



A hearty band of OCA members sets up for this year's Messier Marathon held on March 12th. Although fog ended the campaign early, many observers had a great deal of success, observing as many as 72 objects before midnight! If you didn't make it this year, there's always next year--and these great objects can always be found if you know when to look! (photo courtesy Ray Stann)

OCA CLUB MEETING

The free and open club meeting will be held Friday, April 8th 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 David F. Coppedge, Team Lead System Administrator, Cassini Mission to Saturn, who will share the thrill and the latest and greatest hits of the Cassini mission to Saturn.

STAR PARTIES

The Black Star Canyon site will be open this month on April 2nd. The Anza site will be open April 9th. Members are encouraged to check the website calendar, for the latest updates on star parties and other events.

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

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

COMING UP

The next session of the Beginners Class will be held on Friday, April 1st (and next month on May 6th) at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.

GOTO SIG: June 6th

Astro-Imagers SIG: Apr. 19th, May 17th

EOA SIG: Apr. 25th, May 23rd

Astrophysics SIG: Apr. 15th, May 20th

Dark Sky Group (new!): TBA (contact coordinator for details)

President's Message

Dave Radosevich

Welcome to the April edition of the Sirius Astronomer.

Messier Marathon:

March has turned out to be a busy time at Anza. On the March star party, we hosted the Messier Marathon, during which many of you folks came out to observe. Our sky started out great with 100% visibility, which turned to 0% by midnight! Oh well, that's March for you. If you go by the list, we should have folks with as many as 72 possible Messier objects up to midnight. So if you got 72, you did pretty well. All and all, it was a great turn out and thanks to all who participated. During the April meeting, we will hand out the certificates and a "special prize" for the most imaged/photographed Messiers visible that night. Bring your photos for all to see.

Anza Notes:

The March star party also brought some much-needed work. Weather permitted clean up in the lower pads area, which was a great start. Thanks to Bob Buchheim, Don Lynn, Dan Bonus, and an OCA member whose name escapes me (sorry!) I donated the truck and trailer for hauling which took one load to the dump. We still need plenty of material loaded up and hauled to the dump, so please continue to step up and help. Don Lynn also worked on the South Wall of the Kuhn observatory roof. Tiles needed replacing and Don spent an afternoon repairing it. Don also worked on our water system, which seems to always need tweaking. Vance Tyree has started the Broadband repairs/upgrades. He will be replacing the Cat5 cables with Optical lines for greater reliance and speed. These efforts will make our Anza site more resistant to the harsh conditions our broadband faces. Many Many thanks to all these individuals for their continued support!

Anza House Coordinator:

We have a new Anza house coordinator. Welcome Timothy Hunt who has stepped up to the plate and signed up to help keep the Anza house patron ready. He replaces Larry Carr and (temp) Barbara Toy. Many thanks to Larry and Barbara for past upkeep of this valuable resource. If you use the Anza House and notice issues or supply shortages please contact Timothy at: 'hunt_Timothy@msn.com'.

Pad Licensees:

Correction to the March Presidents Message: As pointed out by our resident attorney (and I wont mention Barbara's name) I called out to "Pad and Observatory Owners". What it should have read was "Pad and Observatory **licensees**". Please excuse the slip-up. Now that that's out of the way - To all pad **licensees** - Last year a letter was sent out regarding the maintenance and upkeep of your pad / observatory area. Now that the weather is warming up, this is just a friendly reminder that you have until May 31st before the board steps in and takes action. This date is less than two months away! We are really serious about this issue and it will be important to all of us that you comply. Trailers will also need to be moved prior to May 31st.

Scenic Highway:

Anza has seen its 100-year flood this year and while this played havoc to our roads, it will still make for a scenic drive. There will be some time by this publication to go out towards Anza and see the wildflowers. This year is very promising. In April, you may need to go to higher elevations but it will be worth it! Take 371 up towards Anza, then take 74 towards Lake Hemet. This will take you thru Garner Valley. Take a camera and picnic lunch and enjoy. By mid-April it could be over, so don't delay.

Astronomy Day 2005:

National Astronomy Day this year is Saturday April 16th. Check our website for updates regarding OCA Activities. www.ocastronomers.org

RTMC 2005:

We are in need of an OCA volunteer for this years RTMC. If you are looking for a weekend in the mountains- hanging out with 2000+ astronomers (some professional and some NOT!), then contact me. We need a volunteer to help set up a booth promoting our club and selling books and things. It helps if you have a truck or large vehicle to transport materials to RTMC. Other members will provide some help in transport but we need a Booth Coordinator! Contact me @ Dave.Radosevich@ngc.com for more info.

Last General Notes:

Our general meetings continue to be lengthy and some changes are coming. One of our fundraisers is during the meeting break. We rely on donut sales to fund a service during the break and your patronage is appreciated. Donut sales are falling and

AROUND OCA

By Barbara Toy

Starting off this month with something a little different than our usual fare...

Astronomy and the Lewis and Clark Expedition

I've been thinking quite a bit about Lewis and Clark – mainly because of a CD I've listened to so many times on my way to and from Anza (and other places) that I've lost count, that was put together to commemorate the bicentennial of their famous expedition. One song starts:

*The river sorely tested us that spring of 1804
When we set out to explore Louisiana...*

I don't know why that drove the date home, but – 1804! Cosmically speaking, only the blink of an eye, but what a different world they had! Jefferson was president, California was part of Mexico, our Gold Rush was still 45 years in the future, and the United States was just beginning its westward expansion with the Louisiana Purchase. In Europe, France made Napoleon its emperor, and he was pursuing his own expansion plans. In astronomical circles, William Herschel had just published his third list of nebulae, and had shown that some double stars were true binaries that orbited each other, not just visual binaries that happened to be along the same line of sight. Frederick Wilhelm Bessel was calculating the orbit of Halley's comet using observations made by Thomas Herriot two hundred years before, and William Wollaston had just noted the existence of dark lines in the solar spectrum, though nobody yet had any idea what they meant. 1804 also saw the discovery of the third and fourth known asteroids (Juno and Vesta; the first two were Ceres in 1801 and Pallas in 1802).

Artificial lighting of the time was by flame – candles, oil lamps and lanterns of various types, and wood or coal fires were still the main sources of light when the sun or moon weren't available. Experiments had started on lights fueled by coal gas, but true gas lights were still several years away. Night skies over the cities of the time might have been smoky, but were still very dark. And the night skies over the Lewis and Clark expedition must have been darker still – when they weren't clouded over or filled with moonlight, of course. So, naturally, the historically-minded astronomer wonders about what astronomy they might have done on that expedition of discovery...

Meriweather Lewis bought a six inch long telescope in Philadelphia among his other supplies, about the length of finderscopes on many modern amateur telescopes. He also had at least one that was 15 inches long, which would still be a pretty short telescope. Unfortunately, I couldn't find any direct information about the apertures, even though there's a 15-inch telescope from the expedition at the Athenaeum in Philadelphia. One refractor from that era with a 3-inch primary is 35 inches long, and another with a 4-inch primary has a 60-inch focal length (see <http://www.antiquetelescopes.org/19thc.html> and the Kenyon College site given below). These imply that a 15-inch tube had a correspondingly smaller primary – "fast" short-tube refractors are a more modern phenomenon. As additional comparisons, I have a 3-inch refractor with a 31-inch tube, and the finder for my ETX is four inches long with a 1-inch aperture – overall, the indications are that the expedition's telescopes were of pretty small aperture, most likely one to two inches. There are also references to the expedition using "spyglasses," one of which was carried by Captain Clark and used to scan terrestrial objects, including parties encountered along the way – again, most likely of pretty small aperture. I've found no descriptions of the optical qualities of their telescopes, even of the surviving telescope at the Athenaeum, but, even if their optical equipment wasn't of the size or quality we would expect to see at a modern star party, they clearly did have a number of telescopes of various types along with them.

Sadly, if anyone used the telescopes for astronomical viewing beyond the navigational requirements of the expedition, it doesn't seem to be recorded in the expedition journals (though there's a description of Northern Lights observed on the night of November 5, 1804, from Fort Mondan). Lewis received training in astronomy and navigation in preparation for the trip, and did use the sun, moon and stars regularly to determine their location, using the same techniques more often used at sea. This was by Jefferson's specific directive, so they would have a better record of the locations of important points they found along the way than if they made their maps based only on their observations of the terrain without celestial references. To make the necessary readings, Lewis brought along a number of specialized pieces of equipment, in addition to the telescopes – a quadrant, a sextant, an octant, a surveying compass, artificial horizons and a chronometer – and took frequent readings to determine the expedition's latitude and longitude.

Latitude was the easier of the two measurements, as it was read off of the position of the sun using the sextant or octant, but properly measuring longitude required an accurate chronometer to provide Greenwich time, which was a problem. As a check on the local time, they used a technique of measuring the altitude of the sun when it was at equal distances on either side of

in jeopardy of being discontinued. EAT Donuts!! It's way cheaper than the after meeting meeting at Hoff's Hut! Also, TRASH-TRASH-TRASH is becoming a real problem in the Irvine Hall. Not sure if we are the culprit but we need to clean up after ourselves. We would hate to lose this great facility over something like TRASH.

Credit where credit is due:

The March SA showed a real nice picture of the Kuhn Telescope with Orion serving as background stars. OCA member Larry Adkins took this photo of the Kuhn. Larry has been using his new toy camera (Canon Digital Rebel) with great results. See Larry's image album on the website for more great pictures.

Thanks for reading and see you at Anza and the April meeting!

Dave Radosevich
OCA President

the meridian, noting the times, and averaging to get the time for local noon. They also used the angular distances from the moon to planets and stars to determine the timing of certain events or configurations according to the tables in the *Nautical Almanac and Astronomical Ephemeris* along with proportional logarithms given in Maskelyne's *Requisite Tables* for times not shown in the Almanac; the difference between the time per the Almanac and their local time would give their longitude. These were exercises that took a lot of computation after they got the actual readings – it seems that this is one aspect of pulling information out of astronomical observations that hasn't changed much in 200 years. Unfortunately, for a number of reasons (including atmospheric refraction, changes in the equipment with temperature and moisture levels as well as wear and breakage, problems with the chronometer, and inaccuracies in the tables), most of the readings that Lewis and his assistants got were not accurate enough to give pinpoint locations (several were miles off), but they were precise enough that most of the locations could be identified by people looking for them later, so they did serve their purpose.

There's nothing like a big anniversary to turn people's attention to particular events, and we're right in the middle of the bicentennial of the Lewis and Clark expedition (which took place from 1804 to 1806). If you're interested in any aspect of the expedition, there are lot of different sites available on the Internet to help you out. I'm particularly indebted to *Discovering Lewis and Clark*, <http://www.lewis-clark.org/>, *Lewis and Clark Historical Articles* from the Bureau of Land Management, <http://www.id.blm.gov/lc/>, the Philadelphia Chapter of the Lewis and Clark Trail Heritage Foundation, <http://www.lewisandclarkphila.org/>, the Lewis and Clark Internet Archive, <http://www.lcarchive.org/>, and *American Journeys*, a digitized collection of original documents from America's early days, including the full published journals from the Lewis and Clark expedition (<http://www.americanjourneys.org>). Another useful site, though not specifically on Lewis and Clark, is at <http://www.answers.com/>, which has all kinds of interesting information, such as what was happening when. Kenyon College has a lot of pictures about equipment used in the early days of physics on its site, including optical equipment; see <http://physics.kenyon.edu/EarlyApparatus>; the part of the site on telescopes is <http://physics.kenyon.edu/EarlyApparatus/Optics/Telescope/Telescope.html>, which – for those interested in true classics – includes pictures of several different Clark telescopes. And the album I started off with is "*Most Perfect Harmony*," *Lewis and Clark: A Musical Journey* by the Discovery String Band, a great sing-along album for those long trips out to the dark site of your choice.

[Thus endeth the educational portion of this column. For further educational content, you might want to check out Don Lynn's AstroSpace Update...]

Turning to more current matters...

The 2005 Messier Marathon and Clean-up Day

Every year's Messier Marathon seems to have its own twist, and this year's was no exception. Those who were out at Anza the night before the Marathon, which was the night of the March general meeting, have told me (some with – from my perspective, anyway – unnecessary glee) that it was a wonderful night out there, and there have been pictures posted to the website from that night that support their claim. I haven't attempted a head-count, but it seems that there were a lot of people enjoying Anza that Friday night – which explains why certain familiar faces weren't at the meeting (for all of you who missed it, Dr. Millis, Director of the Lowell Observatory, gave us an excellent talk on the observatory itself, its research, and the 4.2 meter state-of-the-art telescope that they are currently constructing).

I know from personal observation that we had an excellent turnout for the star party itself, and I'm told that the hardy folks who helped with the Anza site and Anza House clean-up made good headway on what needed cleaning/clearing up. Alas, I can only report what I'm told about that – I wasn't able to get to Anza myself until almost dark. But, as I was driving up to the

ASTROSPACE UPDATE

April 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) has been observing aurora on Saturn along the Hubble Space Telescope, which has yielded a number of discoveries. Saturn auroras can last for days, much longer than those on Earth, but not essentially permanent like on Jupiter. Like earthly auroras, those at Saturn occur as a ring around the magnetic poles of the planet. But the ring on Saturn shrinks in diameter after it forms, while the ring on Earth expands. Sometimes Saturn's ring is actually a spiral rather than a single complete ring. Saturn auroras become brighter near the day-night boundary, unlike either Earth or Jupiter. Sometimes Saturn auroras sit still while the planet rotates under them, as earthly auroras do, but other times they move with the rotation, like Jupiter's auroras do. On Earth, auroras occur when the magnetic field in the solar wind cancels the Earth's field, allowing charged particles to enter the magnetosphere. But at Saturn the magnetic field in the solar wind has little effect on when auroras occur, but the pressure of the solar wind does affect Saturn auroras. Radio waves given off by Saturn auroras resemble those on Earth, so the physics that creates the radio waves is probably the same.

Cassini's **radar** discovered a crater the size of Iowa on Saturn's moon Titan. Previous areas of Titan studies are nearly free of craters, indicating that the moon has been resurfaced recently enough (geologically recent) to have covered up nearly all the impact craters that had to have formed earlier in its history. Channels appear to flow into the giant crater, and were probably formed by methane rain. The infrared imager took detailed pictures of the same area as seen in radar; the previous 2 passes have imaged different areas than radar. Also seen in the radar images is an area of parallel linear features that are being nicknamed "cat scratches". They may have been formed by wind, but more study is needed to be sure.

Cassini has measured the **mass of** some small **moons**, and found that they must be rubble piles, with large voids within, in order to have that little mass. The mass was measured by observing the density waves in rings that were induced by the moons' gravity. A new moon was found, only about 3 miles across, that shares the same orbit as the large moon Dione, but staying 60 degrees away. This is the same effect that keeps the Trojan asteroids in Jupiter's orbit, but 60 degrees away. The new moon has been named Polydeuces. Saturn is the only planet known to have such "Trojan" moons, and there are 4 of them now known.

The orbit of the moon **Pan**, which orbits within the A ring, has been measured more precisely, and found to be slightly inclined and slightly eccentric (non-circular). This indicates that gravitational interaction with ring material is causing the inclination and eccentricity. This effect should also take place when planets are forming within a disk of dust and gas, and may explain why planets' orbits are slightly inclined and eccentric. A ring has been discovered exactly in Pan's orbit. Somehow the ring particles manage to avoid colliding with Pan, or otherwise the ring would long ago have disappeared.

Many new **rings** have been found by Cassini, some quite clumpy, and some within known gaps. The rings within gaps and the clumps are thought to be caused by moons orbiting nearby, so searches will be made for such moons. A number of spikes of material protruding from the edges of rings have been found, similar to those known to be formed by gravitational effects of the moon Prometheus passing near rings. Possible moons causing the spikes will be searched for. Some of the clumps in rings have a rope-like appearance, and definitely form in the wake of passing moons.

Ionized molecules of **oxygen** were found above the ring plane. Apparently there is some process (probably driven by sunlight) that breaks down the water ice molecules of the rings and then recombines oxygen atoms into oxygen molecules. This would make a second known process (life is the other) that produces large quantities of oxygen molecules. This will have to be taken into account in the planned future missions that will look for oxygen at extrasolar planets as a sign of possible life.

A huge storm, dubbed the Dragon Storm, has been found in a region of Saturn's southern hemisphere, that is a source of bursts of radio waves. The bursts stop while the storm is in sunlight, which is yet to be explained. The storm may be lasting so long because it may be absorbing heat energy from deep within the planet, since the Sun's energy is not thought to be strong enough at Saturn to sustain storms for long periods. Other smaller storms have been observed to merge into larger storms, and yet others to split off from larger storms. Cassini will continue observing Saturn **storms** for a few more years to better understand them.

A close pass by the moon **Enceladus** has produced images with the best resolution ever. This moon has the most reflective surface in the solar system, apparently due to a coating of quite clean water ice. The new images show large areas free of craters, a 7-mile wide band of chevron-shaped features, and a fresh-looking crevasse system with fractures more than 6/10 mile wide. The crevasse system cuts across a complex of older faults. The spectrometer found no compounds other than water ice on this pass. Scientists had expected to detect ammonium compounds and carbon dioxide. Possibly the most intriguing features are a series of small (400-2500 feet across) dark spots, which in many places are aligned in chains parallel to fractures. Some linear features are slightly different color than the surrounding surface. This may indicate different formation mechanism or different ages.

Because the **clouds** on Saturn are generally a light yellowish color, scientists were surprised to find that cloudless areas pictured by Cassini show that the planet's sky is blue, like Earth's. The composition is completely different – mostly hydrogen rather than nitrogen and oxygen – even though the resulting color is the same. Cassini has been able to image the blue skies only in the northern hemisphere, and it is not yet known why. The southern hemisphere may be cloudier or have higher clouds or have some other reason why no blue sky can be found.

Saturn's magnetosphere was found to differ from that of the Earth in that it has 3 more kinds of plasma (charged particles) sources, the various kinds of plasma interact both chemically and electromagnetically, and the plasma particles coat the surfaces of the icy moons and rings. One of the sources of plasma is that sunlight hitting the icy moons knock atoms loose from the surface and ionize (electrically charge) them. Like the Earth's, Saturn's inner magnetosphere rotates with the planet, controlled by the magnetic field of the planet, but Saturn's rotating magnetosphere extends much farther out, to nearly a million miles.

To the members of the Orange County Astronomers,

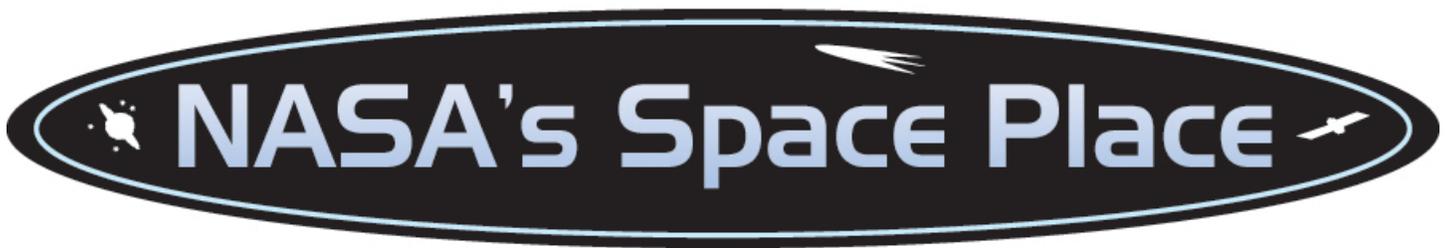
We are pleased to award you and your club the enclosed certificate of appreciation. As an active NASA Space Place astronomy club partner and by carrying our NASA column in your club newsletter or on your web page (or both), you facilitate science and technology education among club members and throughout your community. Through your public events, you not only educate, but you also inspire your audiences, both young and old. Through your use of hands-on activities and experiences for children, you play a key part in developing tomorrow's scientists.

Please accept this certificate of appreciation with our gratitude.

Sincerely yours,

The Space Place Team





Utterly Alien

by Dr. Tony Phillips

There's a planet in our solar system so cold that in winter its nitrogen atmosphere freezes and falls to the ground. The empty sky becomes perfectly clear, jet-black even at noontime. You can see thousands of stars. Not one twinkles.

The brightest star in the sky is the Sun, so distant and tiny you could eclipse it with the head of a pin. There's a moon, too, so *big* you couldn't blot it out with your entire hand. Together, moonlight and sunshine cast a twilight glow across the icy landscape revealing . . . what? twisted spires, craggy mountains, frozen volcanoes? No one knows, because no one has ever been to Pluto.

"Pluto is an alien world," says Alan Stern of the Southwest Research Institute in Colorado. "It's the only planet never visited or photographed by NASA space probes."

That's about to change. A robot-ship called New Horizons is scheduled to blast off for Pluto in January 2006. It's a long journey: More than 6 billion kilometers (about 3.7 billion miles). New Horizons won't arrive until 2015.

"I hope we get there before the atmosphere collapses," says Stern, the mission's principal investigator. Winter is coming, and while it's warm enough now for Pluto's air to float, it won't be for long. Imagine seeing a planet's atmosphere collapse. New Horizons might!

"This is a flyby mission," notes Stern. "Slowing the spacecraft down to *orbit* Pluto would burn more fuel than we can carry." New Horizons will glide past the planet furiously snapping pictures. "Our best images will resolve features the size of a house," Stern says. The cameras will also target Pluto's moon, Charon. Charon is more than half the size of Pluto, and the two circle one another only 19,200 kilometers (12,000 miles) apart. (For comparison, the Moon is 382,400 kilometers [239,000 miles] from Earth.) No wonder some astronomers call the pair a "double planet."

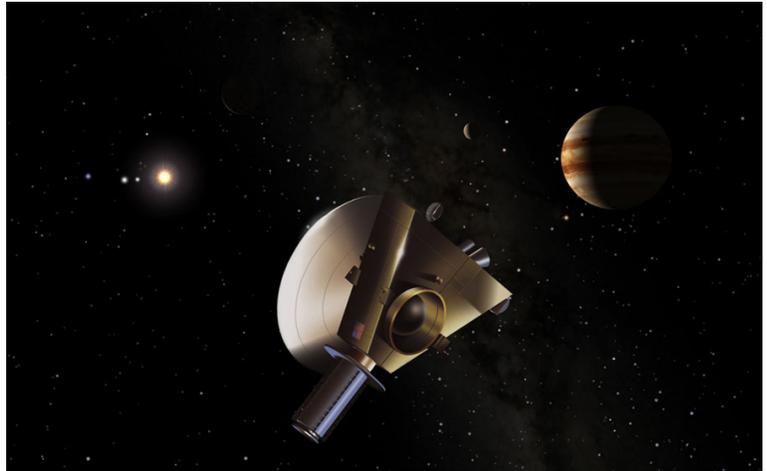
Researchers believe that Pluto and Charon were created billions of years ago by some terrific impact, which split a bigger planet into two smaller ones. This idea is supported by the fact that Pluto and Charon spin on their sides like sibling worlds knocked askew.

Yet there are some curious differences: Pluto is bright; Charon is darker. Pluto is covered with frozen nitrogen; Charon by frozen water. Pluto has an atmosphere; Charon might not. "These are things we plan to investigate," says Stern.

Two worlds. So alike, yet so different. So utterly alien. Stay tuned for New Horizons.

Find out more about the New Horizons mission at pluto.jhuapl.edu/. Kids can learn amazing facts about Pluto at spaceplace.nasa.gov/en/kids/pluto.

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



New Horizons spacecraft will get a gravity assist from Jupiter on its long journey to Pluto-Charon. Credit: Southwest Research Institute (Dan Durda)/Johns Hopkins University Applied Physics Laboratory (Ken Moscati).

24 prominent craters found in Cassini images of the moon **Phoebe** have been named. The theme for Phoebe feature names has been chosen as the Argonauts, explorers in Greek mythology.

Titan's atmosphere – It is not clear why Titan has a thick atmosphere of mostly nitrogen while no other moon has any substantial atmosphere. It appears that moons do not have enough gravity to hold an atmosphere for billions of years. A new theory, which fits data from the Huygens and Cassini spacecraft, says that the nitrogen is being continuously replaced as fast as it is lost. The replenishing comes from the chemical breakdown of ammonia, massive amounts of which are theorized to lie in a water-ammonia liquid layer beneath the frozen surface of Titan. Parts of this layer would occasionally be thrust onto the surface by volcanic activity, which would explain why the expected impact craters on Titan have been almost all covered over. Features like lava flows, but made of icy materials, have been imaged by the Cassini radar. A subsurface liquid layer would tend to make Titan's orbit eccentric rather than circular, which indeed it is. More observation and study will have to be done to see if this theory holds up.

Dark matter galaxy – A team of astronomers using radiotelescopes has found a large mass (about 100 million times the Sun) rotating like a galaxy, but without detectable stars. It is in the Virgo cluster of galaxies, about 50 million light-years away. Follow-up observations have ruled out the possibility that it was a remnant thrown off from a collision of galaxies, leaving only the possibility that it formed like a galaxy, but just didn't form any stars.

Galaxy clusters – A very deep image of one square degree of sky was taken by the 8-meter Subaru Telescope in Hawaii, and the same area is being imaged by various telescopes at many wavelengths. In this image is a cluster of 6 galaxies so distant that the light left there only 1 billion years after the Big Bang, and so is the earliest known galaxy cluster. This contradicts the theory that says individual galaxies formed first, then clustered by gravity. The cluster differed from typical modern galaxy clusters in that it has far fewer members, totals about 100 times less mass, and is forming new stars much faster.

Spitzer (infrared space telescope) has discovered a population of very bright galaxies (as bright as 10 trillion Suns) that were completely hidden in visible light by dust. These are the brightest galaxies known. The infrared light from these galaxies left there 11 billion years ago, since they are so distant from us. The galaxies were found by comparing thousands of galaxies seen in long exposures in infrared with long exposures of the same regions in visible light, in an effort to find objects hidden in visible light. 31 hidden galaxies were found. Spectrographic follow-up observations discovered silicate dust in the majority of these hidden galaxies. This was surprising because it was thought that it would take longer after the first galaxies formed for them to build up substantial amounts of silicate dust. This means that rocky planets, made in part of silicate dust, might have formed earlier in the history of the Universe than previously thought.

Brightest flash – A flash lasting 1/10 second was seen in various wavelengths, particularly gamma rays and radio waves, that was the brightest flash ever seen from outside our solar system, brighter than the full moon. It even disturbed the Earth's ionosphere. It was given off by a known magnetar, a neutron star with an extremely strong magnetic field. Radio telescopes detected material ejected from the magnetar with a velocity nearly a third the speed of light. This magnetar is a soft gamma repeater, a rare class of star that flares up occasionally, but this flash was roughly a billion times brighter than such flares. It is believed that the flash was produced by magnetic reconnection, the same process that creates solar flares, but the Sun's flares are on a far smaller scale.

XMM-Newton (X-ray telescope) has studied a protostar, that is, a star still being formed from a collapsing gas cloud, since X-rays should penetrate the dust that surrounds such protostars. It found far more very hot gas giving off X-rays than theory says should occur this early in the life of the star. Theory predicts less than a tenth that much gas could have been heated by gravity this quickly. The best guess is that a magnetic process is heating the gas. Adding magnetic effects should greatly speed up star formation from current theory, which depends only on gravity.

Chandra (X-ray telescope) has identified ions (charged atoms) crashing into Jupiter's atmosphere, creating auroras, and identified their source as the moon Io. The particles are believed to have been expelled from Io by volcanic activity. This source accounts for only some of Jupiter's auroras. The Earth's auroras are all caused by particles from the Sun.

Mars rover Spirit found a rock dubbed "Peace" that represents a new class of water-affected rock. It appears that it formed when ground up volcanic rocks, such as olivine, pyroxene and magnetite, were cemented together by magnesium-sulfate salts. The cementing process had to involve water, either percolating through with the salts dissolved, or to form acids that weathered magnesium rocks. Spirit also found a bright patch of soil (dubbed "Paso Robles") that its wheels had disturbed, and measured its composition, which had the highest salt content (iron sulfate salt) yet found on Mars. The rover reached a spot named Larry's Lookout, because it is the first point in the planned path that reaches the ridge leading up to Husband Hill, and so provided the first look into the next valley. A dust devil (dusty whirlwind) showed up in an image taken by Spirit. Dust devils have occasionally been seen in images of Mars taken from orbit, but this is the first time for either of the current Mars rovers.

Mars rover **Opportunity** set increasing Martian one-day driving records, the last being 582 feet. All long drives start with a route planned by spacecraft controllers, then continue with the rover taking images of the path ahead, analyzing them, and planning its own route around any possible obstacles. The rover is still heading for an area classified as "etched terrain", but stopping to take data on interesting rocks along the way.

It was recently discovered that the X-ray spectrometer heads had been switched between the 2 Mars **rovers** before launch, so all data from that instrument were reprocessed using the calibration for the other one. Fortunately, the heads were nearly identical, so only small shifts in amounts of elements resulted. No scientific conclusions were affected.

Mars Express (European Mars orbiter) has imaged an area of Mars that appears to be the fractured surface of a frozen sea, now covered in dust. The water that formed this sea appears to have erupted out of fractures about 5 million years ago, relatively recently geologically. This suggests that the liquid water that formed the many eroded channels on Mars may still today be capable of erupting to the surface, not just billions of years ago, as many scientists have thought.

Smallest Star – The OGLE survey has been monitoring vast numbers of stars for gravitational lensing events, but while they were observing they also looked for dips in brightness that would indicate a planet was passing in front of the star. The Very Large Telescope in Chile has been following up the planet candidates found by OGLE. By measuring the radial velocity of the star, the presence of a planet can be confirmed (or not), and the mass and diameter of the planet calculated. In several such cases, the mass of the "planet" turned out to be large enough that it was actually a star. This increases substantially the known stars smaller than 1/3 the mass of the Sun. One masquerading star had a diameter only 16% larger than Jupiter, the smallest known for a star. Astronomers are reworking their theories to explain how so massive an object can have such a small size. This discovery

also means that astronomers doing searches for planets by detecting their transits in front of stars will have to measure the masses to weed out the stars that at first detection appear to be planets.

Galaxy motion – Astronomers using the Very Long Baseline Array, a group of radiotelescopes spread across the Earth, have detected the motion across the sky of the Triangulum Galaxy, M33, the first detection of a galaxy's proper motion, other than that of Milky Way satellites. The speed is about 30 microarcseconds per year. Combining the motion across the sky with radial velocity (that toward or away from us) measured with spectrographs, the orbital motion of the galaxy with respect to the Milky Way can be calculated. Next the team will measure the motion of the Andromeda Galaxy, M31.

Planetary formation - A new theory has been developed as a result of computer simulation of forming planets. It is a modification of the gravitational instabilities theory, which claimed that material clumps at unstable regions in the disk of material surrounding a new star. The problem with the gravitational instabilities theory was that those unstable regions were so violent as to destroy planets every time they got started. The new simulations show that planets can form at the edges of the unstable areas and be out of the way of the destructive collisions.

Most distant galaxy cluster – Combined observations from the XMM-Newton X-ray telescope and the Very Large Telescope in Chile have found the most distant large cluster of galaxies known, so distant that the light left there over 9 billion years ago. So we are seeing the cluster as it was when the universe was less than 1/3 of its present age. It contains reddish elliptical galaxies, which are mature as galaxies go. It was not expected to find mature galaxies this early in the history of the universe. Large galaxy clusters contain large amounts of hot gas giving off X-rays, so searching for them in X-rays should be an efficient method, although this particular one was found in the background next to a nearby target studied by XMM-Newton. Redshift measurement using large Earth-based telescopes is the most reliable way to determine distance.

Radio burster – Astronomers who have been monitoring the center of our Milky Way galaxy in radio waves saw a series of 5 bursts of radio energy in late 2002. They were quite powerful, each about the same brightness, lasted 10 minutes and occurred every 77 minutes. Follow up searches in X-rays and radio waves have been unable to detect anything since at that location. The lack of X-rays rules out all known objects that could produce such a series of radio bursts. The conclusion announced recently is that this is a new phenomenon, possibly related to magnetars.

Instant AstroSpace Updates:

Scientists have measured the mass of the **black hole** at the center of the active galaxy NGC 4395 and found that it is less than a million Suns, about 100 times smaller than any other known black hole in an active galaxy (that is, one with a brilliant nucleus). The measurement was made by Doppler tracking gas clouds orbiting about the black hole.

Dr. Mike Griffin, director of space at Johns Hopkins University's Applied Physics Lab, has been nominated (yet to be confirmed by the Senate) to become the **head of NASA**, replacing Sean O'Keefe, who recently resigned. It remains to be seen how he will affect various NASA programs.

How dust collected into larger bodies to eventually form planets has been a problem of **planet formation** theory. An experiment done with ice-coated dust shows that the particles stick together well and grow quickly.

The Planetary Society has announced they will launch their **solar sail** in April. It is to be the first spacecraft ever propelled by the pressure of sunlight.

The European **Smart-1** technology test mission has been extended by a year to August 2006. This will allow nearly global coverage of its stereo and multi-angle mapping efforts as it orbits our Moon, and follow-up high-resolution images of interesting spots found.

The European **Cluster** mission has been extended by 4 years to the end of 2009. This will allow the simultaneous measuring of properties by the 4 spacecraft flying in formation to be extended to new regions inside and outside the Earth's magnetosphere.

The rare isotope sulfur-36 has been detected in a meteorite found in China, and the most likely explanation for this is that a **supernova** exploded in this vicinity just before the solar system formed, and it created radioactive chlorine-36 which decays into sulfur-36. This is the second isotope found (the first was an iron one) that implies a supernova just before the solar system formed.

The first samples of solar wind collected by **Genesis** have been released to university scientists after the NASA lab performed preliminary examination and reduction of contamination that occurred when the parachute failed and the spacecraft crashed into the Utah desert last September. These samples are on aluminum collectors and will be used to determine the concentration of noble gases (neon, argon, etc.) in the Sun.

NASA has selected the experiments to fly on the spacecraft **Space Technology 8**, to be launched in 2008: ultra-lightweight flexible solar arrays, ultra-light graphite mast (useful for future solar sails), miniature heat pipe (dissipates heat build-up in spacecraft), and fault-tolerant computer system that runs a spacecraft with very little human intervention. The spacecraft is part of a series to test new technologies for future use.

NASA has decided to fund the **IBEX** mission for launch in 2008, which will remotely image the termination shock where the solar wind collides with interstellar material, and also study galactic cosmic rays. It will not have to leave the vicinity of the Earth even though it is studying the boundaries of the solar system, which are far beyond Pluto's orbit.

NASA decided to fund a balloon test of advanced X-ray sensors before making the decision whether to build the proposed **NuSTAR** X-ray telescope. It is designed to detect much higher energy (shorter wavelength) X-rays than any existing X-ray telescopes, and so should be better at detecting black holes, jets and supernova debris.

A new detector (named ALFA) has been installed on the 1000-foot diameter **Arecibo** radiotelescope in Puerto Rico, and with it will begin a survey of much of the sky for radio galaxies and hydrogen gas. Unfortunately they tried to be too cute and call the survey ALFALFA.

observatory, I could see that the Football Field was full, and there was a lot of activity in all of the pad areas. Ray Stann took a great picture of what was going on at the Football Field at dusk, as people were preparing for a fun night of finding Messier objects, which should be on this page (or see <http://www.ocastronomers.org/astroimages/album.asp?ID=2579>).

And it *was* a great night for a Messier Marathon – until shortly after midnight, when the sky fogged over completely, very quickly. By then everything at ground level was wringing wet from dew – and then the heavy fog moved in. Some of us felt our way out over the dirt roads and headed home – I was one of those, and admit that I felt somewhat relieved when Jim Benet told me later that it was still very foggy when he woke up from a nap around 3:00, when he had hoped to get the late-night and pre-dawn objects. Bottom line – nobody who was doing the Marathon at Anza that night could have gotten all 110 objects. Leon Aslan was doing the photographic version of the Marathon, and – amazingly – managed to get images of 70 of them (see his montages of the images at <http://tinyurl.com/6x5mq>).

Fortunately, we can all try again next year...

The Club Archives

I'm sorry to report that Jon Bearscove, our club Archivist, was just transferred to Seattle. This is actually good news for him, as his family is up there, but it means that we're losing him as our Archivist. Fortunately, he's willing to continue as a long-distance consultant for the OCA Archive project – he's a professional archivist, so this will be very helpful.

Since this was originally my idea, and as I was working with Jon on it after he took on the job of Archivist, it's fitting that the club archive is back in my court, so to speak – and it *is* consistent with my Member Liaison activities. So, at least for now, I'll be the main contact and collector for the OCA Archive project. If anyone is interested in helping out with this, please let me know.

So, if any of you have any documents or artifacts of any sort from the club's past that you no longer want, please turn them over to me for the club archive! These could be back issues of the Sirius Astronomer, club flyers of different types, information sheets from different stages in the club's history, maps of past observing sites, programs and other documents from past conferences or other events the club has been involved in, past speaker information, minutes and agendas from past Board and other meetings, materials from various classes and other events the club has sponsored over the years, pictures, and anything else that has anything to do with the club and its activities, or even the individual activities of its members. As long as I've got my car with me, you can give them to me any time you see me – or, if you need to have something picked up or have any questions about any aspect of this, please email me at btoy@cox.net or phone me at 714/606-1825. I'm looking forward to seeing what all of you can come up with for this!

In Closing...

That album I mentioned earlier (which includes music from the early 1800's) has two accounts of a sad incident in 1761, when young Timothy Myrick was mowing his father's field and was bitten in the heel by "a p'zen serpent." The second (music hall inspired) version ends with these immortal lines:

*Now all you friends, a warning take,
Don't ever be bit by a rattler snake.
For if you do, I'm telling you,
Lot's of bad trouble you'll get into.*

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 Illuminated 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
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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) Dobsonian 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

For Sale: 8" Coulter (red tube) Dobsonian. The scope is in excellent condition and has only been used a handful of times. \$260.00. Contact Richard Passmore at (714) 558-7714 or RadMD80@aol.com

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 put OCA eBay in the subject line.

To setup a pickup time call Larry McManus at Clearpoint.

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