SIRIUS ASTRONOMER

NEWSLETTER OF THE ORANGE COUNTY ASTRONOMERS

See our web site at http://www.ocastronomers.org

August 2002 *Free to members, subscriptions $12 for 12 issues* **Vol. 29, No. 8**

OCA ex-President John Sanford and friends pose for a snapshot July 14 at Starhome, the location of his observatory in central California. The observatory just celebrated its one-year anniversary. A few who were in attendance were: OCA members Jim Thorp (who helped build the observatory) and Monsignor Ron Royer, Giuseppe Sala, an OCA cyber-member who lives in Italy and who is a distributor for Apogee CCD cameras, and author and planisphere-maker David Chandler and his wife, Billie. John reports that a local realtor may soon be advertising properties for sale which would be ideal for amateur astronomers (you heard it here first!). Starhome is available anytime for a visit–there are two guestrooms, a telescope available for visitor use and plenty of space for setting up telescopes. I can personally vouch for the dark skies above Springville, CA. Photo courtesy of John Sanford.

CHAPMAN MEETING

The free and open club meeting will be held Friday, August 9 at 7:30pm in the Science Hall of Chapman Univ. in Orange. Featured speaker will be OCA Charter Member and JPL Engineer Tim Hogle on "The Voyager Mission to the Outer Planets and Beyond—the First 25 Years." Also featured will be "Astronomy Q and A."

STAR PARTIES

The Anza site and Observatory will be open Saturday, August 10. The "new" Silverado site will be open for observing on Saturday, August 31. Check the website calendar for late updates on star parties and outreach events. For Anza, you may call the Anza Observatory or access the club website's new Webcam.

COMING UP

The Astrophysics SIG will meet August 16, the Astro-Imagers' SIG will meet August 20, the EOA SIG will meet August 21, the next Beginners' Class is September 6, and the next general club meeting will be Friday, September 13.

SPECIAL NOTE: the AstroImage 2002 Conference will be Aug. 23-25 at UCI—see the website for details.

President's Message

by Liam Kennedy

Anza July Star-B-Que

Despite some initially cloudy skies, the July Star Party and BBQ turned out to be a very successful affair–from the vantage point of the delicious foods to be had and also the observing conditions. Some members commented that it seemed to be just about the largest turnout they could remember. A few members of the Riverside Astronomical Society (RAS) arrived to enjoy the BBQ and the night's viewing. The RAS are building their own new dark-sky site and were interested in seeing first-hand what we have already achieved. It was great to be able to share our site with our friends from RAS and I know we will be welcome to visit their site sometime in the future.

Safety and Security at Anza

FIRE HAZARD

None of you will be very surprised to hear that Anza and the surrounding area are just about the driest they've ever been. This situation means that we need to do everything we can to minimize the risk of fire. There is a total ban on smoking at the site, although you may smoke within your own vehicle. The non-smoking rule aside, there are other activities that could also contribute to a fire hazard. For instance, I was quite shocked to find some teenagers on our site throwing "poppers" onto the ground. I spent some time lecturing these teenagers on the consequences of their actions and I am certain they understood what I was saying. This also raised the question of parental responsibility for supervising teenagers. Please ensure that any visiting children are fully aware of the rules and understand the dangers of "playing with fire." This issue certainly raised my own level of awareness of the need for fire and safety planning. Luckily on this very Star Party, we happened to have a brand new member, a retired fire safety professional, who offered to develop a full safety program for us.

SAFETY OF CHILDREN

In this day and age–with the current tragic news headlines what they are–I should hardly have to remind any parent who might bring their younger children onto our site to always ensure they are 100% supervised and are not allowed to wander around by themselves. There is the potential for harm from falling in the dark and also from small critters (such as snakes, scorpions, etc). I must also ensure that everyone is aware our site is pretty open and in most cases it is impractical to check on everyone who drives onto it. If you observe any activity that you are concerned about please report this immediately to either a board member or the Star Member in charge of the observatory.

The "NEW" Silverado Star Parties at Black-Star-Canyon

June 29th was the first star party held in conjunction with the Nature Conservancy at the "new" Silverado site. The new facility is much easier to get to than our old site and just about as dark. This looks to be a long-term place that we can rely upon for continued access due to the generosity of the Nature Conservancy. Please check the website for specific details on how to find the new site and for any late changes to scheduled events. The OCA website is undoubtedly the best place to go to find such timely information as in many cases the information in the Sirius Astronomer may have to be submitted several months in advance of the event.

Sirius Astronomer

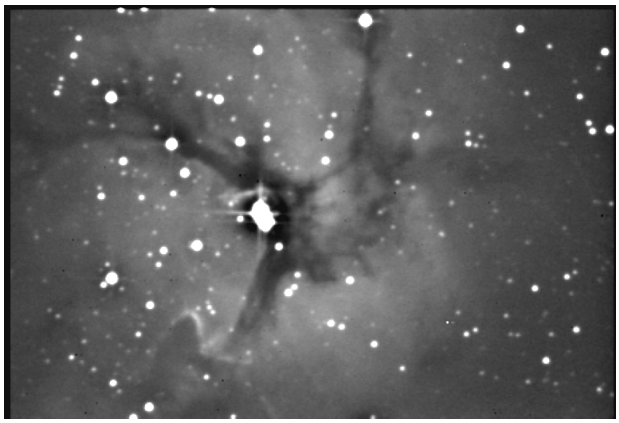
You will no doubt be aware that our precious editor, Chris McGill, has decided to pursue her long-term ambition of training to become a lawyer. That means that this issue is the very last one Chris edits and puts together herself. A group of members and board members have met with Chris and a number of interested future newsletter editors to go over the production of the Sirius Astronomer.

(continued on page 9)

Kuhn Science Imaging Resumes

by John E. Hoot and Russell Sipe

Over the past year, through the efforts of many OCA members, the club's 22-inch Kuhn Telescope at the Anza Observatory has undergone a marvelous transformation. In the last year, the OCA has: refurbished the control system, installed a new computer system and new CCD camera, added off-the-shelf software compatibility, set up a broadband internet connection, and cleaned and reorganized the observatory. The result is a state-of-the-art, computerized observatory capable of producing both stunning images and science- based observation. The image here is a mere 1-minute exposure of M20 with the Kuhn and its new Meade 416XT camera. The observatory is so automated that a user can remotely perform observations. However, a trained Star Member still needs to be physically present at the telescope to monitor its operation and to open and close the roof.



Previous imaging science programs conducted with the Kuhn included supernova and asteroid searches. These projects were difficult to perform and we have great respect for the researchers. At the time those programs were active, the telescope's rear focus plate had to be removed and a heavy CCD head installed. The system required three separate computers and produced images in a format that was not compatible with popular software. All that has now changed with the recent upgrades to the Kuhn. Imaging is now accessible to a much larger group. It is not just a visual scope anymore!

For those not familiar with its capabilities, here are some facts about the Kuhn:

0.55 meter (22-inch) f/8.0 modified Cassegrain design
Focal Length = 4470mm (176 inches)
Fork-Mounted
Rates: Lunar, Sidereal, Solar and King
Periodic Error Correction
Computerized GOTO (Meade LX200-compatible)
Image Scale: up to 18" x 12"
Limiting Magnitude: 18th in 30 seconds

First CCD Imaging Science Workshop at Anza

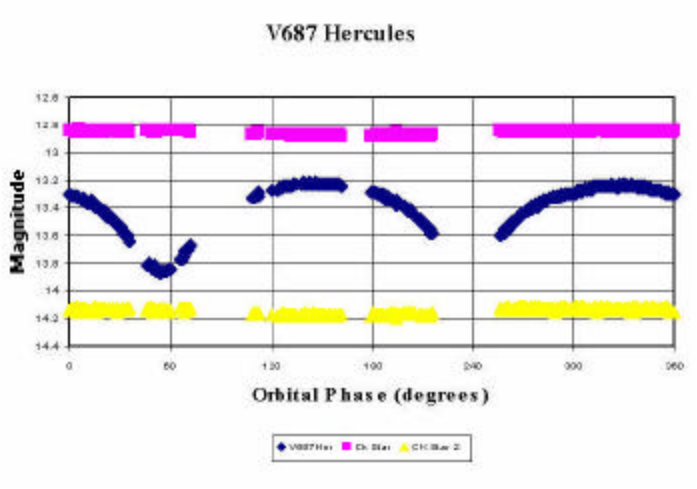
OCA's first CCD Imaging Science Workshop was held at Anza last June. Participants learned about CCD imaging and were introduced to several types of science projects that can be performed with standard CCD cameras. The program was a success and will be offered every three or four months to club members and interested college students throughout Southern California.

Anza Eclipsing Binary Campaign

The latest science project at Anza is the study of eclipsing binary stars. These stellar systems contain two (or more) stars that are in close orbits around their common center of mass. If the plane of their orbits in not too highly inclined with respect to our vantage point on Earth, the two stars will pass in front of each other from time to time. These mutual transits cause variations in the apparent brightness of the system. By measuring the color changes and shape of the light curve, many useful physical properties about the stars can be determined. These properties include: relative luminosity, color of the stars, mass ratios, stellar masses, orbital period, and semi-major orbital axis.

In some very special cases, the stars are so close together that one star will start to accrete matter from its companion. In this case, as the mass transfer occurs, the orbital periods of the stars change. If spectroscopy has been performed on the stars to establish their masses, the actual rate of mass transfer can be determined from the change in the orbital period over time.

A cooperative campaign has begun to determine the orbital period of two contact binary star systems whose periods were last measured over 18 years ago. The campaign is a joint project between the Kuhn, Star Cruiser and SSC Observatories. The stars being measured are LX Serpentis and V687 Hercules.



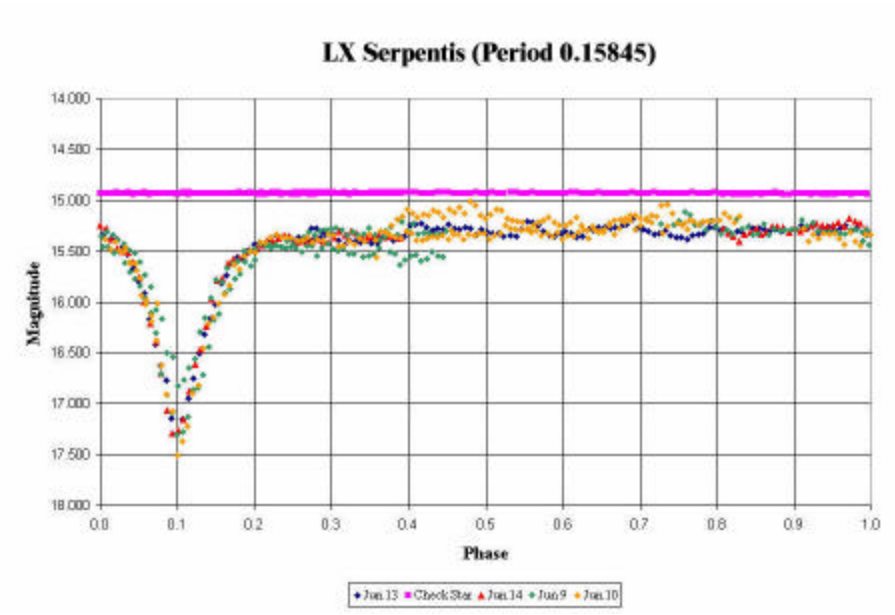
V687 Hercules

The published orbital period for V687 Hercules is 0.32148 days or approximately, 7 hours and 42 minutes. Obviously, these two Sun-sized stars are very close and moving very fast. They are actually so close together that their shapes are distorted, becoming egg-like as their mutual gravity tugs on their gas envelopes. Gas may actually be moving from one star to the other.

In the case of V687 Hercules, both stars are of very similar mass and luminosity. Under these conditions, the rate of mass transfer should be slow and quiet. This leads to a very smooth curve. When looking at these light curves, the ratio of the minima gives an idea of the relative radius of the two stars. In the curve above, more data is needed to fill in the second eclipse. The spacing of the eclipses is related to how elliptical the orbits are and to how the semi-major (long) axis of the orbit is oriented towards Earth. Finally, the period of the orbit can be determined by measuring the moment of greatest eclipsed space by a month or so. This allows the orbital period to be determined with very high precision.

LX Serpentis

The other target of the current campaign, LX Serpentis, is a cataclysmic eclipsing binary. In this exotic type, a white dwarf is in close orbit with a main sequence star. They are orbiting so close together that matter being pulled off the main sequence star is forming an accretion disk around the white dwarf. As matter spirals inward, it creates hot spots where it impacts the white dwarf's surface. Occasionally, it erupts in bright, thermonuclear bursts. This chaotic pattern is superimposed on the standard binary light curve.



The catalogued period of orbit for these stars is listed as 0.15843194 days, corresponding to a period of approximately 3 hours and 48 minutes. So far, observations by the OCA team show only a few seconds' decay in the orbital period in the past 18 years. This amount is within the errors of current measurements, but as the campaign continues, we should be able to reduce the error to the point where we will accurately measure the change.

This is just one type of program the Kuhn is now equipped to handle. The possibilities are limited only by our imaginations.

The Sirius Astronomer Editor says:
"So long, and thanks for all the fish!"

Saying goodbye to what has become, over the past 45 months since I became the Editor of the *Sirius Astronomer*, a labor of love, is difficult. I consider myself lucky to be a member of the Orange County Astronomers, a vibrant, outgoing club. In my duties as Editor, I have tried to entertain and inform club members and other readers about our little corner of the universe. With a readership that includes Ed Krupp, the editors of *Sky & Telescope* magazine, and folks at numerous amateur astronomy societies worldwide, my goal has been to present this information as classily and as accurately as possible. I think I did that. And, it's nice to know that my efforts have been appreciated.

I especially wish to convey my gratitude to those talented club members who have contributed articles featured in the *Sirius Astronomer* over the years. These individuals have responded to my persistent nagging for copy with grace and humor. Keep up the great work!

Finally, I wish to make an appeal to all OCA members (I swear, this is the last time!) to share yourselves with this awesome astronomy club, whether it be through an outreach activity, as a board member, or as a contributor to the *Sirius Astronomer*. Get involved. The club needs each and every one of you.

"I'd like to dedicate this to just thinking outside the box and not being afraid of who you are no matter what you do." ~ Alicia Keys

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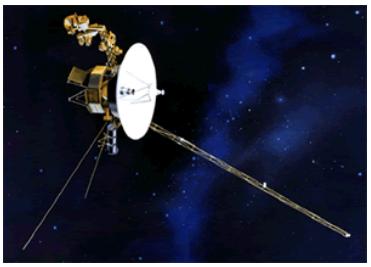
AUGUST'S FEATURED SPEAKER



Tim Hogle, OCA Charter Member and JPL Spacecraft Systems Engineer

The Voyager Mission to the Outer Planets and Beyond -
The First 25 Years of Discovery (and Counting)

In the summer of 1977, two Voyager spacecraft were launched on a four-year journey to fly past Jupiter and Saturn. Following the successful missions, Voyager 2 was put on a trajectory to fly past Uranus in 1986 and Neptune in 1989. Now, 25 years after launch, both Voyager 1 and Voyager 2 are still healthy and continuing to send back new data on the environment of the outer heliosphere, well beyond the orbits of the nine planets. Their distances from Earth are eight and six billion miles for Voyager 1 and 2, respectively. Voyager 1 is further away than any other man-made object. Both will travel forever away from the sun, never to return. Barring a catastrophic failure, both Voyagers could continue to send back valuable data until the year 2020 or beyond. It is hoped that before this time, at least one of the Voyagers will detect the heliopause (the boundary between the influence of the sun's magnetic field and solar wind, or heliosphere, and the corresponding effects from the Milky Way galaxy as a whole). From that point onward, mankind would get a first-hand sample of the environment of true interstellar space.

Tim Hogle is a Spacecraft Systems Engineer at the Jet Propulsion Laboratory in Pasadena, California. Tim is also a charter member of the OCA. Tim graduated from California Polytechnic State University, San Luis Obispo in electrical engineering. A former Navy navigator, he joined the Voyager Flight Team after mission launch as an attitude control analyst. Tim has worked in many areas of the Voyager Project over the years. This has given him a unique perspective on the evolution of the mission and the changes to the spacecraft that have permitted this phenomenal extension of its useful life.

Virtual Astronomy

by Dave Kodama

The March of Technology

I'm currently sitting on my observing pad in the moonlight at the OCA's Anza site, cruising the net, searching for auroral predictions to follow up on a tip I just heard about high solar activity (see http://www.spaceweather.com/ for solar activity and auroral reports). Perhaps if I'm lucky, I'll be treated to an auroral display. Later this evening, I'll submit this article to the Sirius Astronomer Editor via the wireless local area network and satellite link to the internet.

Does anyone else find this amazing? Ten years ago, the OCA was breaking new ground by having a dial-in bulletin board system (BBS) with its library of astronomy-oriented DOS programs. Hard disk drives were about a thousand times smaller in capacity yet a hundred times larger physically!

Today, I routinely process 100mb images, I can get near-real-time weather conditions from the weather station at the Anza site, and we have several OCA member observatories on the verge of full remote operation (see Russ Sipe's remote operation experiment at http://www.sipe.com/starcruiser/html/observations_report05.html). At least one member already has his private remote observatory operating for hire (see http://www.arnierosner.com/are/Rent-a-Scope/rent-a-scope.html). No doubt, we'll soon be using our Anza internet link to order out for pizza at star parties!

And speaking of changes, the new, expanded version of this annual conference will be held August 23-25 on the UC Irvine campus. Again, we are greatly helped by technology– you can read about the conference details online (http://www.ocastronomers.org/astroimage/), you can register online, you can submit images for the conference electronic gallery online, and you can even watch the conference online via streaming video if you are too far away to attend! Behind the scenes, speakers were contacted entirely by email, publicity for the conference utilized electronic mailing list announcements as well as electronic ads, a *Sky & Telescope* ad was digitally submitted (and an electronic invoice sent back to the club), and a Yahoo group was used to coordinate planning by the organizing committee…. Did I miss anything?

And, oh yes… The conference speakers all have their own websites:

http://www.astrovid.com/mtwilimg.htm	Ron Dantowitz
http://home.ix.netcom.com/~optsol/	Don Goldman
http://www.scienceandart.com/0gallery.htm	Bill & Sally Fletcher
http://www.galaxyimages.com/astrophotographybystevemandel.html	Steve Mandel
http://www.jacknewton.com/	Jack Newton
http://www.robertreeves.com/	Robert Reeves
http://home.nethere.net/mpd/	Don Westergren
http://www.wodaski.com/wodaski/default.asp	Ron Wodaski

However, you still can't electronically fully enjoy chatting with the speakers and fellow astroimagers or talk shop over the catered lunch, so make sure that is an in-person experience.

AstroImage 2002 opens on Friday evening (August 23) with a film/CCD introductory overview. This is followed on Saturday by a full day of intermediate to advanced talks given by well-known astroimagers and on Sunday by product seminars and other exhibitor presentations. If you've ever had the urge to take an photo yourself, here's your chance to see how it's done and to meet the people behind all those great web images. See you there!

*You can also get **weekly email notices** of what's going on in the OCA by sending a request to me at: kodama@alumni.caltech.edu.*

AstroSpace Update

gathered by Don Lynn from NASA and other sources

(To find out more on these topics, or those of past months' columns, through the World Wide Web, send your Web browser to our OCA website http://www.ocastronomers.org and select Space Update Online.)

Missing comets - It has long been known that comets seen in the inner Solar System come from 2 reservoirs of comets found outside the orbit of Neptune: the doughnut-shaped Kuiper Belt, just outside Neptune's orbit and the spherical Oort Cloud, extending much further. Collisions or gravitational disturbances are believed to occasionally throw comets out of these reservoirs into the inner Solar System. Oort's announcement of the Cloud was more than 50 years ago. Since then, it has been known that the rate of new comets coming from these reservoirs, combined with the odds of being deflected into permanent short orbits and the expected life of comets, should have left far more comets in the inner Solar System than have been found. A new computer study shows that there should be about 100 times as many comets here as we see. Two theories exist to explain this: (1) comets quickly lose all their frozen gasses, leaving dead hulks resembling asteroids, or (2) most comets are destroyed on their first pass through the inner Solar System. The astronomers doing the new computer study claim there are not nearly enough asteroids in comet-like orbits, so about 99% of Oort Cloud comets must disintegrate on their first pass through the inner Solar System. Surprisingly, comets that came from the Kuiper Belt instead of the Oort Cloud must disintegrate at far smaller rates to match the numbers of Kuiper comets found. It is not known whether this difference in disintegration rates is due to differences in their composition or their orbits.

Chandra (X-Ray Observatory) - observations of the center of our Milky Way galaxy--combined with observations from a submillimeter wavelength telescope located in Antarctica and other telescopes at other wavelengths--showed that a huge ring of dense interstellar gas is accumulating with the mass of millions of Suns. It appears that in about 200 million years the ring will collapse under its own gravity and cause a burst of star formation. This would turn the Milky Way into a starburst galaxy, such as M82, but it would probably not be visible from our location, since dust blocks our view toward the center of the galaxy. Such starbursts create many massive short-lived stars that forge heavier elements and fling them out into the galaxy when the stars die. These heavier elements will form the planets orbiting the next generation of stars. Astronomers calculated that the present rate of about 1 supernova (exploding star) per century in the Milky Way will jump to about 1 supernova per year during the starburst. It is thought that about every 500 million years, a galaxy like ours will undergo such a starburst.

Mars Global Surveyor (MGS) - Further analysis of the elevation data from MGS has discovered the best evidence yet for the existence of a past lake on Mars, even showing indications of shoreline. The dry lakebed was found in the highlands of the planet and covers an area the size of Texas and New Mexico combined. It appears that the lake once overflowed the ridge damming it, releasing a huge flood as the water cut into the ridge, and the flood formed Ma'adim Vallis, one of Mars's largest valleys, having a length of 550 miles and a depth of nearly 7000 feet. The lake was 1400 miles long, and the water released was 5 times the volume of all the Great Lakes combined. Two other smaller lake basins were identified in the region, and all shared the same water level before the flood. For these lakes to have existed without freezing or evaporating, Mars had to have been much warmer and had more atmosphere in the past.

Fast quasar formation mystery - In recent years, quasars (the bright cores of very active galaxies) have been discovered that are so distant that we are seeing them as they were only a billion years after the Big Bang. It was a little surprising to discover that galaxies could form so fast, but it was almost unbelievable when several were found to have cores bright enough to indicate that they contained black holes as massive as billions of Suns. Theoretically, black holes that large should take much longer to form than the galaxies that hold them. A new theory, backed by calculations but not yet by observations, may explain this. The theory says that about 1/3 of all very distant quasars should be affected by gravitational lensing, the bending of light from the quasar by the gravity of nearby intervening galaxies. This bending of light by gravity was predicted by Einstein's theory of General Relativity and has been measured many times. One of the effects of gravitational lensing is to make the distant object appear much brighter than it is. Because the mass of a distant black hole is measured by how bright it is, it is possible that the masses of all black holes in distant quasars have been grossly overestimated. Gravitational lensing also creates multiple images, so astronomers will have to test their theory by surveying many very distant quasars to see if all the bright ones have multiple images.

XMM-Newton (X-Ray Observatory) - has imaged X-rays from a quasar so distant we are seeing it as it was 13.5 billion years ago, and the spectrum shows huge amounts of iron, about 3 times the abundance in our Solar System. There is no theory of how this much iron could be created so soon after the Big Bang. The astronomers who did the analysis say that either the universe is older than we thought, or an unknown phenomenon exists that produces that much iron. The usual method of producing iron and distributing it about space is by supernova bursts. But, from what we know of supernova bursts, there could not have been enough of them to produce that much iron so soon after the Big Bang.

Nanodiamond mystery - Nanodiamonds (very small ones) are known to be common in spacedust and in meteorites. Astronomers believe they are formed and spread about space by supernovae. They then are included in the material that coalesces to form planets, asteroids, and comets. The ages of nanodiamonds can be measured by radioactive dating of xenon, a gas usually found embedded in them. It was expected that comets should have larger concentrations of nanodiamonds than asteroids, since comets generally contain more unmodified material from the time of the formation of the Solar System. This will be better tested when the Stardust spacecraft returns in 2006 with comet material, but in the meantime, the best we can do is collect (as it hits the Earth's stratosphere) interplanetary dust thought to come from comets. But, nanodiamonds in the dust collected so far have been found to be absent or very depleted. To explain this, either the nanodiamonds did not come from supernovae, but from some local process in the Solar System, or the nanodiamonds come from supernova material that somehow avoided the outer reaches of the forming Solar System where the comets formed. Either explanation greatly disturbs our best theories of how our Solar System formed. Other recent observations, for example, that of the dust disks about a forming or young star, support the explanation that nanodiamonds form by some local process during planet formation rather than getting spewed everywhere by supernovae before planets form. Those observations detected nanodiamonds that appeared to have formed in the disks, not before the disks.

Hubble Space Telescope (HST) and VLT (telescope in Chile) - have produced high resolution images of globular clusters orbiting an old elliptical galaxy (NGC 4365 in the Virgo galaxy cluster) and determined that not all the globulars are old. Theory had it that the globulars should have formed when the galaxy formed. But, these globulars fell into 3 classes: (1) older globulars having about the same age as the galaxy (12 billion years) without heavy elements (just hydrogen and helium), (2) older globulars with heavy elements, and (3) newer globulars with heavy elements. The second class had to have formed at least slightly later than the first class, since the heavy elements were spread about the galaxy during the deaths of the stars from the first generation. But, the third class was found to be only a few billion years old, which was confirmed by spectra of the globulars taken independently by the Keck Telescopes in Hawaii.

Star oscillations - For about 30 years, it has been known that internal oscillations in the Sun produce movements in its surface, and that analysis of these movements tell us about what material is where within the Sun, similar to earthquake analysis performed to learn about the interior of the Earth. A few other Sun-like stars have been found to have similar oscillations. This study is called *helioseismology* for the Sun, and *asteroseismology* for other stars. The Euler Telescope in Chile has made the first detection of these oscillations in a star much heavier and much farther along in its life cycle than the Sun. The star is named Xi Hydrae, it is about 10 times the diameter of the Sun, and it is approaching the end of its life, when its outer envelope will expand to become a red giant. The oscillations resembled those of the Sun, but generally were slower, owing to the longer time it takes waves to cross the surface of the larger star.

NEAR Shoemaker (Asteroid Rendezvous mission) - A study comparing the density and other measurements of asteroid Eros made by NEAR Shoemaker with measurements of chondrites, a type of meteorite, has concluded that the Eros has a porosity of 20% (that is, holes or voids inside amount to 20% of the volume) and was heavily fractured by past collisions, but was not demolished into a rubble pile.

Lagrange navigation - An engineer at NASA's JPL is mapping out orbital paths between Lagrange points for the entire Solar System. Lagrange points are the 5 places located about every planet and satellite where gravity from two bodies balances. The Genesis spacecraft, which is collecting solar wind particles, was designed to use such paths, and except for minor course corrections, it is doing all its navigation since launch without further rocket power. It is making 5 orbits about one of Earth's Lagrange points, then it will fall out and into the Lagrange point on the other side of Earth, and finally, it will fall back to our planet to return its particle collection. It is expected from the mapping of these Lagrange paths to find new ways for spacecraft to navigate the solar system with minimal rocket power.

President's Message (continued from page 2)

It is my pleasure to announce that OCA Members Darren Thibodeau and Elaine Vander Linden have agreed to work jointly on the SA. Elaine has a great background in publishing and strict copy editing and will be the Assistant Editor. Darren is an accomplished amateur astronomer and astroimager who is also very well qualified in desktop layout/design and will be the Editor of the Sirius Astronomer. I am sure that you will all wish our new SA Editorial team great success in the future and you will all join me in a statement of profound and deep appreciation to our departing editor Chris McGill for all that she has done for the club. Hip! Hip! Hooray! Thanks Chris!

"Every day we are connecting ever more photons of light from distant galaxies to the eyes, hearts, minds and imaginations of our members and others in our community."

Magazine Subscriptions

Subscriptions to the Astronomy magazines are now due for renewal, if you subscribed for one year or would like to subscribe at the club rate. You may also extend an existing subscription that does not end in December for one year at the club rate. Bring your check made out to the OCA to the meeting or mail it to:

Charlie Oostdyk, Orange County Astronomers, PO Box 1762, Costa Mesa, CA 92628. ***Checks made out to the magazine publishers cannot be processed and will be returned to you***. If you already subscribe, please provide the mailing label or the billing invoice with your check. One year rates are as follows:

	Club Rate	Regular Rate
Sky & Telescope	**$30.00**	$39.95
ASTRONOMY.....	**$29.00**	$39.95

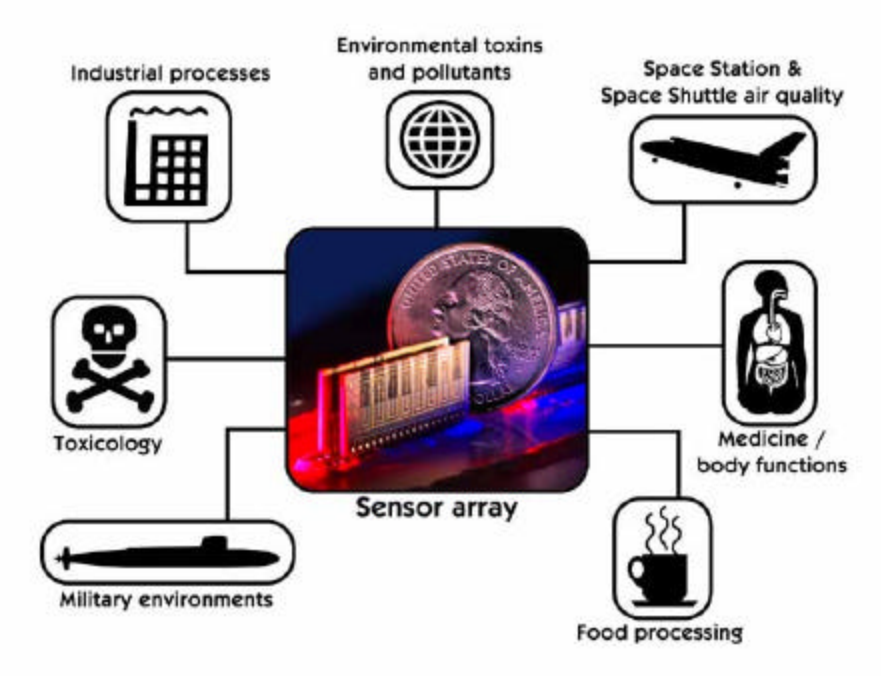
The **DEADLINE** for subscribing at the club rates will be the **October monthly meeting, October 11th.**

Expiration notices will be sent by the publishers to all current club subscribers about November 1 even if you renew through the club. It takes the publishers a few weeks to process renewals.

NASA Space Place

E-Nose—The Last of the 5 Senses to be Simulated by Computer

It is very important to keep a "nose" on the air during space missions. Odors from dangerous chemicals in the air must be detected early and fast. One possible danger is hydrazine, the rocket fuel carried on board spaceships. If it leaked into the cabin area, it could do a lot of damage before anyone knew it was there. The job calls for a "super nose" that can detect faint smells far beyond the ability of human beings.



Scientists at Caltech studied the way human and animal noses worked. They thought it might be possible to make a super-nose. NASA thought this was a good idea, so scientists and engineers at the Jet Propulsion Laboratory in Pasadena developed an electronic nose, or "E-Nose." This nose can sniff using a pump, smell using polymer sensors, and decide what's in the air using a mini-computer. E-Nose was developed to monitor the air that the crew in the International Space Station will breathe. It was tried out on the Space Shuttle, and it worked just fine.

E-Nose will also have many uses here on Earth. It can monitor the air inside submarines and in factories to warn people very early if something is making the air unsafe to breathe. It can be used in processing food to tell if food is beginning to spoil. And someday it may be used on another planet or moon to sniff out what's "cooking" up there.

You can find out more about E-Nose and have fun testing your own nose at the Space Place Web site, space-place.nasa.gov/enose_do1.htm. The Space Place has fun and educational activities for parents, children, and teachers -- and lots of facts related to many of NASA's space missions.

This article was provided by NASA's Jet Propulsion Laboratory, managed by Caltech in Pasadena.

Astrollaneous

FROM THE OCA PRESIDENT:
Reminder for star parties and outreach events listed in the Sirius Astronomer: club members wishing to attend the club's various star parties and outreach events should check the website for late changes to the schedule. In many cases, the events as described in the Sirius Astronomer may be more than two months in advance of the actual event. I'm sure our members will understand there are times when the information presented in the Sirius Astronomer will be legitimately overtaken by unforeseen events. The website is undoubtedly the best place where such changes should be displayed.

FROM THE OCA LIBRARIAN: A request for recommendations for the library goes out from your librarian, Karen Schnabel: I would like to start expanding the library's offering, yet I don't know where to start. I have had a couple of suggestions from members and will start searching for those particular books. However, I would like everyone's input. This is your library and I want it to be the best it can be! Please e-mail me at karen@schnabel.net with any ideas for books or publications you'd like to see show up in the library. I will attempt to find as many as I can, so hopefully you'll be seeing them in the near future.

FROM OCA OUTREACH COORDINATOR JIM BENET: I just want to report to everyone that we had a tremendous outreach program at the Girl Scout day camp. There were 460 viewers queuing up to view the sun on four different telescopes. These included Daisies, Brownies, Juniors, Cadets, and Seniors, adult leaders, and parents. There was even a group of boys there as well.

Each of the four telescopes provided a different image of the sun. Matt Ota borrowed the H-alpha filter from the Mt. Wilson TIE program. The images achieved with that filter were phenomenal. Don McClelland brought a Questar telescope with an orange filter. That Questar really produces exceptionally sharp images. Bill Hepner brought a beautiful little refractor that produced equally sharp images. Matt Ota made me an off-axis filter for my Celestron 11-inch telescope. The aperture on that was 93 mm diameter. With the 11-inch, I had the highest magnification out there. Using my lowest power eyepiece and a 63% focal reducer, I could barely fit the entire sun into the field of view.

Everyone really enjoyed the event. It is always a joy to witness firsthand the enlightenment of a young person's mind. With 460 attendees, this has got to be one of the largest outreach programs for the OCA. I want to thank Matt Ota, Don McClelland, and Bill Hepner for their support.

SERVICES OFFERED: Custom, quality framing for your astroimaging prints, posters, shadow boxes. UW Images, www.qualityframe.com, Ronnie-310-541-9668. Flemmi@aol.com.

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