area includes peaks as high as Mt. McKinley and crater floors 4 times the depth of Grand Canyon. Shackleton is being considered as a candidate landing site for future human missions. The entire Moon, including the far side not visible from Earth, will be mapped in even greater detail by the Lunar Reconnaissance Orbiter scheduled to launch late this year.

Pluto's moons – Computer simulations of moon formation have shown that most of the theories are unlikely to be true on how Pluto's smaller moons Nix and Hydra formed. 1) They may be fragments left by the collision that probably formed Pluto's large moon Charon: but that would put the smaller moons in very elliptical orbits, and Nix and Hydra are in nearly circular orbits. 2) They may have coalesced from small material left by that collision: but that would produce orbits much closer to Pluto than is observed. 3) They coalesced close to Pluto from small material left by that collision and something moved their orbits farther: but no variations in the simulation make this happen. The new simulation does support that the small moons formed by coalescing from the material that formed the planets, so this is now the leading theory. The collision theory of formation remains the one that best fits Charon, however.

Triple asteroid – Radar observations of asteroid 2001 SN263 made by the Arecibo radiotelescope in Puerto Rico showed that it has 2 moons and so is a triple asteroid. This is the first known triple near-Earth asteroid, though some are known in the asteroid belt. About 1/6 of the near-Earth asteroids have been found to be double. The main object is nearly spherical with a diameter about 1.5 miles and the others are about 1/2 and 1/7 that diameter. The smallest is about the size of the Arecibo antenna. Continued observations will attempt to determine the orbits of the 3 about each other and better define their shapes.

Hubble Space Telescope (HST) – Study of a small area of the sky imaged by HST has found 67 gravitational lenses, caused by the gravity of individual massive galaxies bending light from objects behind them. 4 of them produced Einstein rings, complete circular images of the more distant galaxies, which occur only when the alignment of the lenser and lensee is nearly perfect. If similar numbers apply to the whole sky, there should be over a half million individual galaxy lenses. Most of the known gravitational lenses are each caused by the gravity of a whole cluster of galaxies, even though those caused by individual galaxies are more common. This is because the individual lenses are more difficult to find, since they extend over a smaller area and have wider variations in shape. This study started with a list of 2 million galaxies, pared down the list, and examined by eye images of remaining galaxies. Then candidates for lensing had to be checked with further observations. These involved the Spitzer, XMM-Newton and Chandra space telescopes and 3 large Earth-bound telescopes. Now that a thorough survey of a small area has been completed, the astronomers believe that they can write computer programs to automatically find gravitational lenses in images.

Star formation – 2 astronomers have proposed new pieces in the theory of star formation: they believe that formation of a few stars about the size of our Sun within a gas cloud stabilizes the cloud enough that extremely massive stars can then form. Without the earlier Sun-sized stars heating up the cloud, it breaks up into many small pieces that form many small stars instead of one big one. These are the results of computer simulations of star formation that the astronomers ran. Another result found from these simulations is that very massive stars do not form if the density of the cloud is under a certain threshold. This means that clouds in the outer parts of galaxies, where the gas density is known to be lower, are unlikely to form any massive stars. Since massive stars are far brighter than smaller ones, star formation in the outer parts of galaxies might go undetected due to dimness. Recent

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Western Amateur Astronomers Board Meeting Notes

by Tim Hogle

The Board of the Western Amateur Astronomers (WAA) met 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, WAA is an umbrella organ-ization of astronomy clubs of which OCA has been a long time member and supporter. 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. John Sanford was a prime mover in OCA for over a quarter century before retiring and moving to Springfield a few years ago, where something of an enclave of serious amateur astronomers is gradually growing.

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 Marni Berendsen, current Education Project Coordinator for the Astronomical Society of the Pacific, Coordinator and developer for NASA's Night Sky Network outreach program, longstanding active member of the Mount Diablo Astronomical Society, and a regular volunteer for Project ASTRO and the Chabot Space and Science Center in Oakland. She also has several astronomy publications to her credit in journals including Mercury and Astronomy Education Review.

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 several OCA members and nominees. This year's award is to be presented at the Riverside Telescope Makers Conference in May.

Those of you who have followed my reports here in the past may recall I have mentioned that WAA is actively soliciting ideas for a replacement for our 50-year-old logo. So far, there has not been an overwhelming response to this request. If you have some artistic interests and would like to try your hand at creating an astronomy-themed logo, we would be glad to have your input or inputs (several ideas from one person are perfectly okay). We have stopped short of actually having a logo contest, but there is an incentive of $50 to be awarded to the creator of the selected design, and you may be assured that full and eternal credit will be given to this person as well. There are no specific requirements attached to the design, but it should contain the letters WAA and/or the full name, and be suitable for use in monochrome for letterhead, posters and clipart, though a graphically rich version for pictures, and web pages would be welcome as well. It would also be nice to have the design embody the purpose of WAA as described in the first paragraph above. My contact info is on the back of the Sirius Astronomer if you would like to discuss it further or submit entries.

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.

FOR SALE: Starmaster 10" EL f5 with Zambuto optics and full Argo Navis computer, with encoders. This is a great portable scope, sets up in minutes. The mirror is in excellent shape and comes with certifications,this Zambuto mirror is a 10"f5, S/N SM10-027, with a strehl ratio of 0.986, so a premium mirror. Also included is a laser collimator, JMI focuser, Rigel Quickfinder, Argo Navis computer with encoders installed,data cables, and a pc cable to update the Argo Navis catalogs. The scope is in like new condition, the wood is in perfect shape and the mirror is in perfect shape, two wooden dust covers and a cap cover for the secondary are included. This scope has been kept indoors and covered and was hardly used. That is why I am selling it. I am asking $3000 delivered or best reasonable offer. Pics can be seen at http://www.pbase.com/snowlep/starmaster. I can be reached on my cell at 818-237-6293 or email at asmallbone@earthlink.net Thanks for looking.

FOR SALE: Pentax K10 D w/18-55mm F3.5-5.6 AL zoom lens, charger, 4 GB memory, T-mount, remote cable CS-205, carrying case. All in original boxes w/warranty papers and software. Cost over $1400.00. Sell $900.00. Jim Leonard 760-377-3474

FOR SALE: Meade 10" LX200 Schmidt Cassegrain with SBIG ST-8 CCD Digital for computer imaging. TeleVue lens, 31mm Nagler, 35mm and 22mm Panoptic, 14mm and 8mm Radian, 2x Celestron Barlow, 12mm Meade Illuminated Reticle. Pelican 1500 hard case, one portable stand and one bolt-down stand. Over $12,000 in equipment. Asking $4500.00 Ray Vega 661-264-6627

FOR SALE: 10mm 2-inch eyepiece, $40. Also selling one brand-new (in box) green laser pointer, has a momentary switch (momentary is release and it goes off) for $50. This can be adjusted to about 4 times as bright as the pointers commonly seen for about $25 additional, but the beam is visible in the dark as is. Glenn Hand 909-861-6461 or email scopeguy20@gmail.com

PAD LICENSE FOR SALE: Located on **Jupiter Ridge**, second pad up from the bottom. The pad includes spacious pad area, a long gravel driveway for parking, electrical outlets at the redwood work bench and also attached to the heavy duty pier bolted down on the pad and light breaking bushes and trees surrounding most of the pad perimeter. The Schaefer type pier (96 lbs.) is metal and is 10" in diameter and 31" in height. I will sell the pad for what it cost to build and the pier for what I paid for it. Please call Roy at (949) 768-5205 for further information.

NASA's Space Place

Tracking Wildlife from Space

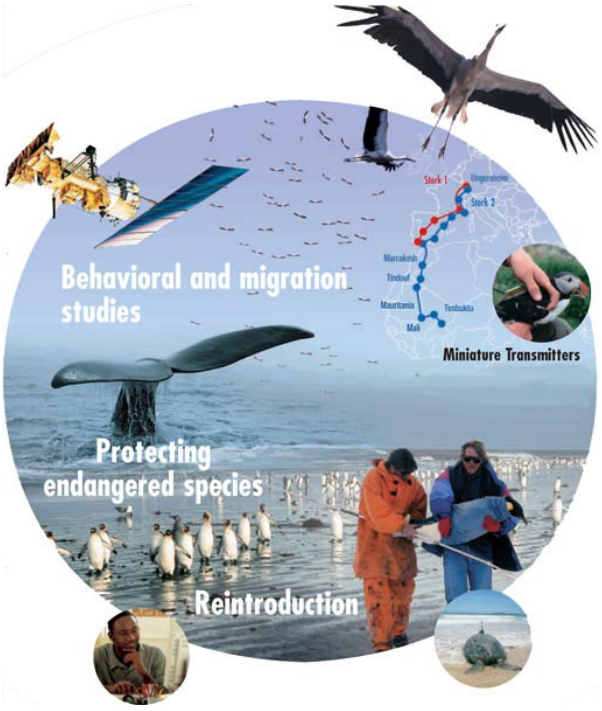
by Patrick Barry

It's 10 o'clock, and do you know where your Oriental Honey Buzzard is?

Tracking the whereabouts of birds and other migrating wildlife across thousands of miles of land, air, and sea is no easy feat. Yet to protect the habitats of endangered species, scientists need to know where these roving animals go during their seasonal travels.

Rather than chasing these animals around the globe, a growing number of scientists are leveraging the bird's-eye view of orbiting satellites to easily monitor animals' movements anywhere in the world.

The system piggybacks on weather satellites called Polar Operational Environmental Satellites, which are operated by the National Oceanic and Atmospheric Administration (NOAA), as well as a European satellite called MetOp. Sensors aboard these satellites pick up signals beamed from portable transmitters on the Earth's surface, 850 kilometers below. NOAA began the project—called Argos—in cooperation with NASA and the French space agency (CNES) in 1974. At that time, scientists placed these transmitters primarily on buoys and balloons to study the oceans and atmosphere. As electronics shrank and new satellites' sensors became more sensitive, the transmitters became small and light enough by the 1990s that scientists could mount them safely on animals. Yes, even on birds like the Oriental Honey Buzzard.



The ARGOS program tracks the whereabouts of endangered migrating animals via miniature transmitters on the animals and the POES satellites in orbit.

"Scientists just never had the capability of doing this before," says Christopher O'Connors, Program Manager for Argos at NOAA.

Today, transmitters weigh as little as 1/20th of a pound and require a fraction of a watt of power. The satellites can detect these feeble signals in part because the transmitters broadcast at frequencies between 401 and 403 MHz, a part of the spectrum reserved for environmental uses. That way there's very little interference from other sources of radio noise.

"Argos is being used more and more for animal tracking," O'Connors says. More than 17,000 transmitters are currently being tracked by Argos, and almost 4,000 of them are on wildlife. "The animal research has been the most interesting area in terms of innovative science."

For example, researchers in Japan used Argos to track endangered Grey-faced Buzzards and Oriental Honey Buzzards for thousands of kilometers along the birds' migrations through Japan and Southeast Asia. Scientists have also mapped the movements of loggerhead sea turtles off the west coast of Africa. Other studies have documented migrations of wood storks, Malaysian elephants, porcupine caribou, right whales, and walruses, to name a few.

Argos data is available online at www.argos-system.org, so every evening, scientists can check the whereabouts of all their herds, schools, and flocks. Kids can learn about some of these endangered species and play a memory game with them at spaceplace.nasa.gov/en/kids/poes_tracking.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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ultraviolet observations have found star formation regions in the outer parts of galaxies that were too dim to see in visible light, supporting this theory.

Planet formation – A study using the Spitzer infrared space telescope has found that the kind of dust indicative of formation of rocky planets is common around Sun-like stars during the time in the star's life when planets are thought to form. The percentage of stars forming rocky planets can be calculated, but depends on the length of time the dust remains, which is not well known. So the best that can be said is that 20 to 60% of Sun-like stars form rocky planets. A separate study of dust around stars also indicated formation of rocky planets is common. The Kepler mission due to launch next year should start finding these planets.

Spitzer (infrared space telescope) was used to measure the gas components in some protoplanetary disks, which surround many young stars and are believed to be where planets form. Most previous studies of such disks have concentrated on the dust components rather than the gas in the disks. Hydrogen cyanide, acetylene, carbon dioxide and water vapor were found in the disk about the star AA Tauri. The concentrations were found to be higher than the concentrations in molecular clouds. Such disks and their young stars form when molecular clouds collapse from their own gravity. So the chemistry was likely created or at least enhanced sometime in the collapse or disk stages. Water vapor was found in some other disks. An independent study, also using Spitzer, found water in several other protoplanetary disks, then measured the water concentration in 2 of those with the Keck II telescope in Hawaii, confirming this finding.

Exoplanets (planets outside our solar system) – The OGLE project watches more than 100 million stars in order to find objects passing in front of any one of them by the gravitational lensing of the foreground object on the light of the watched star. One recent discovery was a triple lensing event caused by a star and 2 of its planets. Those planets were roughly the mass of Jupiter and Saturn. The star is about half the mass of the Sun and is about 5000 light-years away. These are the 5th and 6th planets seen by OGLE, though it has seen about 3000 events caused by stars. The lensing technique is sensitive to smaller planets at greater distances from their stars and at greater distances from us than any other method of finding planets. Discoveries such as these assure astronomers that planets like those in our solar system are not so rare. The large number of discoveries of super-Jupiters very near their stars has many astronomers worried that solar-system-like planets are rare. But most of these discoveries were made with techniques that are sensitive to more massive planets closer to their stars.

Chandra (X-ray space telescope) – Astronomers have found in old Chandra X-ray images a double star, one of which was likely the star that was later seen to explode as a Type Ia supernova (named SN 2007on). This type of supernova is generally believed to occur when one star of a double dumps gas onto the other (which must be a white dwarf star) until the dumpee gets unstable and explodes. But such a double has never been seen before the explosion. The dumping process should produce strong X-rays, so that fits the Chandra observation. Some astronomers believe that Type Ia supernovas occur when the 2 stars of a double merge together, but that would not produce as much X-ray radiation before the explosion as is seen in the Chandra images. Because of position uncertainties, it is not absolutely certain that the Chandra observation showed the correct star, so further work will be done to verify this.

Pulsars versus magnetars – Magnetars are neutron stars that have magnetic fields about 100 times as strong as pulsars (ordinary neutron stars). They sporadically undergo starquakes, when the magnetic field readjusts, producing violent X-ray bursts. Pulsars don't have this type of X-ray burst. Pulsars spin faster than magnetars and have a different sort of spectrum … except the youngest known pulsar (PSR J1846-0258), which was observed by the Rossi X-ray space telescope to give off magnetar-like bursts 5 times in 2006, including 4 times in one day. Further observations with Chandra (X-ray space telescope) found the spectrum to be changing to be more like a magnetar and that its spin is slowing down, which usually means a very powerful magnetic field is applying the brakes. Further observation will be needed to determine if a magnetar can look like a pulsar sometimes, or if a pulsar can turn into a magnetar.

Planetary nebulas – When Herschel saw round nebulas, sometimes green, he called them planetary nebulas, because of their resemblance to the planet Uranus. This has confused generations who wonder what relation planets have to planetary nebulas only to learn there is no relation. Stars like our Sun go through a stage for tens of thousands of years at the ends of their lives where the outer parts expand and get blown away into a planetary nebula. A team of astronomers has announced the results of their study of what happens if a star in the planetary nebula stage has a companion star or large planet orbiting it. If the companion is orbiting far from the dying star, the companion drags nebular material into a spiral wave, which constricts further expansion of the nebula in the plane of the spiral. The result is a 2-lobed shape to the planetary, similar to what is seen in the Dumbbell Nebula, a famous planetary. If the companion orbits close to the dying star, 3 different outcomes are possible: the nebular material can be deflected into a disk, the star's magnetic field can get twisted up and eject material out the magnetic poles, or the companion is destroyed and it is ejected (along with nebular material) out the magnetic poles. So the shape of a planetary nebula may be determined by a planet orbiting the dying star. Is this discovery going to clarify or add to the 300 years of confusion about the name "planetary"?

Ulysses (polar solar mission) is coming to an end soon. After 17 years orbiting over the poles of the Sun, the radioactive power supply onboard Ulysses has dropped in capability to the point where there is not enough power to run all instruments, radios and heaters. The heaters are necessary to prevent fuel, used for stabilizing the spacecraft, from freezing during the far reaches of its orbit, where the sunlight is insufficient. A decision was made to turn off one radio transmitter temporarily during the cold part of

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If you can spend an hour or two helping with the booth on Friday, Saturday or Sunday morning, please contact Karen at Karen@Schnabel.net or me at btoy@cox.net. We also need people to take things out there on Friday and/or to haul tables and other things from the booth back to Orange County, probably on Sunday – please let us know if you can help us out that way, as well. Any help you can give will be very much appreciated!

There will be more about RTMC and what happens there next month. It's a great event, and, if you go, please be sure to stop by the OCA booth to say "hi" even if you don't have time to help out with it – and remember to show up there at 1:00 on Saturday afternoon for the annual club photo!

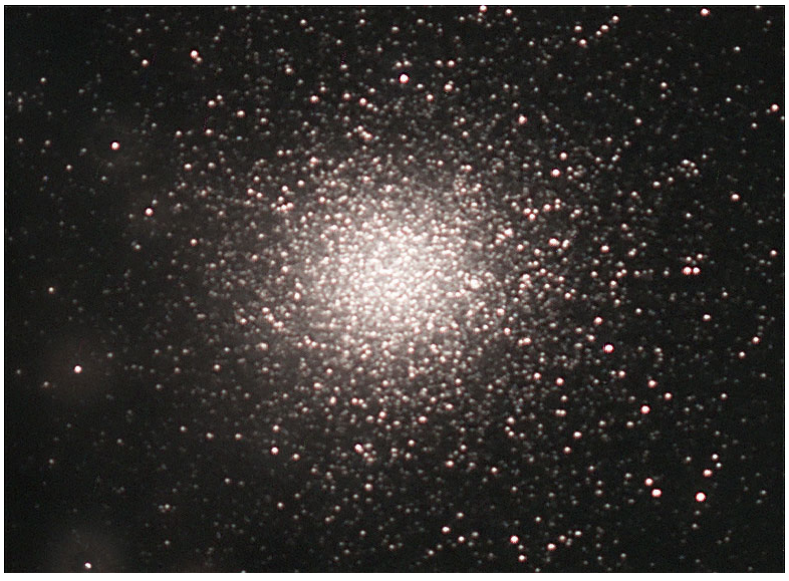
Astronomy Bringing People Together

Unfortunately, hate and fear are easy "sells," especially with the turmoil and destruction around the world these days. I've been particularly distressed by the increase I've seen in hate-driven emails over the last year, which usually give an account of something that supposedly shows why the targeted group can't be trusted and should be hated (it's always a good idea to check stories that are passed around by email on the Snopes Urban Legends Reference site, http://www.snopes.com/, particularly those that are outraged about something or telling about something that's too good to be true – even those that seem reasonable are often bogus, mistaken, or outdated). Not too surprisingly, a lot of the emails circulating right now target Muslims, and characterize *all* Muslims as extremists or in sympathy with them.

Well, in the dark under the stars, bundled up against the cold and sharing in the wonders of the night sky and the challenges of seeing them or capturing their images, what comes through is our similarities more than our differences. Interest in astronomy crosses all boundaries – we all share the same sky – and our membership includes people from all religious and cultural backgrounds. Those differences are irrelevant to what brings us together in our club, and this is one of the unexpected benefits of membership – the chance to know people of other backgrounds as people without religion, culture or politics acting as social barriers. Among our members are a number of interesting and wonderful people who happen to be followers of Islam, and they provide living proof that the extremists in the news don't speak for all Muslims any more than, to pick but one example, Neo-Nazis speak for all Caucasians.

In the broader context, you may recall Mike Simmons telling us about his experiences visiting the amateur astronomy communities in Iran and neighboring countries – another demonstration that interest in the night sky transcends religious, cultural and political boundaries. The organization he started to increase ties between astronomers around the world, Astronomers Without Borders, is going strong, and one of its goals is to channel donated astronomical equipment from wealthier countries to parts of the world where it's almost impossible to get equipment and where it can and will be put to good use. This lets less fortunate astronomers pursue interests we have in common, and also shows the best side of our country in areas where local events and propaganda make it hard for people to see us in a positive light. If you are interested in Mike's program, please check his website at http://www.astronomerswithoutborders.org/, and also get on the mailing list for his newsletter.

May June Gloom be slow to arrive and quick to leave this year, and may the bridges you build through astronomy be strong ones!



NGC 5139, better known as Omega Centauri, is the largest and brightest globular cluster in the night sky. Although technically a Southern Hemisphere object, it may be observed from our Anza site very low on the southern horizon during the spring. Omega Centauri was originally believed to be a bright star and thus given a Bayer designation. It lies outside the Milky Way galaxy, about 18,300 light-years from Earth, and is estimated to be approximately 12 billion years old. (photo credit: Alan Smallbone)

ASTRONOMY & TV PROS JOIN FORCES TO ANNOUNCE THE BIRTH OF A NEW STAR

Astrocast.TV premiers on the Internet

Centreville,VA.—March 20, 2008-- Astrocast.TV announces the launch of the first of its kind webcast for experienced amateur astronomers and anyone interested in learning about our universe in visually rich format. On March 24, 2008 Astrocast will be launched and hosted by an impressive roster of individuals including NASA/Jet Propulsion Laboratory Solar System Ambassadors, Greg Redfern and Greg Piepol; with Astrocast Special Advisor, Dr. Harold Geller, Associate Chair of the Department of Physics and Astronomy, George Mason University (GMU).

Recognizing the need to inform and educate people of all ages about astronomy and space science, Executive Producer Richard C. Mathews said the Astrocast team of Redfern, Piepol and Geller wanted to share their wealth of knowledge and experience so that many who view this program gain a better understanding. "Our goal is to increase public awareness of astronomy and our solar system and how it impacts our lives," said Mathews.

Co-host, Redfern's writings, media appearances, and public lectures on astronomy and space exploration have reached thousands for over four decades. He was host during a live TV-Internet broadcast Hour 4 of Space Day 1999 Cybercast at the National Air and Space Museum. Redfern continues his public outreach as a NASA JPL Solar System Ambassador. Redfern can be seen regularly on WTTG Fox 5 and internationally on the Voice of America. For more information visit Greg's WTTG-TV Fox DC Blog site, "SkyGuy's Blog" at http://community.myfoxdc.com/blogs/category/WEATHER and WTOP News at http://www.wtopnews.com/?nid=422&sid=latest for his column, "What's Up? The Space Place".

"A person's first look at the sun through a properly equipped telescope is not quickly forgotten, remarks Piepol, it's that good!" Piepol, also serving as the show's co-host, is actively involved with solar outreach and travels around the United States sharing his fascination with our closest star. His presentations include 3D, video and sound to inform and inspire others to look safely into the sun. His solar images have been used on MSNBC, The History Channel, Nature Magazine and hundreds of worldwide resources. Greg received the Astronomical League's first ever "Webmaster of the Year" award in 2003. His website http://www.sungazer.net was awarded the Griffith Observatory Star Award for its promotion of astronomical awareness.

Dr. Geller http://www.physics.gmu.edu/wiki/People:Profiles:Harold_Geller will play a dual role serving as the show's advisor as well as host of the Astrocast.TV Q & A segment. His achievements include co-designing the first astrobiology course taught at GMU, within the general education Honors Program; and he designed, developed and funded the construction of George Mason University's new observatory, to be completed in 2008 with the installation of a 32-inch Ritchey Chrétien telescope.

"Star gazing isn't only exciting, but it's about seeing both the past and our future" exclaims Mathews, "I want to send a message and have people look at life from literally another point of view." Astrocast.TV is the creation of Executive Producer Mathews, a former television Producer/Director for CNN Headline News, NBC, WORLDNET and the Voice of America whose fascination with space exploration grew during his years of directing a number of NASA Space Shuttle launches/landings and repair missions for CNN/HN.

But the program would not be complete without the assistance of his son Chris Mathews, a 3-D animation artist who provides graphic and animation elements to support the visually rich show format.

Astrocast.TV is a webcast produced by Midnight Rider Productions, LLC, a company developing and marketing sophisticated and elegant video production techniques for the internet.

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the orbit and use the power for the heaters. Unfortunately, part failures made it impossible to control the transmitter, and it is now stuck in a state using up power but unable to transmit. So it is expected that Ulysses will soon freeze its fuel, start tumbling, and contact will be lost. Solar and space data are being collected and sent to Earth using the other (low-capacity) transmitter as long as possible. Ulysses has far exceeded its original mission, scheduled to last about 5 years. Some of its discoveries include the first direct measurements of interstellar dust particles and interstellar helium in the solar system and the shape of the magnetic field of the Sun. Ulysses was the first spacecraft to make solar measurements outside the plane where the planets orbit. It did this by doing a gravity slingshot at Jupiter, moving up out of the planets' plane.

Space Shuttle Endeavour launched March 10 on a 16-day mission to the International Space Station (ISS), carrying part 1 of the Japanese Kibo Laboratory module. The mission will exchange one crew member of the ISS. The day before, the European Space Agency (ESA) launched its first Automated Transfer Vehicle (ATV), named the **Jules Verne**. Its purpose is much like the Russian Progress spacecraft, dozens of which have docked to ISS and previous space stations, filled with supplies, are then unloaded, packed with trash and dispatched to burn up in the atmosphere. Supplies include clothing, food, experiment equipment, spare parts, water, fuel to raise the ISS against its slow drop from atmospheric drag, and oxygen. The ATV has 3 times the capacity of Progress, and will provide the only alternative to Progress to supply ISS after the Shuttles are retired in 2010, although the Japanese space agency is planning a supply vehicle also. ESA has contracted for 4 more ATVs through 2015. For safety, the ATV is not allowed to dock at ISS while the Shuttle is docked, so ATV controllers will use the time to test all systems on the new spacecraft at a great distance from ISS. Docking tests are scheduled for March 29-31 and actual docking for April 3. It can be no later than April 6 in order to allow the next Progress to arrive. Jules Verne uses a laser system to guide it to the docking port (a first in space), although as backup it has a Russian radar docking guider also. It is being called the most sophisticated spacecraft ever built by ESA.

Large Binocular Telescope (LBT) took images of galaxy NGC 2770 as its first light, using both of its 8.4-meter mirrors. Thus it became the largest optical telescope in the world. First light with one mirror was achieved in late 2005. It has the light-gathering power of a single 11.8-meter (39 foot) mirror, and the resolution (achievable only with adaptive optics) of a 22.8-meter mirror. LBT is located on Mount Graham in Arizona.

Instant AstroSpace Updates

A computer simulation of **diamond dust** in space shows that when exposed to ultraviolet light, it glows brightly in infrared. Thus astronomers who have been searching for diamond dust in space, such as is found in meteorites, should be looking with infrared telescopes, not visible light, and should look near blue stars that emit much ultraviolet.

A team of astronomers has been using the CFHT 3.6-meter telescope in Hawaii to map **dark matter** by its gravitational effect of bending light (as described by General Relativity) from more distant objects. They have found the largest structures of dark matter known, spanning up to 270 million light-years.

Astronomers using various large Earth-based telescopes have found the first evidence of **sandy particles** (larger than dust often found) orbiting a newborn star at about the same distance as the Earth orbits the Sun. The star is in the Cone Nebula, about 2400 light-years away, and the disk of sand eclipses the star's companion star, during which time spectra of the disk can be made.

It has long been known that the Earth has an outer and an **inner core** (about 1500 miles across), with different seismic properties. Geologists have now found another boundary within the inner core, probably signifying that the inner-inner core (about 730 miles across) has a different iron crystal structure from the outer-inner core.

Mars Reconnaissance Orbiter (MRO) has imaged in detail Holden Crater, a possible landing site for the Mars Science Lab rover, and found megabreccia (large blocks of material broken by impact), clay (indicating past water), a past lake that filled at least twice, and a break in an impact crater rim where water overflowed, releasing a massive flood.

MRO imaged **avalanches** of ice and dust moving down a steep slope more than 2300 feet high and resulting dusty clouds on Mars, a first for any planet other than Earth. The area will be monitored to determine if avalanches are frequent there and if they depend on season.

An astronomer using observations available on the internet has shown that the disk of warm ionized gas that is a component of our **Milky Way** galaxy is about 12,000 light-years thick, not the 6,000 that astronomers had been assuming, based on other ways to measure the **thickness** of the galaxy. The new measurement was made from observations of the effect the ionized gas has on light from pulsars.

A new method has been proposed to **deflect an asteroid**, if necessary to avoid collision with Earth. The method uses a pair of solar sail spacecraft that collects and concentrates sunlight to vaporize an area on the asteroid's surface, producing a jet that propels it.

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