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This spectacular image of M33 was obtained by Stevan Hart from Hartbyte Observatory, Laguna Mountain, California on October 13, 2007.

OCA CLUB MEETING

The free and open club meeting will be held Friday, November 9th at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. The scheduled speaker is yet to be announced as of press time so be sure to check the website!

Next General Meeting: December 14th

STAR PARTIES

The Anza site will be open this month on November 6th. The Black Star Canyon site will be open again on November 3rd. 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, November 2nd (and next month on December 7th) at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.
GOTO SIG: TBA (contact coordinator for details)
Astrophysics SIG: Nov. 16th
Astro-Imagers SIG: Nov. 20th, Dec. 18th
EOA SIG: Nov. 28th, Dec. 26th
Dark Sky SIG: TBA (contact coordinator for details)

President's Message

By Barbara Toy

We're heading full-tilt into the (mercifully short) annual election season at OCA – so get your nominations in! If you want to run for a Trustee or officer position, you can be nominated at the November general meeting, or you can email Bob Buchheim (rbuchheim@earthlink.net) or me (btoy@cox.net) before the meeting and we will be happy to nominate you. The deadline for nominations for the 2008 Board is the November general meeting, and the ballot will be finalized shortly after that. We will be posting it for download from the website, and sending copies in the December issue of the Sirius Astronomer (not the January issue as in years past). Copies will also be available at the January meeting as usual, with envelopes, so you can cast your ballot at the meeting if you haven't already mailed it, even if you didn't remember to bring a copy with you to the meeting.

I'm happy to report that Bob Evans has agreed to run the election again, as he has for many years now. This includes authenticating the ballots and counting the votes, which can take a lot of time. We are very grateful that he is still willing to do this for us – as one of the current officers, I can assure you that it's a real comfort knowing that this will be handled with Bob's usual care and efficiency!

The full instructions for voting will be on the ballot, and you can vote by mailing your completed ballot to Bob Evans at the address on the ballot or by putting the completed ballot (in an envelope) in the ballot box at the January meeting. Please be sure to put your name on the outside of the envelope containing your ballot so Bob can verify that the ballot comes from a member in good standing and that only one ballot per member is cast.

Some Tips for Meeting People in The Club...

Maybe you're new to the OCA, and you've come to some of our general meetings and found a sea of unfamiliar faces that left you wondering how you could actually meet and get to know any of these people. Maybe you're not getting to know as many people as you'd like, though you've been in the club awhile. Or maybe you've been a long-time member, and you notice a lot of new people around you don't know but you'd like to. We have a lot of advantages as a big club with a lot going on, but sometimes it can be hard to hook up with other compatible members. For all of you who want to connect with more people in the club, here are some tips that I hope you'll find helpful.

Our Email Groups

The easiest way to get to know people is to join one or more of our e-mail groups. One of our two largest email groups is for general astronomy interests and club matters, ocastronomers@yahoogroups.com. The other big group is for people who are interested in various aspects of imaging, including such necessary areas as the fine points of mounts and telescopes as well as cameras, AstroImagers@yahoogroups.com. If you're interested in dark sky and light pollution issues, OCAdarksky@yahoogroups.com should be on your list, as well. If you're interested in doing scientific research, consider joining our science e-mail group, OCAscience@yahoogroups.com. There is no limit – you can join them all, if you'd like.

Besides giving you a great way to get questions answered, learn more about areas of interest to you, and keep tabs on what's going on, the e-mail groups make it easy for you get a feel for the personalities and interests of different people on the list. If you join in the discussions, you'll also give others on the list a chance to know who you are and what you're interested in. All of this helps when you see these people at meetings, star parties or other events – it's much easier to strike up a conversation with someone when you've exchanged a few e-mails on topics of mutual interest or concern, and it's much easier to feel part of the overall group when you recognize names and have an understanding of how those people fit in from what you've seen in email exchanges.

The Outreach Program

Another low-stress way of getting to know people in the club is to volunteer for the outreach program. This is run by Jim Benet (jimbenet@pacbell.net), and our main activity is bringing telescopes and other equipment out to various schools and parks for viewing events. The idea is to let people who otherwise wouldn't have a chance to see celestial objects with their own eyes look through your telescope or binoculars, and see for themselves what's up there. It's a great way to help people get turned on to science and to help counteract some of the pseudoscience that's all around us. In other words, it's a fun and useful activity in its own right, but it also gives you a wonderful opportunity to meet other club members. To join in, check for upcoming outreach events on the club's website calendar or get on Jim Benet's email list for upcoming events, decide on which ones you'd like to go to, and let Jim know you plan to come so he has an idea of how many volunteers to expect (you can still go even if you haven't notified him, but it makes his life easier if you do).

Usually, the volunteers for each event try to get to the outreach site half an hour or more before the viewing starts, and there is a certain amount of visiting back-and-forth as people are setting up their equipment. In my experience, people go out of their way to greet newcomers and to help them out with any questions they might have about the proceedings. Jim attends almost all of the outreaches, and, if you haven't yet met him in person at the time of your first outreach, that's a great time for you introduce yourself. When things get going, usually everyone is too busy with their particular line of viewers to do more than check now and

then to see who is on which object, but once the viewing is over and people are starting to break down their equipment, there's a lot more visiting between the volunteers. By the time you've been to two or three events, you'll feel like an old-timer with war stories of your own to tell and you'll be very much a member of the group. It's a great way to have some feel-good experiences as well as meet some great people.

Special-Interest Groups

We currently have four formal special-interest groups ("SIGs") in the club. These are smaller groups of club members that center around particular interests. There's a lot of interaction between the members in all of these groups, which makes it easier to get to know people. It's also easier to notice new people in these smaller groups, and all of the SIGs do their best to make newcomers feel welcome. Coming to SIG meetings doesn't bind you to anything, and it would be well worth your time to attend some meetings of all of the groups, to find out which ones fit your interests best. If you feel shy about going to any of these for the first time, contact the person who chairs or coordinates that group (they are all listed on the website and on the back of the Sirius Astronomer) to help you through any awkwardness.

If you've been to some of our general meetings, you'll probably see familiar faces at any of the SIG meetings, as many people who are active in the general meetings are also members of one or more of these groups – including me. Since everyone is there because of a common interest in a particular area, it's a lot easier to have interesting conversations with people at these meetings than it would be if you were at a social party of people you don't know well, even if everyone is a complete stranger to you.

Here's an overview of our SIGs, in alphabetical order:

AstroImagers: This is the largest of our special-interest groups, and it is for people who have any interest in any type of imaging. The group includes complete beginners through advanced imagers, and equipment used includes all of the major types of cameras on the market (including webcams, DSLRs and various film cameras, as well as all kinds of CCD cameras). Meetings are on the third Tuesday of the month, at the conference room at Gibson, Dunn & Crutcher in Irvine. We usually have around 15 to 30 people at the meetings, and there are generally two to three breaks for socializing in each meeting – a very pleasant mix of formal and informal activities. I wrote about the AstroImage SIG last month, so please check the October President's Message for more information about the group. There's one big change since last month, however – we are very happy to welcome Tom Kucharski as the new chair of the group!

Astrophysics: People who come to the Astrophysics SIG are interested in the "why" of astronomy. Our meetings center around video lectures from recognized experts in different areas. We are currently going through the most recent set of astronomy lectures from Dr. Alex Filippenko, astronomer and professor at UC Berkeley. We usually have a general discussion session before the first video, on discoveries and other items of interest in the news or to one or another of the members or recent talks people have gone to, and Don Lynn (who does the monthly AstroSpace Update column in the Sirius Astronomer and is also our main expert for "Ask an Astronomer") normally shares the most recent pictures he has downloaded from NASA and other websites, with explanations of their significance. We watch one or two lectures per meeting, depending on the time, with a period in between and at the end for discussion of topics raised in the lectures and in general socializing. It's the best type of seminar, where the "students" choose the curriculum and the lecturers based on what they are genuinely interested in.

The meetings are on the third Friday of each month at 7:30 p.m., though the December meeting has been cancelled because it's so close to Christmas. We meet on the ground floor of the carriage house at the Centennial Heritage Museum on Harvard in Santa Ana, and regardless of the amount of knowledge you may already have about the universe around us and how it works, you will be very welcome.

EOA/Mocat project: The main current activity of the Electronically Oriented Astronomers (EOA) is the club's remote controlled telescope project, known for historical reasons as the "Mocat." The current Mocat telescope is a 12-inch LX200 GPS that was donated by John Hoot, which is located in the small flat-topped clamshell-style observatory just to the west of Anza house.

In the original concept, the "remote controlled telescope" was to going to be controlled from the computer room in Anza house over a hard wire connection to the observatory. Changes in technology have allowed us to expand beyond this, and JV Howell and Gene Kent (who are currently doing most of the field work on the project) have been able to control the telescope over the Anza network from the living room area in Anza House using a laptop. Besides showing people in Anza House what the Mocat is looking at during star parties and other events, this could be used for classes, scouts and other groups at Anza, and by members with physical limitations that make it hard for them to do direct observing themselves. Even more exciting is the very real possibility of controlling it from off-site over the Internet, so we could have classes or other groups control it as part of our outreach program (a concept similar to the Telescopes In Education program that used to be run from Mt. Wilson), and even have groups in other countries use it. One member of the EOA recently moved back to Pakistan, and we are hoping that we will soon have a session where he controls the telescope from Islamabad and uses it to demonstrate some of the wonders of the night sky to students or other interested people there.

Although it has not been well publicized within the club, this is a challenging project with a lot potential benefits to the club and to

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AstroSpace Update

November 2007
Gathered by Don Lynn from NASA and other sources

Mars ice – A study of topographical and gravitational data from 3 Mars orbiters has measured the volume and mass (and therefore density) of the planet's south polar cap and surrounding terrain. The density of the visible cap, and for some area around it, is 1.22 times that of water. The only likely composition that yields that density is water ice mixed with about 15% dust. This proves that the polar cap has little dry ice (frozen carbon dioxide), in contradiction to what some astronomers believed. It also proves that the ice cap is much larger than is seen, with the edges hidden below a smooth layer of dust. A similar study will be done of the north polar cap.

Mars Reconnaissance Orbiter (MRO) is examining several features that address the role of water on Mars. 2 of the gullies that have new deposits in them since images taken in 1999 were imaged and spectra taken. The deposits are not frost, ice or minerals left by evaporation. The material could be a dust slide, not involving liquid water, as the slope is steep enough for this to occur. Other gullies are known with young deposits that are not steep enough for dust slides, so further observation of these is needed. Some of these have braided channels that are almost certainly from liquid flow. Braided channels and fan-like deposits around impact craters were also examined in the new MRO observations. These are likely a result of liquid water flow that occurred at the time of the impact, from melting of ground ice. MRO also used its ground-penetrating radar to observe layered deposits near the poles. Patterns found near the south pole suggest climate periods of accumulating ice alternated with erosional periods. This supports theories involving Martian climate cycles. These observations supported those reported above, that the south polar cap is mostly water ice.

MRO has produced 143 highly detailed false color images of areas on Mars that are possible landing sites for the Mars Science Laboratory, a long-distance rover, to be launched in 2009. The false color is used to accentuate surface material, such as clay minerals and volcanic rocks. In early October the data returned so far from MRO exceeded 26 terabytes, the amount that all previous Mars missions combined have returned.

Mars Odyssey has measured the temperature of 7 dark spots on Mars suspected of being cave entrances. The small temperature differences between night and day confirmed that they are indeed deep holes into the planet. Caves are interesting to those looking for microbial life on Mars, and to those looking for locations for manned Mars mission shelters. However, these particular caves are all at too high an altitude for such interests, being high on the Arsia Mons volcano. The same observational technique will be used to search for caves at lower elevation.

XMM-Newton (orbiting X-ray observatory) has made observations of explosions at a magnetar (neutron star with extremely strong magnetic field). Such explosions are known to occur occasionally on magnetars, but mechanism and location of the explosions remained unexplained. The new observations were combined with computer simulations of magnetars, and the best fit was for the explosions to be occurring just below the surface of the star, in an area only 2 miles across. The process also allowed determination of the magnetic field strength. The value (600 trillion times the Earth's) agrees well with those calculated from observations of magnetar spin slowing. So now we know where the explosions take place, but the mechanism remains unexplained. Further observations and computer simulation will be done.

Orphan stars – Observations by Chandra (orbiting X-ray observatory) and by the SOAR (visible light) telescope in Chile of a galaxy plunging toward the center of a cluster of galaxies showed a huge tail of gas extending about 200,000 light-years, well outside the galaxy. Such tails are common for galaxies interacting gravitationally with others. This is one of the longest tails known. The new observations showed that millions of stars had formed recently (last 10 million years) in the tail. Some astronomers had predicted that there was not sufficient gas and dust to form large numbers of new stars outside the galaxy itself, but this is not the case. The material in the tail was stripped out of the galaxy by the pressure of plunging through the hot gas pervading the space between the galaxies of the cluster. Eventually most of the gas from the galaxy will be stripped away, leaving little material to form new stars within the galaxy. But the stars formed in the tail will remain as orphan stars, far outside the galaxy. Such orphan stars may have been more common billions of years ago when galaxy collisions were more frequent.

Spitzer (infrared space telescope) has studied the winds blowing away from a supermassive black hole at the center of a distant galaxy, and identified the constituents of the wind. They found a mix of dust made of the minerals in glass, sand, marble, rubies and sapphires, among others. Finding the crystalline silicate (sand) and some other crystalline forms was a surprise. Radiation from stars is known to transform these crystalline forms into an amorphous glass-like state. This implies that some process near the black hole is creating the dust, and it hasn't had time to transform yet. The theorists who worry about how dust was produced in sufficient quantity in the early Universe to match our observations are interested in this result. Other than supermassive black holes, the only other proposal for producing dust early is that supernovas made the dust, but it doesn't seem that supernovas can make enough dust to match observations.

Deep Impact (comet crash mission) – More surprises found in images taken just before Deep Impact hit comet Tempel 1: the comet is ringed by strangely-layered terrain that looks sedimentary, but there could never have been lakes or rivers on the comet to deposit sediment in the usual ways. One possibility is that the comet formed layer by layer. Another is that erosion from heat during passes near the Sun causes layers to form. Another surprise was landslides. Many were found, one over a half mile long. With such low gravity on comets, this was not expected. It is hoped that the flyby of the comet planned for 2011, using the former Stardust spacecraft (now known as NExT), will help explain these. *(continued on page 8)*

The Red (Hot?) Planet

by Patrick L. Barry

Don't let Mars's cold, quiet demeanor fool you. For much of its history, the Red Planet has been a fiery world.

Dozens of volcanoes that dot the planet's surface stand as monuments to the eruptions that once reddened Mars's skies with plumes of glowing lava. But the planet has settled down in its old age, and these volcanoes have been dormant for hundreds of millions of years.

Or have they? Some evidence indicates that lava may have flowed on Mars much more recently. Images of the Martian surface taken by orbiting probes show regions of solidified lava with surprisingly few impact craters, suggesting that the volcanic rock is perhaps only a million years old.

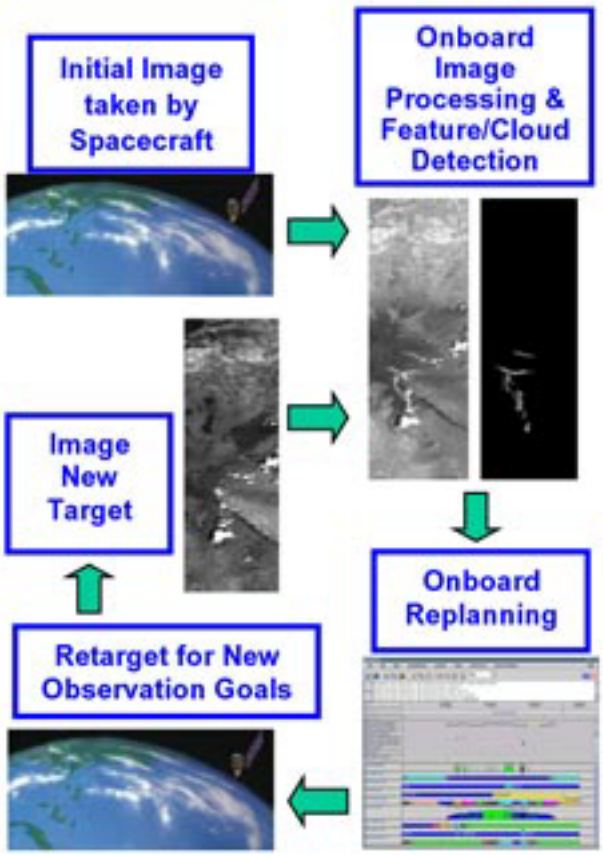
If so, could molten lava still occasionally flow on the surface of Mars today?

With the help of some artificial intelligence software, a heat-sensing instrument currently orbiting Mars aboard NASA's Mars Odyssey spacecraft could be just the tool for finding active lava flows.

"Discovering such flows would be a phenomenally exciting scientific finding," says Steve Chien, supervisor of the Artificial Intelligence Group at JPL. For example, volcanic activity could provide a source of heat, thus making it more likely that Martian microbes might be living in the frosty soil.

The instrument, called THEMIS (for Thermal Emission Imaging System), can "see" the heat emissions of the Martian surface in high resolution—each pixel in a THEMIS image represents only 100 meters on the ground. But THEMIS produces about five times more data than it can transmit back to Earth.

Scientists usually know ahead of time which THEMIS data they want to keep, but they can't plan ahead for unexpected events like lava flows. So Chien and his colleagues are customizing artificial intelligence software called ScienceCraft to empower THEMIS to identify important data on its own.



Just as changing cloud patterns on Earth were identified using Earth Observing-1's Advanced Land Imager along with ScienceCraft software, the THEMIS instrument with ScienceCraft on the Mars Odyssey spacecraft can avoid transmitting useless images.

This decision-making ability of the ScienceCraft software was first tested in Earth orbit aboard a satellite called Earth Observing-1 by NASA's New Millennium Program. Earth Observing-1 had already completed its primary mission, and the ScienceCraft experiment was part of the New Millennium Program's Space Technology 6 mission.

On Odyssey, ScienceCraft will look for anomalous hotspots on the cold, night side of Mars and flag that data as important. "Then the satellite can look at it more closely on the next orbit," Chien explains.

Finding lava is considered a long shot, but since THEMIS is on all the time, "it makes sense to look," Chien says. Or better yet, have ScienceCraft look for you—it's the intelligent thing to do. To learn more about the Autonomous ScienceCraft software and see an animation of how it works, visit http://ase.jpl.nasa.gov .

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

Tidbits from POSS-2

By Tom Kucharski

Recently I had the great pleasure of meeting Jean Mueller and taking a private tour with her of the 48 inch Samuel Oschin Telescope on Palomar Mountain. Both Jean and the Oschin Telescope were vital in compiling the Second Palomar Observatory Survey (POSS 2) completed in 2000. Jean also assisted the Shoemakers and David Levy in developing their comet images and searching those plates for comets during the '90s.

Fig. 1: Jean Mueller

First a little background. Jean was the first woman astronomer to run the 100 inch telescope on Mt. Wilson. She was also the first woman astronomer on Palomar Mountain (Fig. 1). In the course of her career Jean has discovered fifteen comets, twelve asteroids (mostly Amurs and Apollos), and over one hundred supernovae – second only to Fritz Zwicky.

The Samuel Oschin Telescope is a classic Schmidt camera with a 49 inch (not 48 inch!) corrector plate and a seventy-two inch spherical primary mirror (Fig. 2). POSS 2 took fifteen years to complete from 1985 to 2000. Kodak film emulsions on 14 inch glass plates were the imaging media. Each field was imaged in blue, red, and near infrared. The survey covered 897 fields north of the celestial equator down to a stellar magnitude of ~20.

Jean would start a night of surveying by using a photometer to estimate the sky brightness and use that data to help determine the exposure times that could be anywhere from 40 minutes to 2 hours. The first plate would be a thirty minute total exposure to establish focus: the plate would be exposed for ten minutes, the plate would be covered while the scope was moved by about thirty arcseconds and the focus changed by a specific amount, then the plate was exposed for another ten minutes, and the process repeated one more time. The plate would then be immediately developed and the result used to set the focus for the night.

The plates to be used for the night had earlier been chemically hypersensitized in the prep room on the floor below the telescope and each was mounted in the plate holder shortly before use and sent up to the telescope via a dumbwaiter. Since the prime focus of a Schmidt camera is curved, each glass plate was forced into a curve in the holder to keep the image in focus. In addition, even though the corrector plate was replaced during the survey, each plate had to be adjusted slightly in addition to the overall curvature. To position the plate holder intro the telescope, Jean had to lift it over her head to slide it in the holder slot on the telescope tube, not an easy feat since the glass plate and holder (Fig. 3) weighed 27 pounds. She did that over five thousand times for POSS 2.

Once the plate was at prime focus, exposures could begin. But this was before telescopes had computer controls so Jean performed the function of an autoguider. She would sit atop at stepladder, sometimes up to ten feet above the floor, and use a hand paddle to correct the telescope's motion, while tracking a star through a long focal length refractor piggybacked on the Schmidt. She would be on that ladder up to six hours a night.

When the night's session was over, the plates were developed and placed in a queue for examination for acceptability. Very little scheduled time was allotted for this activity which had to be carried out on cloudy nights or between other activities. Despite her long string of discoveries, Jean said that their prime directive was to take acceptable images and not to examine them for changes that could lead to discoveries. She says that many possible leads on new discoveries such as asteroids and comets were simply ignored in their haste to complete the survey! It was very frustrating to her when she would notice a streak on a plate that was possibly an asteroid or a faint comet and she was refused time to further evaluate the possible discovery. Her comet and asteroid discoveries occurred during the rare times when she was given permission for further evaluation., or on her own time.

The reason why most of Jean's asteroid discoveries were Amurs and Apollos was that those two asteroid families have orbits that bring them close enough to earth that their motion across the sky would show on the plates over the course of a night since the exposures were up to two hours and three plates would be taken. Jean's more than 100 supernovae discoveries were conducted on her own time by comparing fields taken with both the POSS 1 and POSS 2 surveys.

Fig. 2: The Samuel Oschin Telescope

When the plates were examined, they were placed on a light box (Fig. 4) where they were very closely examined with a magnifier for acceptability. In the first three years of the survey prior to replacement of the corrector lens with a higher quality one, ninety percent of the plates were rejected. After the corrector lens was replaced, rejects fell to ten percent.

Finally, in 2000 the survey was complete. It is available in a digitized format and is still actively examined for comparison with the latest imaging for comparison on interesting objects. For example, Jean has a current assignment to compare a particular star that an astronomer in Europe suspected of being a long period variable.


Fig. 3: Glass plate with holder

The original glass plates from both POSS 1 and POSS 2 are currently stored on Palomar Mountain in a secure room. All of the glass plates are in specially built wood cases that are precisely identified as to their contents and long chains run through the handles of each case and are connected to the cement wall and the shelving. The room itself is the size of a small library yet the door is unlocked once entry to the overall facility is established.


Fig. 4: The light box

Oddly enough, not all of the original plates are there and the location of some are not known. While the survey was being conducted, astronomers from other observatories and universities had objects of interest and frequently would return home with the plates they were studying. Once the plates were copied and prior to permanently securing them, no accurate accounting of them was ever made! Today, Jean frequently gets calls from retiring astronomers asking if she would like the plates they have returned, or more rarely, a box of plates will unexpectedly be delivered.

I hope you enjoyed this inside look at one of the great sky surveys of all time as much as I did. ■

News for Astro-Equipment Junkies
by Bob Buchheim

There is a vibrant industry out there, busily creating astronomical instruments, accessories, gadgets and nick-nacks aimed at the amateur astronomer. Some of the members of this industry are "big guys", able to afford advertising in *Sky & Telescope* and *Astronomy*. Others are the hopeful inventors that you bump in to at RTMC and other conventions. I though I was staying reasonably up-to-date on the offerings, developments, and new ideas in the astronomical marketplace, but a new magazine has shown me that there are a great many things that I've been missing out on.

The new magazine is *Astronomy Technology Today*. It's a monthly publication by Parkerson Publishing LLC (Dallas) that provides you with about 50 pages of new product descriptions, user comments, and advertisements every month. It's a bargain at $18/year (I think; check www.astronomytechnologytoday.com to confirm the price, since the introductory pricing may have expired by the time you read this). It's a fun read, with a soft-sell approach and a good understanding of its target audience of experienced amateur astronomers.

I'll give the current issues to Karen for the OCA Library, so that our members can check them out.

Owens Valley Radio Observatory Tour
by Doug Millar

I am planning a trip to the Owens Valley Radio Observatory on Dec 27-28th. We will carpool up on Thursday and come back on Friday. We will have a tour of the site, some science demonstrations and an opportunity to do night time astronomy. We will stay at the Bristlecone Pine Motel in Big Pine. The trip is for children as well. There are also lots of other activities. Most of the trip is along highway 395 through Mojave and Lone Pine. There is lots to see and do, including playing in the snow near Big Pine. Check my website at K6JEY.com to see what is going on. If you would like to go please contact me. at this email or 562-810- 3989 and I will pass along more information.

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people outside the club, as well. The core group that is currently working on this is only six to eight people, so you would have an easy time getting to know everybody. The group's regular meeting is on the fourth Wednesday of the month at Coco's on Holt at Newport Ave. in Tustin at 7:30 p.m., to go over developments with equipment and other aspects of the project, discuss what needs to be done, and so on, as well as socialize and have a good dinner. If you have any interest in helping to get a remote-controlled telescope working reliably, or in using it – do come to our next meeting!

GoTo Group: This started as the "ETX Group," which was a bunch of people who had ETX telescopes and wanted to share information and help each other improve the performance of their telescopes. Many of the original members are now using other types of GoTo telescopes, and because of that and interest from people with other makes of scope, we became the more general "GoTo Group." Anyone who is interested in GoTo telescopes is welcome, whether or not they actually own one, and the group is particularly good for people with new GoTo scopes who need some help learning to use them.

The meetings tend to be set more sporadically than the other SIGs. They are set about other month, usually on a Monday evening early in the month, and the chair, Mike Bertin, also comes up with a topic of interest for each of the meetings. Since the meetings are usually held at Craig Bobchin's house, we don't make the address available on our website; if you are interested in coming, please contact Mike Bertin (MCB1@aol.net, 949-786-9450) or Craig Bobchin (ETX_Astro_Boy@sbcglobal.net, 714-721-3273) for the address and directions.

We start the meetings with a session in the house, discussing the topic of the day, seeing demonstrations of equipment or techniques, getting to know new people and discussing matters of general interest. This is usually followed by a mini-star party in Craig's backyard, if the weather allows. We generally have 10 to 20 people at the meetings, and the group sometimes has special events, such as the overnight party Craig hosted to view the recent lunar eclipse. The group also helps out with but the "How To Use Your Telescope" session of the Beginners Class in January and July, which allows us to help even more people get comfortable enough with their new scopes that they'll actually use them.

In Closing

These are just a few of the options for getting to know people in the club – I didn't talk all about star parties or the general meetings, which give you other opportunities. I hope you'll give these a try – if you do, you'll most likely find that you're learning a lot more about astronomy and equipment than you did before, learning it a lot faster, and also meeting a bunch of really great fellow members. ■

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Neptune – A team of astronomers, using observations by the Very Large Telescope in Chile, has made the first temperature maps of the lowest portion of Neptune's atmosphere, and discovered that the south pole is 18 degrees hotter than the rest of the planet (which is at minus 328 F.). Methane freezes before rising to the Neptunian stratosphere over most of the planet, but it should remain gaseous at the hotter south pole, and may leak out of this region. It is southern summer on Neptune, and it is thought that the continuous sunlight near the pole is heating it. Seasons on Neptune last 40 Earth years, so the sunlight's effect accumulates for all that time, countering the fact that sunlight is about 900 times weaker at Neptune than on Earth. The polar heating may be related to the fact that Neptune has the strongest winds of any planet in the solar system, at 1200 mph. The new observations also showed hot spots in the stratosphere found at high latitudes, which are not yet explained, though it probably involves upwelling gas.

Magellanic Clouds have long been considered satellite galaxies, orbiting about our Milky Way. New precise observations of their motions in 3 dimensions indicate that they are moving too fast to be in orbit, but are just passing by for the first time. This is in contradiction to a number of other observations and theories, so needs to be checked before being accepted. The contradicted observations include: 1) the warping of the Milky Way's disk, thought to be caused by the gravity of the Magellanic Clouds over several passes; 2) the long trail of gas behind the Large Cloud, thought to be caused by tidal interaction or collision with gas from the Milky Way over several passes; 3) the stars in the Clouds appear to have formed in periodic bursts, not continuously, and the bursts are thought to be caused by passes by the Milky Way.

Oxygen – It has long been known that the amount of oxygen in the Earth's atmosphere rose sharply between 2.3 and 2.4 billion years ago, when simple life forms that give off the gas began to flourish. Study of a new kilometer-long core drilled in western Australia shows that oxygen began rising 2.5 billion years ago. 2 different teams analyzed the core, for different elements that correlate to atmospheric oxygen, and both came up with the earlier date. Oxygen-producing life definitely existed earlier than previously believed. Now scientists need to explain what prevented the huge rise in the gas for about 100 million more years.

Planet types – Scientists have studied what kinds of terrestrial (Earth-like) planets could exist, given what we know about how planets form, and have concluded there may be at least 14 types, having various compositions. Some are nearly all one element or compound, such as water, carbon, iron, silicate, carbon monoxide, or silicon carbide, but others are mixtures of these. They calculated how the size of each type would depend on the mass. Essentially all solids behaved the same; that is, the graph of diameter versus mass was the same shape, though the graphs were higher or lower depending on the material. Planet finding methods that can determine the mass and diameter, in particular searching for planets transiting across their stars, can use these results to determine what type of planet has been found. The only problem would be distinguishing carbon planets from silicate

(continued on page 10)

What have you been doing in the Dark?

Have you been doing a project that other OCA members would be interested in learning about? Have you participated in an astronomical activity that would entertain the other OCA'ers? For example, perhaps you have:

- Taken an astronomically-oriented expedition (stargazing at Lake Titicaca?)
- Made a telescope or an optical instrument (a handicap-friendly telescope?)
- Conducted a research project or astronomical investigation (photometry? double-stars? spectroscopy?)
- Exposed the stars at a unique "outreach" venue
- Made an unusual observation (anyone discover a supernova or asteroid?)
- Participated in a special activity by one of our Special Interest Groups (visited a major observatory? Used a remotely-operated telescope?)

If you have, then it's time to start thinking about your presentation for the "Member's Night" December OCA Meeting. Don't keep it to yourself: Inquiring minds will want to know what you've been doing in the dark!

The OCA is filled with inventive people doing new, intriguing, and wonderful things. We'd be delighted if you would present a 10-15 minute description of one of your astronomical activities at the December OCA meeting. To add your name to the presenter's list, please contact Craig Bobchin by e-mail at ETX_Astro_Boy@sbcglobal.net

NOTICE: All submissions, including ads, to the Sirius Astronomer should now be submitted to stevecondrey@verizon.net. To avoid unnecessary delays or unfortunate but well-meaning efforts by the editor's spam killer, please include the notation [SA] in the subject line of all messages regarding the newsletter.

FOR SALE: 8 inch Celestron NexStar. Brand new - never used. $900.00 Contact: Ken Duvall (714) 240-2993

WANTED: I am interested in buying an observatory with a warming hut at Anza. If you are interested in selling yours, please email me. Thanks, Ray Stann

Contact: r_stann@yahoo.com

2-inch new (not used) eyepieces from Surplus Shed. One is 10 mm focal length for $40; the other is 38 mm focal length fo $60; these only fit 2 inch focusers. Also selling 2 different new (in box) green laser pointers, one with constant on switch (just like a flashlight) for $135, the other with a momentary switch (release and it goes off) for $80. These are both 4 times as bright as the pointers commonly seen. Ph: 909-861-6461 or email scopeguy20@gmail.com

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FOR SALE: Celestron CR 150hd Dual Axis Drive CG5 Mount. New motors and hand controller; roll-about hard case. Nice condition. $750.00
Meade LXD55 8 inch Schmidt Newtonion. Recent complete service by Meade, new Autostar, etc. Roll-about hard case. Nice condition. $800.00
Contact Steve Bird 562 234-2157

FOR SALE: Meade 8-inch LX200 GPS w/all factory accessories; aluminum channel tripod w/pneumatic tires. Contact Bob Krause at 949-248-3111

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planets, as their densities are quite similar. The team made educated guesses about where different types of planets would be found. For example a carbon monoxide planet seemed likely around evolved stars such as white dwarfs and pulsars, or stars with carbon-rich disks, such as Beta Pictoris.

Allen Telescope Array (ATA), a group of 42 linked radiotelescopes, was recently dedicated. First images were maps of the Andromeda and Triangulum Galaxies (M31 and M33). Each scope is a 20-foot diameter dish, mass produced for economy, using much commercial telecommunications technology. Its specialties will include studying supernovas and supermassive black holes, though many other astronomical objects also give off radio waves detectable by ATA. Two unique features are the ability to look at a large area of the sky at once, and to search for signals from other civilizations at the same time it is making astronomical observations. It also uses new methods of filtering out man-made radio interference. In full operation, ATA will collect every 9 days as much SETI (Search for ExtraTerrestrial Intelligence) data as all previous efforts combined. ATA is located near Hat Creek in northern California. "Allen" in the telescope name is Paul Allen, cofounder of Microsoft, who donated much of the money to build the array. Fundraising is underway to expand the array to 350 dishes.

Cassini (Saturn mission) – Study of Cassini data has shed more light on the geysers and Tiger Stripes (parallel cracks) on Saturn's moon Enceladus. The geysers of water are rising vertically, directly from the Tiger Stripe cracks. When tidal forces on Enceladus are compressing the cracks, geyser activity is at minimum, while forces that stretch the cracks produce maximum activity. The hottest regions of the Tiger Stripes produce the largest geyser plumes.

More results from the recent Cassini flyby of the moon **Iapetus**: The giant equatorial ridge crossing the dark side does not continue across the bright side of Iapetus. Instead, large isolated mountains mark the equator. It is not known whether the ridge never formed all the way around or if some of the ridge was destroyed after forming. The ridge is quite old because it is pitted with craters, showing exposure to meteorite impacts for billions of years. The transition region from the dark hemisphere to the bright one is a complicated patchwork of craters and highlands, with low elevations filled by dark material. There are essentially no grays on Iapetus, only black and white. Although most of the bright side is water ice, ultraviolet data show that it contains a portion of some material that is not water ice, but has not been identified yet. The presence of very small craters excavating ice from below the material on the dark side indicates that the dark coating is fairly thin. A theory has been proposed to explain the dark and bright sides, that is supported by the new images. Originally, all sides of Iapetus were the same brightness. Something, probably dusty matter thrown off by moons beyond Iapetus, collided with the side of Iapetus that leads in its orbit about Saturn. This caused the leading side to be somewhat darker, which absorbed more sunlight, and raised the temperature just enough to sublime (turn ice to vapor) water ice. The vapor eventually froze on the trailing side, which had remained colder, making that side even more reflective. Essentially all exposed ice on the dark side eventually sublimed, leaving the side entirely dark.

Mosaic radar images of the moon **Titan**, taken by Cassini on several passes, now cover 60% of the north polar area, and 14% of the imaged area is covered by lakes of liquid hydrocarbons, such as ethane and methane. It is believed that winter rains of methane in the polar area are creating the lakes. They appear to be in varying states of fullness, suggesting there is a complex hydrologic system similar to Earth's water cycle. The question arose whether lakes remain during the summer. Very little of the south polar region, now experiencing summer, has been radar imaged. The latest pass of Cassini by Titan imaged some of the southern area, and it does indeed have a few lakes. Seasons on Titan last 7.4 Earth years, so it wasn't practical to wait about 15 years for summer to arrive at the northern areas. Cassini celebrated its 10th anniversary since launch.

New Horizons (Pluto mission) – More analysis of data collected during the recent flyby of Jupiter has been released. Lightning was seen near the poles, the only polar lightning ever seen other than on Earth, movies of ammonia clouds revealed how they go through their life cycle, clumps were found in the faint rings, and the structure of volcanic eruptions on the moon Io was seen better than previously. On Io 11 different volcanic plumes were seen, 3 for the first time, the highest plume yet was seen, infrared glow from 36 volcanoes was detected, and more than 20 geological changes were spotted since Galileo spacecraft's observations. New Horizons was the first spacecraft to fly down the magnetic tail of Jupiter, necessary due to the relative positions of Pluto and Jupiter, so much new science was done there. Among those findings were large dense slow-moving blobs moving down the tail, which were made of volcanic material thrown off by Io. The spacecraft happened to arrive shortly after the Little Red Spot developed, so it produced the most detailed images of it. More than 700 images were returned from the flyby of Jupiter, twice what is planned during the Pluto pass in 2015.

SOHO (Solar space observatory) has discovered more than 1300 comets, when they happened to pass close enough to the Sun to show up in the spacecraft's cameras, but none of them was found to be periodic until now. Analysis of the orbits of the comets showed that one seen in September 1999 was probably the same as one in September 2003. If so, it was to appear again in September 2007. It showed up right on schedule, and has now been given the periodic comet designation P/2007 R5 (SOHO). As comets go, it is a rather poor one, showing more of a brightening than the usual comet head while near the Sun, and no tail at all. It is thought that it is nearing extinction from many passes close to the Sun, having expelled most of its volatile ice. The comet nucleus is estimated to be 100-200 yards in diameter.

Opportunity (Mars rover) in late September reached its first science target within Victoria Crater, a band of relatively bright bedrock exposed partway down. The rover is using its robotic arm to place instruments against the rock and analyze it. It is planned to analyze many rock layers while descending into the crater, to piece together a geological history of the rock that was present when the impact occurred that formed the crater. Victoria Crater is a half mile wide and 230 feet deep, providing the greatest depth, and therefore the longest geological record, encountered by either rover. Opportunity has experienced slopes as high as 25 degrees while descending, but slippage of the wheels has not been bad.

The missions of both Mars **rovers** have been extended, for the fifth time, through 2009, dependent on continued operability. They have been operating for 45 months now, with the original design for 3 months of roving. Spirit has driven 4.51 miles and returned more than 102,000 images, while Opportunity has driven 7.19 miles and returned more than 94,000 images.

Kaguya (lunar mission), also known as Selene, has been launched by Japan to orbit the Moon. It consists of 3 spacecraft to measure topography, abundance of elements, gravity, weak magnetic field, plasma and energetic particles. It has a high-def TV camera. The main spacecraft has separated its 2 smaller ones. One of these is a relay satellite, to forward data from the main spacecraft when it is behind the Moon, and so out of radio contact with Earth. The other is using an interferometer between the spacecraft to very precisely measure their separation. From this, accurate masses will be calculated of the terrain that the spacecraft are flying over.

FUSE (far [short wavelength] ultraviolet space spectrograph) has finally failed. The other times its failure was announced (2001, 2004 and earlier this year), spacecraft controllers brought it back to life. All the momentum wheels have failed (one of them twice), so the telescope can no longer be pointed. The mission was originally designed for 3 years, but managed 8 years of observations. FUSE's specialty was determining temperatures, densities and chemical compositions of astronomical objects. Some of its most important discoveries were: measuring molecular hydrogen in Mars' atmosphere, confirmation of a hot gas halo surrounding the Milky Way and a first-ever observation of molecular nitrogen outside our solar system. The FUSE team will process and archive all data for future use.

Integral (European gamma-ray space telescope) has discovered a unique object. About 30% of the objects found by Integral are at first not identified with any object seen in other wavelengths, as was this object. Soon after, Swift (gamma-ray space telescope) found the object in X-rays, and pinpointed its location, at which time it was identified as a known active galaxy. It is a blazar, the most energetic type of active galaxy. To give off the gamma-ray energy observed, the supermassive black hole at the center of this galaxy must be consuming a mass equivalent to our whole solar system every few days. The feature that makes this blazar unique is that it does not have the infrared emission characteristic of all other blazars, and the gamma-ray emission is concentrated in low-energy gamma rays, while all other blazars concentrate in high-energy gamma rays. Further observations are needed to understand this object's emission, and to find if there are any other objects like it.

STEREO (space solar telescope pair) has observed for the first time the collision of a coronal mass ejection (a cloud of gas ejected by the Sun) with Comet Encke. It blew away the comet's tail, and a new tail formed soon afterward. Comet tail disconnections have occasionally been observed in the past, and it had been conjectured that coronal mass ejections might be one cause. This observation proved the conjecture.

International Space Station (ISS) – The Expedition 16 crew launched to ISS aboard a Russian Soyuz spacecraft. Veteran astronaut Peggy Whitston commands both the Soyuz flight and ISS for the next several months, both female firsts. 2 of the Expedition 15 crew will have descended in the previous Soyuz by the time you read this, along with a "spaceflight participant" (tourist) from Malaysia. Astronaut Clayton Anderson from Expedition 15 will remain aboard ISS until a later Shuttle flight.

Instant AstroSpace Updates

NASA has decided to restart the **NuStar** mission, which was previously stopped due to budget pressure. NuStar will have 500 times the sensitivity of previous missions to detect hard (high frequency) X-rays, which are typically given off by material falling into black holes.

NASA has agreed with the Russian space agency to carry Russian-made neutron detection instruments on both the Lunar Reconnaissance Orbiter, launching next October, and Mars Science Laboratory, to launch in 2009. Such instruments **detect hydrogen**, such as is found in ice, near the surface.

India is scheduled to launch its **Chandrayaan-1** lunar mission early next year, and China's **Chang'E** is to launch to the Moon this year. Most spacefaring nations are participating in the International Lunar Decade.

Dawn (mission to asteroids Vesta and Ceres) launched in late September for first arrival in 2011. This column in August outlined the exciting goals of Dawn.

A study of **microbes taken into space** aboard the Space Shuttle showed that some became more infectious as a result. It was already known that astronauts spending long periods in space were more susceptible to disease, and this may be part of why.

Warner Bros. is sending an **IMAX 3D** camera aboard the Space Shuttle on its 11-day 5-spacewalk mission to repair the Hubble Space Telescope (HST) next year to shoot film that will become part of a movie telling the story of HST. Sounds spectacular.

SOFIA (100-inch infrared telescope in an airplane) is undergoing flight tests, the first ones being with the 16-foot-high door over the telescope closed, but with the door open next year. Tests will continue through 2008, with the first real observations in 2009.

A group of undergraduate college students has combed through images taken by the Sloan Digital Sky Survey and located the asteroids in them, resulting in 1300 new **asteroids discovered**, and useful data on 14,000 asteroids already known. The Sloan survey is imaging 1/4 of the entire sky through multiple colored filters. ■

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