SIRIUS ASTRONOMER

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The Newsletter of the Orange County Astronomers

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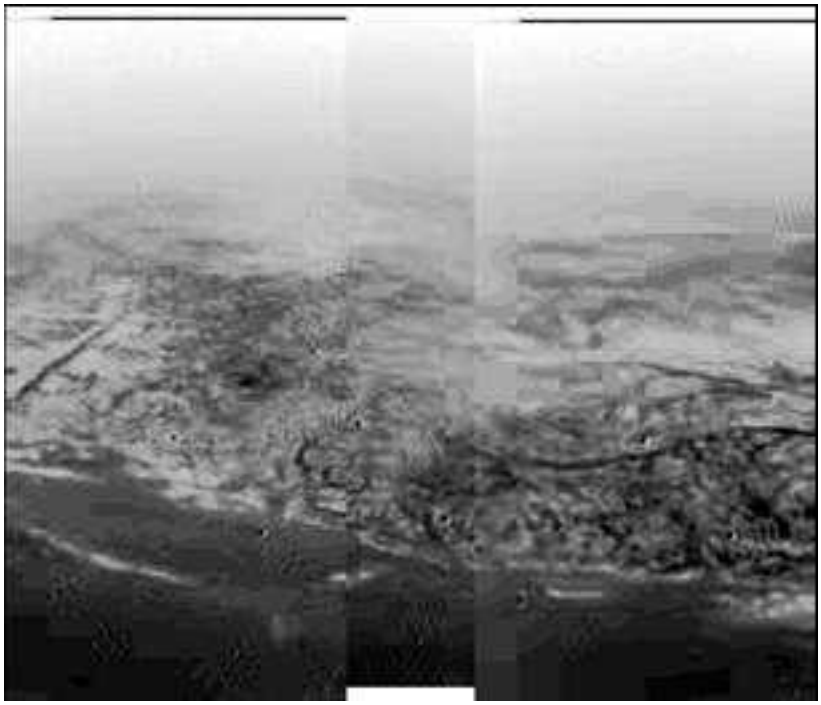
2005 OCA ELECTION RESULTS! PAGE 6



This composite was produced from images returned on January 14, 2005, by ESA's Huygens probe during its successful descent to land on Titan. It shows the boundary between the lighter-coloured uplifted terrain, marked with what appear to be drainage channels, and darker lower areas. These images were taken from an altitude of about 8 kilometers with a resolution of about 20 meters per pixel.

Credits: ESA/NASA/JPL/University of Arizona

OCA CLUB MEETING

The free and open club meeting will be held Friday, February 11th at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. The featured speaker this month is Dr. Gary Peterson of San Diego State University, lecturing on "Mercury: The Forgotten Planet"

STAR PARTIES

The Black Star Canyon site will be open this month on January 29th. The Anza site will be open February 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, February 4th (and next month on March 4th) at the Centennial Heritage Museum (formerly the Discovery Museum of Orange County) at 3101 West Harvard Street in Santa Ana.

GOTO SIG: Mar. 21st

Astro-Imagers SIG: Feb. 15th, Mar. 15th

EOA SIG: Feb. 28th, Mar. 28th

Astrophysics SIG: Feb. 18th, Mar. 18th

President's Message
By Barbara Toy

This is my last formal message to you as president of Orange County Astronomers – a fitting time for some retrospection, introspection, or even plain ol' reminiscing... Whatever it may be, here are some ruminations on the presidency as seen from the inside… (Caution! The experience of other presidents may differ…)

Some General Ruminations

It has really been a great experience being president for the last two years. Even though I worked pretty closely with Liam Kennedy, my predecessor, as vice president, and so had the chance to see some of what was involved from close quarters, there's definitely a learning curve and a need for some attitude adjustments when you take on that position. You can get a lot of satisfaction, as well, sometimes in quite surprising ways.

The job certainly adds a touch of excitement to life. You get phone calls and emails from all kinds of people for all kinds of reasons. Some samples: astronomers planning to visit the area and wanting to know about viewing opportunities (at least one made it to Anza and wrote up a glowing report for his own club's newsletter), people wanting information or recommendations about telescopes, people (fortunately not too many) wanting help locating "their" stars, reporters with questions about the astronomical phenomenon de jour (especially Mars during the 2003 opposition) or wanting information about our activities, people (usually not members) with questions about something they'd read in the paper or seen on TV, and even members or potential members who have questions about the club and its many activities. Every now and then there'd be one who was on such a different wavelength that – well, let's just say that communication was difficult. Most have been a pleasure to deal with, though I'd sometimes wonder why they'd selected me to contact…it's a testament to the effectiveness of our website that most told me that that's how they found me.

Besides the excitement of never knowing who will contact you or why, the presidency imposes a certain discipline. There are regular deadlines that have to be met: the President's Message has to be done by the 15th of the month, preparations for the general meetings (such as the pre-meeting slide show) have to be done by the 2nd Friday of the month, the agenda has to be finished, circulated and posted well before the bimonthly Board meetings, and so on. This regular rhythm makes it an interesting challenge – maybe it's even taught me to be more disciplined in general (one can always hope!).

One pleasant surprise to the position was the ability it gave me to bring bits and pieces of information or equipment together to help solve a particular problem, such as pulling together the major pieces so we could install the 12-inch LX200 donated by John Hoot as the first remote-controlled telescope in the Mocat observatory, using a pier that had been donated to the club and put in storage by Charlie years ago, which only he remembered was there, a long-forgotten focal reducer I found at the back of one of the desk drawers in the club observatory, and computers donated through the efforts of Bob Buchheim and Joe Busch, among other donated equipment. In fact, by the time you read this (if the weather allows), the telescope and its control systems should be operational and ready for fine-tuning, which is great cause for rejoicing. Even though the other EOA members have done the actual work of building the observatory, designing the system and getting all of the pieces to work together, my involvement in the project as an officer of the club has helped us reach this point – a little-recognized but very real benefit to holding these positions is the ability they give you to help other club members achieve their goals.

The Joys of Administration

The president is the club's chief administrator. Most members know that the president runs the monthly general meetings, and may know that he or she also presides over the Board meetings. The responsibilities go beyond this, though, as the president sets the agenda for the Board meetings and has the final responsibility for anything that happens at the general meetings – if there's any significant problem (such as with the speaker, change of meeting location, equipment issues – basically, anything associated with the meeting), it's ultimately up to the president to deal with it.

Fortunately, this is far from a one-person show. The vice president, of course, is responsible for the speakers, including making sure that they know how and when to get to the meetings, and arranging for whatever equipment they need, though the president is often involved in these issues as well. Beyond this, when we've been faced with the unexpected in the two years I've been president, it seems that there have always been people who've willingly lent a hand to keep things moving in the right direction – which has included picking the lock to the circuit breaker box so we could get power to the projector (that really did happen!), hauling sheets of wood up the auditorium stairs to put together a makeshift table for the refreshments, posting notices around Hashinger Hall about a last-minute change in the meeting location, and helping out with the frequent problems with the sound system, to list just a few things over the last couple years that have helped make our meetings – interesting.

I usually found out about these little problems when someone emailed or telephoned me (if it was before the meeting) or button-holed me at the meeting to tell me about them, at which point – this is the particular joy of being the chief administrator

– they became *my* problem to resolve. Often this could be done by identifying an appropriate person to pass the problem off to (a popular administrative technique known as "delegation") or by getting the word out about the problem and asking for help. For all of you who came forward when we needed help – many, many thanks!

Of course, it's not just meeting-related problems that land at the president's door. As the chief administrator, he or she may be called upon to deal with any issue that comes up as to any aspect of the organization, which covers a lot of territory. A few highlights I recall are the fire (of course – hard to forget that!), water and wind damage at Anza (a recurrent problem), getting notice that our insurance policy wasn't going to be renewed, and getting notice from the Centennial Heritage Museum that a small building that had been used by the club in an earlier lifetime was being demolished but still had club property in it (be it hereby known that Charlie Oostdyk did all the heavy lifting – in the last case, literally – on those last two problems. He and I consulted about it a number of times, but he was the one who worked directly with our insurance agent to find a new policy, and he was the one who went to the museum to retrieve whatever we might want to keep from the old building).

Sometimes I've actually been able to take care of a particular situation myself, such as putting up the sign with our street address on it when we received a warning from the fire department because it wasn't posted, and putting in a new lock box with a key at Anza House when the lock on the old lock box couldn't be opened (when Don Lynn got back from his vacations last summer, he figured out how to fix the old lock box lock – we have such talent in our organization! – so we now have two functional lock boxes), but usually my role has been to collect information about the situation, get it to whoever needed to know about it, monitor the situation as other people have done the actual work, and express appropriate heartfelt appreciation in the process.

Well, admitting this may get me kicked out of the Ex-President's League, but – dealing with all of these things was fun.

A Case Study…

Of course, the main reason I've enjoyed dealing with these things is that I've been working with such talented and industrious people. Here's a very recent instance (this is actually the simplified version – there was even more going on, having to do with the perimeter fence and the observatory plumbing. Since I don't have room to do all of that justice here, let me at least thank Don Lynn in passing for his efforts in both those areas):

When I was leaving our Anza site in December, I found that the gorge carved by runoff into the far edge of the road going up to our property had widened to the point that someone making a too wide a turn from our driveway onto the road could easily slide into it. I notified the other members of the Board, and Gary Schones immediately volunteered to fill the gorge with a slurry of concrete and dirt that would be more resistant to further erosion on that slope than a repair with just dirt. Equally promptly, Bob Buchheim volunteered to help him, but the project had to be postponed briefly.

Gary was out at Anza working on something else in the week after Christmas, however, and notified the Board that Friday that there had been recent wind damage to the club observatory and to Russ Sipes' Star Cruiser observatory. When I passed the word on to Don Lynn about it, he promptly volunteered to replace the roof shingles that were torn off the club observatory by the wind at the next star party, which was when he would next be able to get out there. That was more than a week away, and, perhaps being a bit compulsive, I decided to go out the next day (New Year's Day) to check on the damage for myself and to take some shingles I happened to have as replacements. I found, among other things, that the intervening rainstorms had carved some additional deep and nasty ruts in the driving surface of our entrance road.

While I was walking the site before it got dark, Dave Radosevich and John Kerns tracked me down – they had come out to Anza earlier that day to check on possible damage to their property, and had also checked the club's property. The observatory roof wasn't leaking, but they discovered that water had gotten under the door to the warming room and soaked the shipping container that was holding the club's 10-inch LX200, which had just been repaired by Meade but hadn't yet been reinstalled on its pier. When I got the observing area open, they undertook the strenuous job of getting the telescope onto its pier (the water hadn't actually reached the telescope, fortunately). Dave, who actually carried the telescope up the stairs and held it in position on the pier while John got the bolts in to hold it, also mentioned that one of the trees on the club's property had fallen, taking out part of a fence and blocking the road on that side – he'd already cleared it out of the road by the time I got there.

After I got home, I notified the rest of the Board about the additional road damage, which was of particular concern because of the upcoming January star party, as the damage would make it difficult for passenger cars to get over that stretch of road. Gary noted that there was supposed to be a break in the weather on Thursday of that week, and he emailed me later that he had rented a bulldozer and would repair the road if the weather allowed – which it did. Unfortunately for those of us who were hoping to get a good view of Comet Machholz near the Pleiades, the star party didn't actually happen because of rain, but at least that stretch of road is now passable and should resist further water damage, thanks to Gary's hard work and expertise.

(continued on page 10)

NASA's Space Place

Stardust Up Close

by Patrick L. Barry and Dr. Tony Phillips

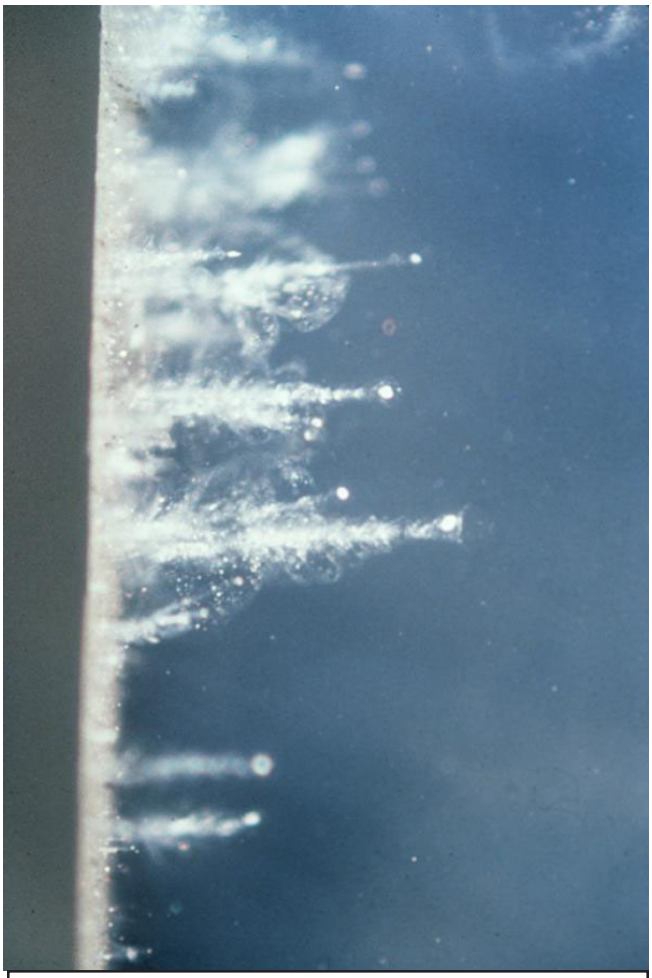
Like discarded lumber and broken bricks around a construction site, comets scattered at the edge of our solar system are left-over bits from the "construction" of our solar system.

Studying comets, then, can help scientists understand how our solar system formed, and how it gave rise to a life-bearing planet like Earth.

But comets have long been frustratingly out of reach — until recently. In January 2004 NASA's Stardust probe made a fly-by of the comet Wild 2 (pronounced "vilt"). This fly-by captured some of the best images and data on comets yet ... and the most surprising.

Scientists had thought that comets were basically "rubble piles" of ice and dust — leftover "construction materials" held together by the comet's feeble gravity. But that's not what Stardust found. Photos of Wild 2 reveal a bizarre landscape of odd-shaped craters, tall cliffs, and overhangs. The comet looks like an alien world in miniature, not construction debris. To support these shapes against the pull of gravity, the comet must have a different consistency than scientists thought:

"Now we think the comet's surface might have a texture like freeze-dried ice cream, so-called 'astronaut ice cream': It's solid and can assume odd, gravity-defying shapes, but it's basically soft and crumbles easily," says Donald Brownlee of the University of Washington, principal investigator for Stardust.



The Stardust spacecraft used a grid holding aerogel to capture dust particles from comet Wild 2. In this test, high velocity dust particles are stopped unharmed at the end of cone shaped tracks in a sample of aerogel

Scientists are currently assembling a 3-D computer model of this surface from the photos that Stardust took. Those photos show the sunlit side of the comet from many angles, so its 3-dimensional shape can be inferred by analyzing the images. The result will be a "virtual comet" that scientists can examine from any angle. They can even perform a virtual fly-by. Using this 3-D model to study the comet's shape in detail, the scientists will learn a lot about the material from which the comet is made: how strong or dense or brittle it is, for example.

Soon, the Stardust team will get their hands on some of that material. In January 2006, a capsule from Stardust will parachute down to Earth carrying samples of comet dust captured during the flyby. Once scientists get these tiny grains under their microscopes, they'll get their first glimpse at the primordial makings of the solar system.

It's heading our way: ancient, hard-won, possibly surprising and definitely precious dust from the construction zone.

Find out more about the Stardust mission at stardust.jpl.nasa.gov. Kids can read about comets, play the "Tails of Wonder" game about comets, and hear a rhyming story about aerogel at http://spaceplace.nasa.gov/en/kids/stardust/.

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

ASTROSPACE UPDATE

February 2005
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 Web site (http://www.ocastronomers.org), select Space Update Online, and the topics are there to click on.

Cassini (Saturn mission) released the **Huygens** lander in late December, which made a perfect landing on the moon Titan on January 14. A heat shield and a series of 3 different-sized parachutes brought the spacecraft to a slow enough speed to survive smacking into the surface. On the descent it took images, measured atmospheric composition, pressure, temperature and wind speed. Numerous Earth-based radio telescopes tracked Huygens' radio signal during the whole mission, to determine the descent trajectory and track Titan wind effects on Huygens. The signal was not strong enough (as planned) to get the data from this reception method, so the images and other data had to wait for a few hours for the Cassini spacecraft to receive it and relay it to Earth. On Titan's surface it continued measurements until its batteries ran down, over 2 hours after landing, much longer than designed. The first image from the surface showed a plain littered with rounded rocks, which are believed made of ice. At about 300 degrees below zero, ice is about as hard as rocks. Images from just before landing appeared to show a liquid lake, perhaps liquid methane or ethane, and hills with eroded channels that may have formed from flowing liquid. Further analysis will take place over the next weeks and months, perhaps years. This is the only landing ever made on a moon, other than our own Moon. Titan is the only moon with a substantial atmosphere, and may be the only moon with liquid on its surface.

Cassini's ultraviolet spectrometer has discovered large variations in the amount of **oxygen** extending outward from the planet for millions of miles. Scientists believe the oxygen is generated by subatomic particles in Saturn's radiation belts slamming into tiny ice particles, and breaking the ice into hydrogen and oxygen. The tiny ice particles (dust size) probably came from collisions of larger ice objects. The best suspects for the larger objects are tiny moons (say a mile across) colliding with ring particles. This would require far more tiny moons near the rings than we have yet discovered. Other possibilities are that meteorite collisions or ice volcanic activity on a moon create the tiny ice particles.

The rate at which the spectrometer saw ring material dissipate says that the entire E-ring, one of the **rings** with less material, could easily be swept away in under 100 million years. This implies either the E-ring is (and possibly all the rings are) temporary, in terms of the life of a planet, or it is being replenished with new material. Theoretical calculations had shown the rings ought to have dissipated during the life of the planet, but now it has actually been measured.

Saturn's **magnetosphere** has been found to be very different from Jupiter's. Saturn's has more neutral gas particles, instead of charged particles, and more water-rich ingredients. This implies that Saturn's ring and/or moon systems absorb charged particles and create neutral gas particles to a much greater extent than Jupiter's.

Cassini detected radio signals from **lightning** on Saturn that are 1 million times stronger than signals from Earth's lightning. Theorists are trying to explain why the Saturnian lightning is so powerful.

Saturn's **magnetic field** has been measured to rotate 6 minutes slower than was measured by Voyager 24 years ago. Since theorists cannot figure how the rate could change that much, they are now looking at the possibility that the magnetic field rotates at different speeds at different latitudes. The Sun is known to do that.

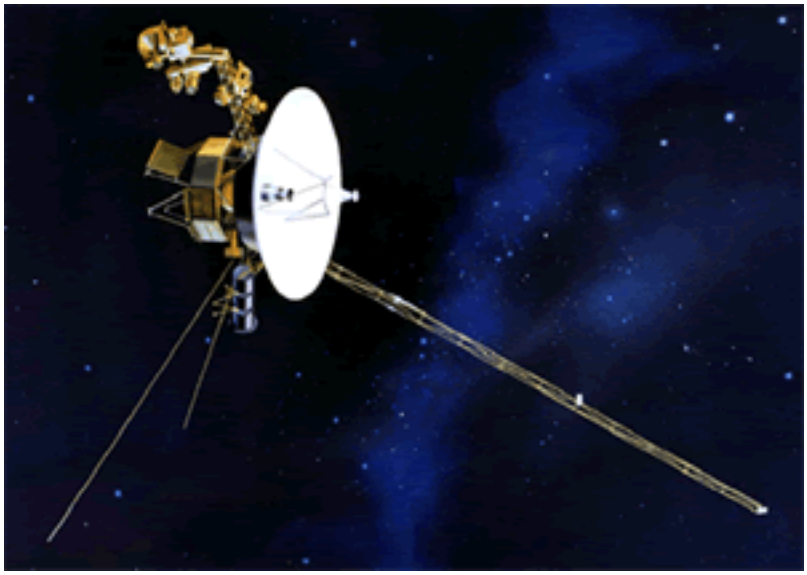
Observations during the second close flyby of Saturn's moon Titan showed that there are many more **haze** layers in Titan's atmosphere than seen before, perhaps dozens. Data from the Huygens landing should very soon give us much more information on the complexities of the atmosphere.

A pass by the moon **Dione** in December yielded good images of it. The wispy braided streaks seen by Voyager more than 20 years ago are now shown to be ice cliffs created by tectonic movement.

A pass by the moon **Iapetus** on New Year's Eve was hoped to get good enough images to answer why one side of the moon is dark as asphalt and the other side almost as bright as snow. Feathery black streaks were found at the boundary between the dark and bright areas. Craters near the boundary were found with bright walls facing one way and dark walls the other. These support the theory that the dark area was caused when dark material collided with the moon, but do not entirely rule out the theory that the dark material came from beneath the surface. The dark material blankets all cratering, so must have occurred later. But the images brought up more questions. There is a very long (at least 800 miles) high (up to 12 miles) ridge around much of the moon, closely following the equator, generally bisecting the dark half. It looks like a seam on a poorly made toy moon. Nothing like it in the known universe. A very large crater has walls that are too steep. Cassini has one more Iapetus flyby scheduled (Sep 2007), which will be much closer and yield images with 100 times the resolution. (cont'd pg. 8)

Voyager Spacecraft Milestone – 10,000 Days from launch

By Tim Hogle



The twin Voyager spacecraft recently reached a milestone with a nice round number - 10,000 days from launch in the summer of 1977. Voyager 2 reached this milestone on January 5, and Voyager 1 on the twenty-first. Both spacecraft had very successful flybys of Jupiter and Saturn, with Voyager 2 continuing on to Uranus and Neptune in the late 1980s. Since 1990 they have been on an extended voyage searching for the edge of the solar system.

Although many people think of the edge of the solar system as being the orbit of the Pluto, both Voyagers are well beyond that distance. In terms of the sun's environment, the edge of the solar system may be defined by the point where the solar wind stops speeding out at a million miles per hour and mixes with the interstellar medium (ISM). This boundary is referred to as the heliospheric termination shock, and although its exact location is not known, Voyager 1 has been seeing indications of being close to it for the past two years. Outside of the termination shock, Voyager will be the first spacecraft to sample the ISM.

If they survive long enough, the final boundary for these intrepid travellers may be the heliopause, where the sun's magnetic field is pushed "downwind" by interstellar winds into a long magnetotail. Outside of the heliopause, there is virtually no influence the sun would have on the interstellar medium except for its weak gravitational influence and still being the brightest star in the sky.

Voyager 1 is currently at 93 AU from the sun, with Voyager 2 following on at 76 AU. To put this into perspective, the average distance of Pluto is 39 AU, the termination shock is thought to be somewhere between 93 and 100 AU, the heliopause at 120 to 140 AU. By comparison, the nearest star is about 275,000 AU distant.

Both spacecraft are still going strong and are returning valuable science data. Each has six of its original science instruments still operational. These include the cosmic ray detector, magnetometer, plasma and plasma wave detectors, planetary radio astronomy receiver and low-energy charged particle detector. Voyager 1 still has an ultraviolet spectrometer operating as well. They will continue sending data as long as they are able. The limiting resource is electrical power. The nuclear generators have enough capacity to continue to power the spacecraft and at least some of the instruments until at least 2020.

2005 Election Results

Thanks to the efforts of Bob Evans, the ballots cast in the 2005 election have now been tallied, and the elected members of the OCA 2005 Board of Trustees are:

Officers:

Dave Radosevich	President
Craig Bobchin	Vice President
Charlie Oostdyk	Treasurer
Bob Bucheim	Secretary

Trustees:

Gary Schones	Matthew Ota
Tom Kucharski	William Hepner
Tony Obra	Paul Brewer
Steve Short	

Congratulations to the new Board, which I'm sure will provide us with excellent leadership over the coming year!

Barbara Toy
2004 OCA President

ABOUT OUR SPEAKER

Dr. Gary L. Peterson has given many popular presentations on planetology to OCA in the past. His most recent offering to the club was 'Atmospheres and Oceans of the Terrestrial Planets,' given at the February 2004 club meeting. He holds a Ph.D. in geology from the University of Washington and is a Fellow of the Geological Society of America. More information about Dr. Peterson's talks and publications may be found at http://www.rohan.sdsu.edu/~3gleep6/planets.html

Comet Machholz with Taurus and the Pleiades, taken from Joshua Tree National Park's "Wonderland of Rocks" on January 5, 2005. This photo was taken with a Canon 20d w/35 mm lens at f/2.0 and ISO setting 1600, 20 second exposure (courtesy Wally Pacholka)

(continued from page 4)

GALEX (ultraviolet observatory) has discovered 3 dozen massive newly formed galaxies relatively nearby (2-4 billion light-years away). They are being called ultraviolet luminous galaxies. It had been thought that galaxies stopped forming roughly 10 billion years ago, since no large newly formed galaxies had been found before this discovery.

Chandra (X-ray telescope) has found the most powerful known eruption in the universe. Studying a cavity in hot gas around a supermassive black hole at the center of a galaxy, and the jets emitted by that black hole, scientists calculated that the black hole swallowed the mass of 300 million Suns over the last 100 million years. Astronomers are not sure how that much matter could fall into a black hole that fast. The heat generated should have expanded the surrounding gas and kept matter from falling in so fast. The gas missing from the cavity was calculated to have been more than the mass of the Milky Way, and most of it apparently was pushed away from the black hole by the energy of the eruption. Astronomers were surprised to find this supermassive black hole, since it does not have a very bright central radiation nor very bright jets, as other very active black holes do.

Dark Matter – An analysis of light bent by gravitational lenses has yielded maps of where the mass lies in the galaxy clusters causing the lensing. Most of the mass, as expected, is dark matter, not the stars and gas of which galaxy clusters are made. The dark matter was found to be clumped somewhat, exactly agreeing with the predictions of the concordance model of dark matter. That model was developed by computer simulating the growth of the universe and trying different properties for the dark matter until the end result of the simulation matched the pattern of structure that is observed in the universe today.

Structure of the universe - A team of astronomers has analyzed the distribution of galaxies found in the 2-degree Field Galaxy Redshift Survey (2dFGRS), taken with the 4-meter Anglo-Australian telescope, and the power spectrum of the galaxy distribution matches the power spectrum of the cosmic microwave background (CMB) found by the WMAP satellite. This shows that the present distribution of galaxies could have grown out of the ripples in the CMB, a relic of vibrations in the hot material soon after the Big Bang. This is the first observational evidence that links the present structure with the early structure of the universe. The distribution of galaxies was also found to be consistent with ordinary matter (protons and neutrons) comprising only a small fraction of all matter, and consistent with dark energy, a repulsive force speeding up the expansion of the universe. Astronomers are planning a survey similar to the 2dFGRS, but with more distant galaxies to try to shed light on what the non-ordinary (dark) matter is.

Spitzer (infrared space telescope) imaged the dust disk around the star Vega. The dust is being blown out by the intense light of the star, so the disk must be a temporary phenomenon, probably formed within the last million years. Calculations show that it would take a collision of a Pluto-sized body to create this much dust. The majority of dust is very fine particles, about 100 times smaller than sand grains. The disk is larger than seen before with less sensitive telescopes, about 40 times the diameter of our solar system. There is a hole in the disk twice as big as Pluto's orbit. It is thought that the collision that formed the dust occurred at about this radius, and the hole was left when the collisional dust was pushed outward by the starlight.

XMM-Newton (X-ray observatory) for the first time has tracked clumps of matter (by tracking their Doppler shift) circling a supermassive black hole, yielding the orbital period, allowing calculating the mass of the black hole. The clumps were traveling 20,000 miles per second, orbiting the black hole in only 27 hours, in an orbit about the size of Jupiter's about the Sun. The galaxy containing the black hole is known as Markarian 766 and is located in Coma Berenices at a distance of about 170 million light-years. The black hole's mass is that of a few million Suns.

Frame dragging - A team of astronomers using the Rossi X-ray observatory found changes in the strength of X-ray light emitted by gas circling a black hole that is most likely caused by the rotation of the black hole dragging space time with its rotation. This phenomenon is known as frame dragging, and is predicted by General Relativity. Frame dragging has been measured only once before. The observations also showed the light red-shifted from climbing against the gravity of the black hole, another prediction of General Relativity, but this effect has often been observed before.

Black holes – The Chandra X-ray observatory has found 4 X-ray sources within 3 light-years of the center of our Milky Way galaxy whose X-ray characteristics make them most likely stellar-sized black holes. Since only a very small percentage of black holes are believed to be X-ray active at any given time, finding these 4 implies that there are thousands of such black holes quite close to the center of our galaxy. Theory has predicted that stellar-sized black holes should spiral inward toward the center of the galaxy over long periods of time, but until now, no such concentration of the black holes had been found.

Mars Rovers Spirit and Opportunity celebrated a year of exploring Mars in January, and show no signs that they might fail soon. The next Mars mission, an orbiter, will launch in August. In December Spirit found a completely new type of rock in Columbia Hills, unlike anything seen before on Mars. Rocks named Wishstone and Wishing Well

have jumbled textures and look like the product of an explosion, perhaps from a volcano or meteorite impact. They are much richer in phosphorus than any other known Martian rocks.

Opportunity visited its heat shield, which hit the ground about a mile from where the rover touched down. It created a new crater, and the impact turned the shield inside out. Then the rover headed for nearby etched terrain, an area resembling Earth's eroded badlands.

The **Helix Nebula** was named after the 3-dimensional geometrical figure the helix, shaped like a coil spring or coiled snake. A recent study of the speed and direction of material flow made with the Hubble Space Telescope (HST) and the 4-meter telescope in Chile showed that it has a more complex shape than a helix. It is a pair of perpendicular disks, one hollow, the other filled. The filled disk is smaller and was ejected from the dying star in the center of the nebula about 6600 years ago, and the other disk was ejected 12,000 years ago. The older disk is slamming into surrounding gas as it expands, and so is glowing brighter. Theorists are at a loss to explain the shape, but are suggesting that it might be explainable if the central star is a double star.

Instant AstroSpace Updates:

Deep Impact was launched January 12, scheduled to collide at 23,000 mph with Comet Tempel 1 on July 4 to see what is inside a comet. The spacecraft almost immediately measured a temperature too hot, which threw it into safe mode, but controllers were able to restore it to full operation.

In support of the Cassini mission orbiting Saturn, the Keck 2 and Gemini telescopes in Hawaii have been imaging Saturn's moon **Titan** with their adaptive optics systems that allow detail to be seen. Results show many mid-latitude storms on Titan that occurred at times when Cassini was not passing Titan; on the spacecraft's first passes by Titan it had seen only polar storms.

The European **Mars Express** orbiter has taken images of 5 Martian volcanoes, and eruptions from them have been age-dated as recent as 2 million years ago, contrary to some theories that held all Martian volcano activity ended billions of years ago. Some scientists now believe a Martian volcano could erupt in the future.

About 80% of **planetary nebulas** have non-spherical shapes, and various suggestions have been theorized to explain this: centrifugal effects of rotation, a companion star, or magnetic fields. A survey of a few central stars of non-spherical planetaries made by a spectrograph on the Very Large Telescope in Chile has found magnetic fields 1000 times as strong as the Sun's, supporting the magnetic theory.

New techniques for measuring the temperatures of molecules in stars, combined with the latest distance measurements of stars, have allowed the calculation of the diameters of red giant stars. Applying the techniques to 74 selected **red giants** resulted in 3 of them having the largest diameters known for stars, more than double that found for Betelgeuse by previous methods.

Observations of objects in the galaxy NGC 541 using the Very Large Array radiotelescope, and computer simulations of jets, showed that **jets from a black hole** can collide with a gas cloud and cause the cloud to collapse and form new stars.

Astronomers using the Byrd Green Bank radiotelescope in West Virginia observed the globular cluster Terzan 5 and found 21 previously unknown **pulsars**, including 13 in binary systems, 2 eclipsing binaries, the 4 fastest pulsar known in any globular, and 2 rotating at nearly 600 times per second.

Astronomers using the Gemini South 8-meter telescope in Chile have imaged the dust disk around the star Beta Pictoris and found a concentration of very fine dust that was probably created within the last 100 years by a **collision** of planet-sized bodies in the process of forming.

The Very Large Array radiotelescope has imaged the dwarf irregular galaxy UGC 5288 and found a huge **disk of hydrogen gas** rotating about it, which shows no signs of having been disturbed by star formation or by encounters with other galaxies. So the disk may be pristine gas left over from the time of the galaxy's formation.

NASA chose the instruments to go on the **Lunar Reconnaissance Orbiter**, to go to the Moon in 2008: laser altimeter, wide angle and narrow angle camera, neutron detector, temperature radiometer, far ultraviolet hydrogen mapper, and measurement of cosmic ray effects.

The planners of the **Advanced Technology Solar Telescope**, a 4-meter solar telescope that will operate in ultraviolet, infrared and visible light, and employ adaptive optics, has selected Haleakala, Maui, as the site. Completion is scheduled for 2012.

(continued from page 3)

That's a snapshot view of how several significant problems were taken care of recently through the efforts of a wonderful and capable bunch of folks. This is essentially how most problems we've had over the last couple years have been handled – my role has mainly been to get the word of a particular situation out to the appropriate people, who have willingly volunteered to do what needed to be done to take care of it (and many times they'd just take care of a problem when they saw it). These volunteers all have a lot of other responsibilities in their lives, sometimes causing more delays before a job could be finished than we'd like in a perfect world, but working with them in resolving whatever has come up has been such a pleasure that I think I'm now totally spoiled when it comes to dealing with similar problems in the "real world" outside of OCA.

Of course, the people mentioned in this account are only a few of the folks whose efforts have kept the club going in the last couple years and whose work has helped make my job pretty easy. It would be impossible to give a complete account here of everyone and what they've done – and, if I tried, I'd inevitably forget someone and feel terrible about it forever after. If you look at the Contacts list on the back of the Sirius Astronomer or on the website, look at the people who've served on the Board, look at the people who've been mentioned in past President's Messages – that'll give you an idea. Don Lynn and Gary Schones do deserve specific mention, however, as they are the ones who do the vast bulk of the construction and repair work out at Anza and I don't know how we would manage without their help (Don doesn't limit his helpful activities to Anza, as he showed by stepping in on minimal notice to fill in for "What's Up" at the January meeting).

In Conclusion…

I do have a motive here beyond roving a bit down memory lane. I've found being on the Board and serving as president to be immensely rewarding experiences that I'd like to see other members share. Sometimes people think that the formal leadership of a club like ours really isn't that important, or that serving on it is incredibly onerous and to be avoided. As I've tried to show you in my various accounts of the Board and its activities over the years, including this one, ours is a very hands-on Board that has the serious task of running the club and whose decisions can have a direct affect on every member, but serving on the Board is far from grim or excruciating. In fact, doing any of the wide variety of things that Board members can choose to do for the club while they are in office can give a real sense of accomplishment and satisfaction, and doing them is often just plain fun.

A disproportionate share of the actual work that's needed to keep this club going is done by current and past Board members (Don Lynn and Jim Benet are two who come to mind in the "past Board member" category), and the episode I described above is typical that way. I have no reason to think that the 2005 Board will be any different in that respect from the Boards I've served on in the last four years. Since I'm not running for the 2005 Board, I can be reasonably dispassionate in asking you to please pay particular attention to what Board members do in the coming year to help keep the club viable and growing, and let them know that you notice and appreciate what they are doing. Everyone can use an "Attaboy" now and then, and Board members are no exception.

In closing, I'd like to say to all of you club members who entrusted me with the management of the club these last two years – thank you for your trust, and for the honor and the incredible experience of serving as your president.

And to all of you past and current Board members, coordinators, and other volunteers who have done so much for the club over the years and who did so much that made my job as president a pleasure, you have my very deepest gratitude. As one of my last official acts as president, I claim the honor of thanking you all on behalf of the club for everything that you've done and continue to do: On behalf of the club, thank you!

For Sale (all in like new condition)

Meade LX 200 8" SC Telescope with Telrad and spotter scope.
Televue 16mm Nagler type II eyepiece
Televue 22mm Panoptic eyepiece
Mead Series 4000 26mm eyepiece
Mead Series 4000 9mm Iluminated Reticle eyepiece
Parks GS-5 15mm eyepiece
Mead 4000 #140 Achromatic Barlow 1.25"
Mead Off axis guider
Mead 4000 f 6.3 Focal Reducer / Flattener
Mead Variable Proj. Tele-Extender
Parks ALP SC rear cell Broadband filter
Lumicon UHC 1.25" filter
Lumicon Oxigen III 1.25" filter

All for $1800.00, Please serious inquiries only. (951) 924-6652

For Sale: 13.1 inch f/4.5 Coulter (red tube) Dob sonian w/ Lumicon 11/4-2inch focuser and Telrad finder and eyepiece, $400. Val Akins 949-855-9018

For Sale: Canon EOS Rebel G, Excellent condition only a few years old. Camera body only. - $100 o.b.o., Please call Bill Johnson at 714-553-5793 or e-mail at home@byjohnson.com

For Sale: Coronado MaxScope 40, perfect condition, $1300. Gerald Strong 714-538-2517

For Sale: 2 Discovery mirrors, 6" F/5 (new coating) and 6" F/8 (coated last year). Unblemished, in excellent condition, aluminized and quartz overcoated. $40 each. Contact Bill Hepner at 714-447-8566 or billhepner@yahoo.com

PADFOR SALE: Anza site, 10 Pad Alley, second pad from west. Contact James Tarleton at 951-314-9217

Don't Forget !
Bring In Your Items for the OCA Auction!

Everyone in the club has some unwanted items that they don't use at home or at the office that are too valuable to throw away, so they just get stored forever!

We are asking you to clean out your closets, dust off these items and donate them to OCA .

We will turn these items into cash by putting them in eBay auctions. There are over 800 members in OCA. Our goal is to just get one good item to auction from each member. If you would like to donate more, that,s wonderful!

We need your help!

The key to the OCA auction is the quality of the items you donate. You get a tax deduction on anything you donate to OCA. The more the item is worth the better the deduction you get and the more money OCA gets for the needed ANZA repairs

Some Suggested Types Of Items

Antiques • Business & Industrial Equipment • Cameras & Accessories • Cars & Accessories
Clothing, Shoes & Accessories • Collectibles • Computers & Networking • Electronics
Jewelry • Memorabilia • Musical Instruments • Sporting Goods • Sports Memorabilia
Hobbies • Video Games • Astronomy

We will collect your items at the general meetings. If you can't come to the meetings or if you have trouble getting your items here because they are too large you can make arrangements to have them picked up.

If you have any questions concerning this OCA eBay fundraiser we ask that you email
Wendy Adams at wadams@clearpointadv.com
Please putOCA eBay in the subject line.

To setup a pickup time call Larry McManus at Clearpoint.

714 731 5542

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The Newsletter of the Orange County Astronomers

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