SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

November 2006 *Free to members, subscriptions $12 for 12 issues* **Volume 33, Number 11**

Bruce Waddington's image of the Ring Nebula (M57) was taken on August 26, 2005 with the Meade DSI color imager through a 10-inch Meade LX200 GPS telescope. If you didn't catch the Ring Nebula last month, you'll have to wait until spring!

OCA CLUB MEETING

The free and open club meeting will be held Friday, November 10th 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 international astronomy ambassador Mike Simmons, speaking about the fate of the Iraqi National Observatory in the wake of two decades of war.

Next General Meeting: December 8th

STAR PARTIES

The Anza site will be open this month on November 18th. The Black Star Canyon site will be open this month on November 25th. 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 3rd (and next month on December 1st) at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.
GOTO SIG: TBA (contact coordinator for details)
Astrophysics SIG: Nov. 17th, Dec. 15th
Astro-Imagers SIG: Nov. 21st, Dec. 19th
EOA SIG: Nov. 29th, Dec. 27th
Dark Sky SIG: TBA (contact coordinator for details)

President's Message

By Barbara Toy

OCA Election Time!

My, my – how quickly this last year has gone by! Not only are the holidays looming, but it's time once again for the OCA elections; specifically, it's time for nominations for the Board of Trustees. For those who may not have been through this before, or who may have thrust these little details of club business into the furthest recesses of their memories where it's hard to retrieve them, we take formal nominations at the general meetings in November and December of each year for the Board for the following year, and members can vote from the time the ballots are finalized and posted on the website (probably a few days after the December meeting) through to the end of the general meeting in January. Besides being nominated at the November or December general meetings, you can become a candidate by emailing Bob Buchheim, our club secretary (rbuchheim@earthlink.net) or me (btoy@cox.net) about what Board position you want to run for.

Our Board is made up of eleven Trustees, four of them officers and seven Trustees at Large. The officers are President, Vice President, Secretary and Treasurer. Anyone who is a member in good standing of the club and who has been a member for at least a year can run for Trustee at Large, or for Secretary or Treasurer. Any member in good standing who has served on the Board at any time for at least a year can run for Vice President or President. That means that there are a whole lot of you out there who are qualified to run for the Board in any capacity – this is your chance to get your name on the ballot for the 2007 Board, and I hope you'll take full advantage of it!

Q&A About The Board:

"That's all very well," you say, "but what exactly would I be getting myself into if I were elected to the Board?" I'm really glad you asked that question – let me tell you a bit about it.

The Board is the body ultimately responsible for running the club, and we've been fortunate to have had an active and professional Board for quite a few years. Its regular meetings are held on a Sunday evening every other month beginning in January (sometimes – very rarely – there are additional meetings for emergency situations or a particular issue that can't be handled properly at a regular meeting). The agenda for the meetings includes all significant budget matters facing the club, general policy matters, various club projects, and requests or issues brought by individual club members. Between meetings, Board members keep in touch by email, and information about issues of concern to the Board is often exchanged by email to help prepare for discussion at the actual Board meetings.

So, if you're a Trustee at Large, your formal duties would essentially be to attend the six regular Board meetings and keep up on Board issues by email – not very arduous at all. Honesty compels me to note, however, that almost everyone on the Board winds up volunteering to help with various matters that come before the Board, which results in involvement beyond just the meetings and emails – but that's generally where the real fun of being on the Board comes in. You can't tell in advance what issues or projects will come up, but a few of these that I recall include the Anza Planning Committee (which is still working on the development of the Anza site), the awards program that Bob Buchheim volunteered to manage, the installation of the Broadband system at Anza that Liam Kennedy conceived of and arranged when he was on the Board, organizing club banquets (Joel Harris volunteered for this in 2004, and Tom Kucharski in 2006), designing and arranging for the club bumper stickers (this was one of Matt Ota's projects) and innumerable repairs and improvements at Anza that Gary Schones has undertaken. These activities are where Board members can really exercise their creativity on behalf of the club, and they can give a tremendous sense of accomplishment and satisfaction

"Well, that seems pretty easy," you say, "but what if I wanted to run for one of the officer positions? What would I have to do then?"

As mentioned above, if you haven't served on the Board before, there are only two officer positions you could run for, Treasurer and Secretary. Of the two, the Secretary position is a bit more straight-forward: according to the club's bylaws, the Secretary is responsible for producing the minutes of the Board meetings, and for maintaining the official Minute Book, so we have some way of determining what the Board has done on various issues in the past. The Secretary also produces official correspondence on behalf of the club, as needed, and often takes on other responsibilities, such as collecting nominations for the ballot. Our current Secretary, Bob Buchheim, has also taken a very active role in our general meetings, as he generally does the announcements and he has also been producing the slide show that is shown before the meetings and at the breaks.

Defining the Treasurer's duties is a bit more challenging. Charlie Oostdyk has held that position for many years, and, over time, he has become responsible for a number of somewhat related jobs, so it's hard to know exactly where his job as Treasurer ends and these other responsibilities begin. The Treasurer is clearly responsible for managing the club's financial affairs – so Charlie deals with such things as the club's bank accounts and tax returns, and keeps track of money coming in and bills that need to be paid. A lot of the money coming in is from membership dues and pad/observatory fees, so Charlie also maintains the membership records and pad/observatory license records, sends out notices of when payments are due, keeps track of who has paid and who has not, and does appropriate follow-ups, etc. He also (because he has the most current membership information) has become responsible for generating the necessary envelopes and mailing labels and for processing and mailing out the Sirius Astronomer each month, as well

as doing any other bulk mailing that the club might need. As part of keeping track of the club's financial obligations, he deals with our broker over our insurance coverage each year, and deals with such things as the contracts with the Irvine Co. and Chapman University (even though we don't actually pay any money for the facilities each of them lets us use). He also selects, obtains and sells the calendars, books and various other items you see for sale at his table at the general meetings (sometimes referred to as "Charlie's store"), records the information for the club's "Starline" information message each month, and a lot of other things that seem rather peripheral to a purely financial position, but certainly help keep the club running smoothly. Bottom line is that, if you ran for that position and won it, I really don't know what to tell you about where your responsibilities would end. I just know that I am very grateful to Charlie for all he's done for the club as Treasurer for all the years he's held that position!

"Interesting," you say, "but what if I want to be President or Vice President?"

If you've served on the Board for a year at any time, you could run for either of these positions. As to duties of these positions, the Vice President serves the vital function of dealing with the speakers for the monthly meetings – making sure we have a speaker for each of the meetings, dealing with any special equipment or other needs speakers might have, and introducing them at the time of their talks. The most challenging aspect of this part of the Vice Presidential duties is finding speakers, but this usually isn't as hard as it might seem, as we have some "regulars" who can be relied on for an interesting talk every year or so, and a lot of people are willing to help out with suggestions and contacts, and many will even handle contacting prospective speakers. Also, even though the Vice President is in charge of finding the speakers, other Board members are very concerned when we don't have a confirmed speaker for an upcoming meeting and will help out with finding someone.

Besides dealing with the speakers, the Vice President presides over general meetings and Board meetings when the President is absent, and, if the President can't complete his or her term for some reason, the Vice President takes over that position. This is a rare situation, but it did happen several years ago when Wayne Johnson had to move to Tucson in the middle of his last term as President and the Vice President at that time, Russ Sipe, had to take over as President for the remainder of his term (which he handled very well, I might add).

The President's formal duties are to preside at the general meetings and Board meetings, and generally to administer the club. In the past, the duties related to the general meetings included putting together the slide shows for each of the meetings, doing the announcements, and often helping to find speakers – with Bob Buchheim doing the slide shows and the announcements and with Craig Bobchin's success in setting up speakers as far in advance as he can get commitments and actively seeking assistance as soon as he is aware of developing problems, the general meetings have turned out to require very little work from me as President this last year, for which I thank both of them! Board meetings require a bit more preparation, as the President drafts and circulates the agenda before the meetings, collects and brings relevant documentation on agenda items for Board members to consider, and is also supposed to bring such things as the club's supply of paper plates and flatware for the potlucks that traditionally precede the meetings and help them get off to an amiable start.

The other formal duty is the President's Message. I've never been told of any specific requirements for these other than that one should be done every month and that they need to be emailed to the editor of the Sirius Astronomer by the deadline, currently the 15th of each month. Content and format (and length) are pretty much up to each individual President. If you look back at the President's Messages posted on the website since late 1999 or in past issues of the Sirius Astronomer, you'll see that they often cover current events related to the club or in astronomical circles at the time, giving interesting snapshots of the past. The real point for my purpose here, though, is that each President approaches the President's Message a bit differently, based on his or her interests and background, and these are all equally valid approaches – so, if you decide to run for President and win the position, you would essentially have a free hand in this aspect of the job.

Since the President is the club's chief administrator and spokesperson, there are a lot of informal duties that go with the position, which essentially boil down to taking care of whatever comes up. Sometimes these are significant issues (such as the fire at Anza, getting notice that our insurance would not be renewed, and problems with locations for club functions such as the Beginners Class or the Silverado/ Black Star Canyon star parties, as a few examples), but usually they're fairly minor – people wanting information about the club or club events, people wanting help with astronomical questions or wanting to know if we can show them "their" stars, people wanting to be put in contact with certain members of the club or wanting to sell astronomical equipment, and so on. A lot of people contact the President because that's the first name they see on the "Contacts" list – the plus side is that you get to talk to a lot of interesting people as a result. As to major problems that come up, you quickly find that you are not alone in dealing with them, as other club members as well as other Board members are very generous about pitching in to help once they find out about a particular problem. Overall, even though you may hear that being President involves a lot of drudgery, that's not really true, and, to the extent it might be the case at any particular time, that's more than balanced by all the great people you get to work with and the other pleasures that go with the position.

The point of all this is...

…that serving on the Board, whether as a Trustee at Large or in one of the officer positions, is really a lot of fun as well as helpful to the club, and the duties that go with the various positions aren't really onerous, even for the President and Vice President positions. If you talk to current or past Board members about why they decided to serve on the Board, most of them will tell you they wanted to give something back to the club – we've all benefited from what the club offers its members, and serving on the

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AstroSpace Update

November 2006
Gathered by Don Lynn from NASA and other sources

Hubble Space Telescope (HST) was used to look for galaxies forming in the first billion years after the Big Bang. By looking at very distant galaxies, we see them as they were when the light left them billions of years ago. Hundreds were found at 900 million years after the Big Bang, but only 1 was found in the same areas at 700 million years. The explanation given was that smaller galaxies, too dim to be seen at that great distance, were frantically merging during the intervening 200 million years, forming large brighter galaxies.

More ancient galaxies – Astronomers using the Subaru 8-meter telescope in Hawaii to look for galaxies forming soon after the Big Bang were able to find in the small area searched only 1 confirmed and 1 probable galaxy at the age of 780 million years after the Big Bang. From the many previously discovered galaxies at 840 million years, scientists had predicted 6 would be found in this area. One explanation presented was that this was the time when intergalactic hydrogen was being heated by hot young stars so that it ionized and became transparent. This would say that more galaxies existed at 780 million years, but the universe was not transparent enough to see them. The alternate explanation was also presented, that many galaxies actually formed during this time interval. More research will be needed to distinguish which is the correct explanation. The method used in this search was to develop a filter passing only hydrogen light that had been redshifted by the amount expected from galaxies at the desired age. This yielded over 40,000 galaxies in a 15 hour exposure of the search area. By comparing the brightness through the filter with brightness at other visible and infrared wavelengths, all but 2 were ruled out. One of the 2 was too dim to get a decent spectrum, but 8.5 hours of exposure with a spectrograph on the other yielded a redshift confirming its age.

Yet more galaxies – An analysis of 2 of the deep field images made by HST has identified more than 500 galaxies that are so distant that their light left in the first billion years after the Big Bang. They tend to be smaller and bluer (after accounting for their redshift) than today's galaxies. The color difference is caused by the birth of hot massive stars in the early galaxies. The star birth rate is about 10 times that of today's galaxies. Finding so many ancient galaxies will enable much to be learned about how galaxies formed and evolved.

General Relativity – A team of astronomers using 3 years of observations of the only known double pulsar (2 neutron stars in orbit about each other) has confirmed that effects predicted by General Relativity match the observations with 0.05%. The double pulsar was discovered in 2003, is about 2000 light-years away in Puppis, and they orbit each other in only 2.4 hours at a speed of about 600,000 mph. One relativistic effect measured was time dilation: the slowing of time on one pulsar whenever it is deep in the powerful gravity of the other pulsar. Another effect measured is Shapiro delay: the delay in arrival of radio signals that have passed through the powerful gravity of the other pulsar. The other effect measured is orbital decay caused by radiation of gravitational waves. Large movements of masses radiate gravitational waves. The energy lost into the waves causes the orbit of the pulsars to become smaller. The pulsars were measured to be moving closer to each other by more than 1/4 inch per day. The Shapiro delay is the most stringent test ever of the effects of strong gravitation predicted by Einstein's General Relativity.

New type of supernova – A supernova has been found that appears by spectrum to be a type Ia, but is more than twice as bright, has half again the mass, and exploded with much less energy. This is disturbing because type Ia supernovas are believed to be quite uniform in mass, brightness, and energy. This is because they occur when material is dumped onto a white dwarf star by its companion until it reaches the mass sufficient to collapse and become a supernova. The uniform brightness is used to gauge distances in the Universe. It is known that carbon/oxygen content or an asymmetric collapse can cause slight differences in brightness, but not as much as this case. One possible explanation is that this particular supernova was from the collision of 2 white dwarfs, not from the slow accumulation of matter. It is important to understand this new type of supernova so that it can be recognized and discarded from distance surveys that rely on uniform brightness.

Lightweight exoplanet – A network of small automated telescopes has discovered another exoplanet (planet outside our solar system) by its passing in front of (transiting) its star. Timing of this allows measurement of the size of the planet, and spectroscopic measurement of the star's wobble allows calculation of the planet's mass. It is half the mass of Jupiter, but 1.38 times the diameter (largest known of any planet). The resulting density is the least known for any planet, less than the density of cork. The planet orbits one star of a double, about 450 light-years away in the constellation Lacerta. It is 8 times closer to its star than Mercury is to the Sun, and orbits in only 4.5 Earth days. The diameter is 24% larger than theory predicts for a planet of that mass. Out of the 11 known planets that transit their stars, this is the second with much too large a diameter. Theorists say this could happen only if the core of the planet is much hotter than expected. The only ways known to heat the core that much are tidal heating from a very eccentric orbit, or tidal heating caused by the rotation axis being sideways. Neither seems likely for the 2 extra-large planets.

Hot exoplanets – Another transiting planet search team has found 2 very hot Jupiters, that is, planets about the size of Jupiter, but orbiting extremely close to their stars, making them very hot, in these cases, over 1800 degrees C. They are among the hottest exoplanets yet found, and their atmospheres are slowly being whipped away into space by the heat. The stars, both Sun-like, are about 500 and 1000 light-years away. The planets each orbit their stars in about 2 days. Both were found with a new system, which consists of sophisticated CCD imagers on 8 lenses of 4-inch diameter at each of 2 locations: the Canary Islands and South Africa.

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Education and Radio Astronomy

by Doug Millar

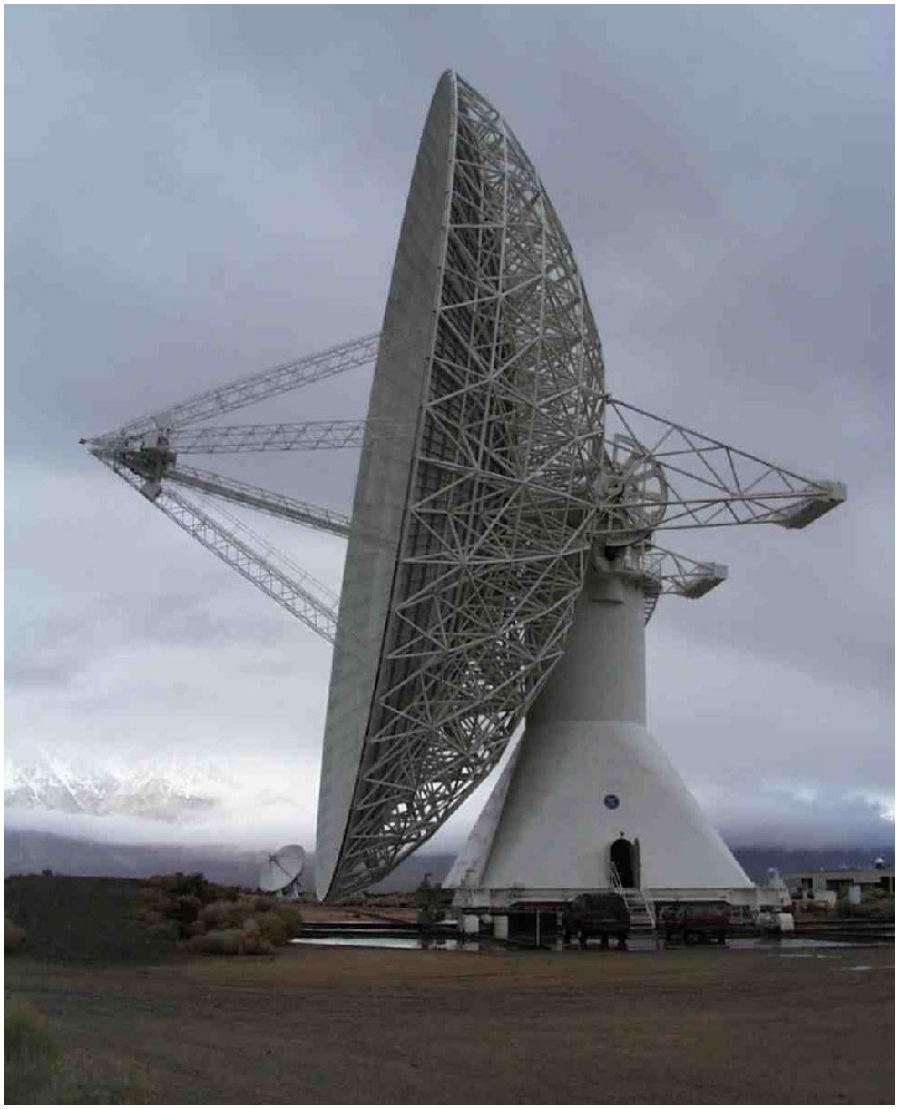
I work both in radio astronomy and in science education for teachers and students, and have been asked to do a monthly article for the Sirius Astronomer about what is going on or may be interesting to OCA members. I have been an OCA member since about 1991 and have served on the board. Professionally I am a professor at several universities in teacher education. My other hobby is ham radio, and in particular using the moon as a reflector for communications signals, called earth-moon-earth reflection (EME).

This month I would like to talk a little about the Owens Valley Radio Observatory. I have bee working for about two years on a project to use their 130foot dish antenna for EME. It is currently the largest antenna used by amateurs for EME. At 74db gain at 10ghz it is quite a performer. On 1.2ghz and 60watts at the feed we dominate communications any time we are on. There has been a great deal of controversy among amateurs about the moon's reflectivity in EME communications. Generally stations have antennas that whose beam more than covers the moon and their signals are dominated by the subtile jitter of the moon and the rough surface that creates a wavery, sometimes there and then not kind of a return signal. The distance is also 500, 000 miles which generally requires as much power as you can muster, the best receivers and best antennas you can get together. In our effort we were curious, since the antenna had such a narrow beamwidth, whether certain parts of the moon were more reflective than others. No one had really looked into the idea. The answer is yes, the smooth parts are more reflective, but not a great deal. It more steadies the signal than anything else.

In terms of radio astronomy this is the first time that the observatory had actually transmitted a signal to observe an object. In this case we reflected a signal off of the moon and measured how that signal was effected by its surface. In a sense it is like reaching out and touching or feeling the moon. Quite an experience.

In the months to come I'd like to focus on various astronomy projects from almost sub hertz to millimeter observing.

The 40-meter telescope at OVRO



On the education side-

During the project, we invited a group of 5th grade students from a school in Lynwood to come up and get a real look at the dish and the OVRO observatory. I will be presenting a DVD of many of the things the students did as well as what the project has been up to. If you are interested, be sure to come to the meeting.

One of my precepts for teachers is that lots of people in the community would love to help you by providing resources for your classroom, but they will never cross the doorstep of your classroom, you have to go find them. I think it is the same for us as astronomers. There are lots of places to visit, and while there are books about them and even organized trips, nothing matches actually being there. Mt. Wilson, Palomar, Goldstone, OVRO, Table Mountain, even John Sanford's Starhome are all great places to visit. There is a long list in our area. You just have to get out and see it. With a little advanced planning, most places and people are very glad to show you what they are doing and share it with you. If you have any great places to suggest please email me at dmillar@moonlink.net.

Take a look at these links and email me with questions if you like. I'll be talking more about the OVRO observatory in coming months.

Here is the link to OVRO http://www.ovro.caltech.edu/
Here is a link to our project at OVRO. http://ham-radio.com/sbms/ovro/

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Yet more exoplanets – HST was used to monitor for a week 180,000 stars in the direction of the center of the Milky Way to look for transiting planets, and found 16 probable planets. Due to the great distances, follow up measurements with Earth-based telescopes have so far been able to determine the masses of only 2 of the probable planets, leaving the possibility that some of them could be too massive to be planets. The 2 were 3.8 and 9.7 Jupiter masses. 16 was about the number predicted to be found based on the numbers of planets found by all methods on nearby stars. When extrapolated, this predicts that there are 6 billion Jupiter-sized planets in our entire galaxy. The Kepler spacecraft, due to launch in 2008, will use the same technique to find transiting planets, but will cover much more of the galaxy, and will be sensitive to planets as small as the Earth. I'm sure that the Kepler designers breathed a sigh of relief when this trial of the technique proved successful. The big surprise is that 5 of the newly discovered planets orbit their stars in less than an Earth day, faster than any of the 200 previously known planets. The shortest period is 10 hours, and it orbits only 740,000 miles from its star, 50 times closer than Mercury is to our Sun. The new planet is heated to about 3,000 degrees F. by its proximity to its star. Most of the 5 short period planets orbit red dwarf stars, which are smaller and cooler than our Sun.

Two theories have been proposed why astronomers have never seen such short period planets before: 1) most planet search has concentrated on Sun-like stars, and they melt and tear apart planets that approach close enough to have such short periods, or 2) the forces that cause planets to migrate toward their stars act near the stars only in the case of small cool stars. Since most of the 200 plus known planets are roughly Jupiter-sized and orbit their stars much more closely than Jupiter does, astronomers have theorized that these planets had to have formed at roughly Jupiter's distance, then been forced to migrate closer. The best theory for the migrating force is that the dust disk about the star out of which the planets form causes a drag force on the newly formed planets, moving their orbits inward. The 5 very short period planets may imply that the inner edge of planet-forming dust disks is much smaller for red dwarfs than for Sun-like stars.

Nearest exoplanet known is a roughly Jupiter-sized one orbiting the star Epsilon Eridani, only 10.5 light-years away. It was discovered 6 years ago by measuring spectroscopically the forward/backward wobble of the star, the most common method of finding exoplanets. But there was some question whether the observations could be caused by atmospheric motion of the star rather than by a planet. So HST was used to observe the right/left wobble of the star (.004 arc second), and it confirmed that all wobble is caused by a planet. Additionally this allowed determination of its mass (1.5 times Jupiter's) and inclination (tilt) of the its orbit (30 degrees), the same inclination as a dust disk known to surround the star. This implies the planet formed from material in that disk, as expected. When the planet is at its brightest in 2007, it may be directly observable by HST or large ground-based telescopes.

Super-Earths – Several exoplanets have been found larger than our solar system's largest rocky planet (Earth) and smaller than our smallest gas giant (Neptune). The guess is that these are probably big rocky planets rather than small gas giants, and they have been dubbed "super-Earths". But some have been discovered orbiting red dwarf stars, and the computer simulations of planet formation are unable to produce large rocky planets at such small stars. A new theory is that the super-Earths are giant ice balls, since there probably is enough ice in red dwarf planet-forming disks to create such. Red dwarf stars undergo a dimming about the time that their planets would be forming, so this would cause large amounts of gases to freeze, making formation of giant ice balls easy.

Brown dwarf & planet system – Scientists using the Spitzer infrared space telescope have imaged a brown dwarf (a star not quite massive enough to fuse hydrogen) orbiting a Sun-like star that also has a planet orbiting it. This is the first such system discovered. The planet orbits much closer to the star (about the size of Mercury's orbit) than the brown dwarf does (about 10 times Pluto's orbit). The planet's orbit is quite elliptical, probably because of the gravitational influence of the brown dwarf. The brown dwarf is so dim and distant that it would not quite be visible to the naked eye from the planet.

Youngest brown dwarf – The same team of scientists also found using Spitzer the youngest T dwarf (the coldest type of brown dwarf), about 300 million years old. Most known brown dwarfs are billions of years old. The companion star to this young T dwarf was already known to have a disk of dust and rocks.

Exoplanet temperature – Spitzer has for the first time ever measured separately the day and night temperatures on an exoplanet, specifically the hot Jupiter orbiting Upsilon Andromedae. The planet was not resolvable separately from its star, but the changes in infrared radiation of the combination, as the planet orbited and presented its day side and its night side, could be translated into temperatures. The temperature difference between day and night was found to be 2550 degrees F.

Milky Way bulge – Using the Very Large Telescope in Chile to examine in detail the composition of stars, astronomers showed that the bulge in the center of our Milky Way formed quickly (within a billion years), early in the history of the galaxy, more quickly than the disk formed. This was determined from the abundance of oxygen and iron in the stars. Those elements became more plentiful throughout the galaxy over billions of years, so their abundance tells when stars formed. The ratio of the elements differed between the bulge and the disk, indicating that the formation of stars that produced iron or oxygen proceeded at different rates in the bulge.

Star formation – Scientists understand reasonably well how stars about the size of the Sun form, but simulations seem to show that forming stars stop accumulating mass when they reach about 8 times the Sun's mass, because they produce enough light to stop infalling material. Yet many examples exist of stars larger than that. New observations with the Very Large Array of radiotelescopes may help solve this mystery. They showed material falling inward to a disk whirling about a young massive (20 Suns) star, with some

material being flung out along the rotation poles of the disk. Such a disk should be able to resist the bright light while still adding material into the star.

Star formation rates – It has long been known that the present rate of forming new stars is much lower than the average over the life of galaxies in order to produce the numbers of stars now existing. A new study of 20 very distant galaxies using the 8-meter Gemini Telescope in Chile shows that this lower rate was true even when the Universe was only 20% of its present age. This implies quite vigorous star formation occurred before that time. It is believed that effects of the central black hole of any large galaxy shut down star formation after this initial burst of star formation. Energy from material falling into the black hole probably heat and expand the remaining gas in the galaxy, keeping it from collapsing into newly formed stars. Evidence of black holes seen in several of the 20 distant galaxies seems to support this explanation.

Chandra (orbiting X-ray observatory) has imaged a gigantic sonic boom generated by the supermassive black hole at the center of galaxy M87. There are loops, cavities and rings in hot X-ray emitting gas, indicating repeated outbursts from the jets near the black hole during most of the life of the galaxy. These shocks are apparently heating the gas in the galaxy too much to allow it to collapse into new stars. Also found were narrow filaments, some over 100,000 light-years long. These have not been seen before, and may be caused by magnetic fields.

More Chandra – For the first time ever, details close to the hearts of 2 quasars were seen by Chandra. This was made possible by finding quasars that happen to have galaxies sitting exactly in front of them, causing gravitational lenses that magnify the quasars. The images supported the belief that a vast disk of hot glowing material surrounds the black hole at the center of a quasar. Because the size of the disk could now be measured, this will refine quasar theory. 20 more gravitationally lensed quasars are known to exist, so they will be observed with Chandra.

Chandra & XMM-Newton (orbiting X-ray observatories) have measured the expansion of a supernova remnant known as RCW86 to show that it had to have exploded about 2000 years ago. Previous methods of dating it had come up with 10,000 years ago. Apparently the discrepancy occurred because the material left in the area by the stellar wind before the supernova caused the expansion to slow drastically in some directions. The new X-ray observations managed to measure the expansion in areas that had not been slowed. The remnant is in the area of the sky where Chinese astronomers saw a temporary star in 185 AD. But astronomers had been reluctant to believe this was the remnant of that sighting because of the differing age. That is now resolved.

The Nobel Prize in physics for this year was awarded to John Mather of NASA and George Smoot of UC Berkeley for their discovery of the ripples and blackbody form of the Cosmic Microwave Background (CMB) using the COBE satellite in 1992. It was considered the strongest evidence of the Big Bang. A decade ago Steven Hawking called this discovery "the most important discovery of the century, if not of all time." Better measurements of the CMB by later instruments gave strong evidence for Inflation, dark matter, and dark energy. The CMB is the brilliant light left over from the Big Bang, but redshifted by the expansion of the Universe so that it is now a microwave radio emission permeating all space.

Swift (gamma-ray burst spacecraft) only detects a gamma-ray burst every day or so, and consequently has had a lot of time on its hands (do spacecraft have hands?). So it took up a hobby, and scanned the entire sky several times using its high-energy X-ray telescope. More than 200 active galactic nuclei (AGNs) were found. This is the most complete census of nearby AGNs ever made, since high-energy X-rays are not blocked by intervening material like other wavelengths of light are. Many AGNs were found that had been missed by previous methods. An AGN is the light emitted by material falling into the super massive black hole at the center of a galaxy. Extremely bright AGNs are quasars (if bright in radio) or QSOs (if bright in visible or other light). It is believed that this census found every AGN within 400 million light-years. Previous studies have shown that nearly every large galaxy has a supermassive black hole at its center, but only a few percent are active, that is, have substantial material currently falling into the black hole. As Swift completes each scan of the sky, the new exposure is added to the old scans to produce a deeper image of the sky. So we keep seeing dimmer and farther galaxies as time passes.

Eris – The former possibly 10th planet 2003 UB313, now ruled a dwarf planet by the IAU, has received its official name Eris, pronounced ee-ris. Not quite as glamorous as Xena, the nickname given by the discoverers. In case you don't remember your mythology, Eris was the goddess of discord and strife, possibly an ironic reference to its discovery triggering the argument that demoted Pluto from being a planet. The moon of Eris received its official name of Dysnomia, the mythological daughter of Eris, and spirit of lawlessness, possibly a reference to Lucy Lawless, the actress in Xena. Mike Brown, one of the discoverers, proposed both the names, which were then accepted by the IAU committee that handles dwarf planet and satellite names. That's a different committee than the one that handles planet names.

Map of the Universe – A team of astronomers has released maps constituting the largest full-sky 3-dimensional survey of galaxies, extending out to 600 million light-years. It was created by measuring 25,000 galaxy redshifts and translating these to distances, which were applied to the 2MASS infrared sky survey. Because the maps were made in infrared, much less is hidden by dust than in maps made in visible light. The only previous 3-D surveys that have reached farther galaxies were made over small areas of the sky rather than the whole sky. Measuring velocities of the galaxies in the new survey allowed a 3-D map to be made of all matter, including dark matter.

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Board is a great way to "give back" by helping the club continue to grow in healthy directions. So, even though all of the election campaigning in the outside world may be leaving you cold about anything that even appears to be related, please do consider becoming a candidate for the 2007 Board. And, of course, come late December/early January, please be sure to vote! ■

(continued from previous page)

Cassini (Saturn mission) has detected what appears to be a large cloud of ethane surrounding the north pole of Saturn's moon Titan. This cloud is probably dropping ethane rain or snow onto the areas recently found to have ethane lakes. The north pole is having winter now, and it is thought that the cloud will move near the south pole when the seasons change. More polar passes by Titan are planned, so more information on this weather will be gathered.

Cassini experienced its longest **eclipse** as it spent 12 hours out of sunlight behind Saturn. The time was spent imaging the rings and planet. Faint ring material shows up well when back lit. The Earth and Moon were imaged as small dots, the first time from Saturn, since they are normally too close to the Sun to point cameras toward them. A new ring was found inside the G ring, and it was determined that it is formed from material knocked off the small moons Janus and Epimetheus by meteoroids. Another ring was found associated with another tiny moon Pallene. 2 more new rings were confirmed within the Cassini Division, and it is suspected that moons will be found in them, but none has yet been seen. One of the new Cassini rings appears in infrared to be the same color as other fresh rings, so the material in it may have been recently added. Breakup of a moon due to collision could do that. Material was imaged being thrown off Enceladus by its geysers and merging into the E-ring. The spokes, lines appearing across the main rings, were seen again.

Ripples in one section of the D-ring have been found that are spaced at intervals of about 19 miles. Images taken in 1995 by HST of the same area show ripples at spacing of about 37 miles. Computer models show that a collision of a comet or meteoroid with the ring in 1984 would cause ripples that change in dimension in that way. A tiny moon on a slightly inclined orbit within the rings that broke up would also create similar ripples of changing size. The ripples are like a corrugated roof, but with the ridges extending entirely around the planet.

A new technique used by Cassini is to image the planet in **infrared**, since it was found that heat from deep within the planet emits infrared that then outlines clouds deeper in the atmosphere than can be seen otherwise. The amount of variety and activity of these deep clouds was surprising. Also seen in infrared was a series of bright spots nearly equally spaced around one of the atmospheric bands. They are actually clear spots in the clouds allowing infrared from deeper to penetrate up. They were dubbed the "string of pearls".

Careful comparison of the Cassini images of the rings with Voyager images from 1980-1 shows a few **new ringlets** since that time.

Mars missions – NASA approved funding to extend the Mars rover missions for another year, yet again. They will reach 3 years of exploration in January. Spirit will resume exploring the inner basin of the Columbia Hills as soon as the spring Sun gets high enough in the sky for full solar power, and Opportunity will explore Victoria Crater, which it reached last month. Also approved were another 2 years for Mars Global Surveyor, which has been orbiting the planet since 1997, and another 2 years for Mars Odyssey, orbiting since 2001. Mars Odyssey is being reprogrammed to take images at an angle (takes only straight down now) so that it can image the polar areas that it does not orbit over. The U.S. participation in the European Mars Express was extended too. With the newly arrived Mars Reconnaissance Orbiter, that makes 6 active missions at the red planet.

Mars Reconnaissance Orbiter (MRO) has begun the highest-resolution imaging ever from orbit. Images of the rover Opportunity even showed the shadow of the camera mast and the tracks it left in the sand. MRO will produce more data from Mars than all previous missions combined. Instruments include the high-resolution imager, a mineral-identifying spectrometer, a ground-penetrating radar, wide angle imagers, and an atmospheric mapper.

Instant AstroSpace Updates

HST has imaged a dark spot (storm) on **Uranus** in visible light for the first time. It is believed to be a product of the changing seasons on the planet.

HST found that the **Red Spot Jr.** on Jupiter has become redder and its winds picked up (to 400 mph) matching the Great Red Spot. Red Spot Jr. was a white storm for decades before turning red last year.

HST observed the Spiderweb Galaxy and showed that it is in the process of being assembled by **merging** of dozens of smaller **galaxies**, supporting the theory that large galaxies formed from merges. Because of its distance, we are seeing the galaxy as it was 3 billion years after the Big Bang.

The Spitzer infrared space telescope was used to observe the **planet-forming** disks around Sun-like stars being ripped away by the intense ultraviolet light and powerful winds from nearby huge stars. This implies planets can form only if there are no nearby massive stars.

The Keck II telescope in Hawaii has used adaptive optics to image the asteroid **Ceres**, obtaining better resolution than even HST, showing features as small as 20 miles across.

Pavel Vinogradov and Jeff Williams and space tourist Anousheh Ansari landed in a Soyuz spacecraft in late September after they had spent 6 months (only 8 days for Ansari) aboard the **International Space Station**. 3 crew members remain at the station, and will be visited by a shuttle mission in December.

Hinode (Japanese solar observatory, formerly known as Solar-B) was launched September 22 with optical and X-ray telescopes and an ultraviolet spectrometer to study different layers of the sun's atmosphere and the effects of magnetic fields. Several NASA instruments are aboard.

ABOUT OUR SPEAKER

Mike Simmons has been involved in amateur astronomy in Southern California for over 30 years. He worked at Griffith Observatory in the 1970s, operating the 12-inch Zeiss telescope for the public, is a past president of the Los Angeles Astronomical Society and is the current Vice President of the Mount Wilson Observatory Association, an organization he helped to found in the early 1980s. Mike is also a leader of eclipse expeditions and organized and led his own tour to Iran for the 2004 Transit of Venus. Mike has met amateur astronomers in several countries during his travels and has written about those experiences for Sky and Telescope and Astronomy magazines. Mike's focus has most recently been shifting to international relations through a common interest in astronomy.

The Iraqi National Observatory was a world-class facility as it neared completion in the early 1980s. As the Iran-Iraq War began, however, the observatory's site on a strategic location near Iran's border brought it under attack by Iranian missiles. The observatory was again attacked by US aircraft during the first Persian Gulf War. Details of this observatory and its fate have been shrouded in mystery in the West ever since. Mike Simmons has just returned from a visit to the observatory in northern Iraq, where he traveled to research articles for national US publications. Mike will give us an inside look at what the observatory was meant to be, its status today and its possible future. Mike will also talk about the isolation of his hosts (members of the Amateur Astronomers Association of Kurdistan), their inability to acquire observing equipment and the 150 pounds of new observing equipment he took them, most of which was provided by OCA members.

FOR SALE: Meade 5" f9.3 refractor with a Celestron CG-5 computerized mount. Includes: polar finderscope, 2" dielectric diagonal; 2" 26mm wide angle eyepiece; 8X50 finder, all rings and mounting hardware with counterweights and case; MV-20 11/4" filter; Cheshire eyepiece and soft case for tube assembly included. All in excellent condition. Contact Val Akins (949) 855-9018 Asking price; $775

ASSISTANCE NEEDED in tracking down telescope donated to OCA in the 1980's by Josephine Webster. The telescope was built by George Webster and is a refractor with hand-ground lenses. If anyone has any information on the condition or wherabouts of this instrument, please contact Donna Zernick at dzernick@thuntek.net

PAD LICENSE FOR SALE: 10 Pad alley, 2nd pad from the East, in a low traffic spot - ideal for astroimaging. Includes shelter wall, shelf, and storage cabinets. Excellent custom made 10" SocalAstro aluminum pier, powdercoated white, electrical outlets. Pier is set up to accept any mount with appropriate adapter plate. I am asking for what I paid for it. Please call Ashton at 714-904-9212 or 714-281-8076

FOR SALE: Meade 14"LX200GPS with UHTC Coatings; Series 4000 Super Plossl 12mm & 26mm Eyepieces; Speed Zero Image Shift Microfocuser; 8 x 50 Viewfinder; 2" diagonal mirror with 1.25" Adapter; Variable-Height Giant Field Tripod; Vibration Isolation Pads; JMI Telescope Carrying Case for Meade 14"LX200; Meade Superwedge; Losmandy dovetail plate for 14" LX200; #777 Off-axis guider; Scope Stuff Balance System; AC adapter for 12 VDC Power from 120 VAC; 12 VDC Power Cord; EZ Balance On-Axis Counterweight; Ergonomic Handles One Pair. Equipment in excellent condition. Complete system $4,900. Contact Rick Brown 714-418-0872

The Creatures of the Night
by Bob Buchheim

In one of the old Dracula movies, travelers through the eerie Transylvanian wilderness are serenaded by the howling of wolves in the distance, and Lon Chaney (as the Vampire) murmurs, "Ah, the children of the night – what a lovely song they sing". Sort of like the song that the coyotes sing out at Anza.

There has been some discussion about encounters with wildlife while stargazing. That reminded me that some of my most memorable observations were of critters under the stars:

In the "wee hours" under the stars in the California desert, my study of some faint astronomical fuzzy was interrupted by the eerie feeling that I was being watched, and a barely-perceptible hint of movement off to my right. I looked up, and there, staring at me was the biggest raccoon I've ever imagined. I mean BIG— the mother of all raccoons – when she sat up on her haunches, she must have been over 3 feet tall. We were separated by perhaps 8 feet. I wasn't sure whether to be worried or not. Somehow, I'd completely missed the classes on raccoons in school, and didn't know if they had sharp claws, big teeth, or aggressive tendencies. I did vaguely remember hearing a recent news report that some of the local critters were rabid (or was it that their fleas carried Black Plague? I wasn't sure). My very limited woodcraft suggested "first thing: show no fear". So I held my ground. She held hers, maintaining her curious study of me, as intently as I was studying her. Well, I couldn't let this go on all night, so after a short spell, I decided to take one confident step toward her. She responded by taking one confident step toward me. Now we were perhaps 5 feet apart. At length, uncertainty was overwhelmed by curiosity, and the irresistible cuteness of her perfectly-groomed, bandit-mask face, and I took another step toward her, which prompted a slow turn and waddling retreat on her part.

On a summer night in a pitch-dark meadow at Drakesbad, in the middle of the Lassen National Park, it was so dark that I literally couldn't see my hands in front of my face, unless I held them up to the sky, where I could see my fingers silhouetted against the granular glow of the Milky Way soaring overhead. I had forgotten my flashlight, and so was operating my 'scope by feel, reveling in the clarity with which I was able to see objects that were too faint to even attempt at my home observing sites. Then, out of the distance, came a "thump-swoosh-clump-swoosh", as something very large, and very heavy, walked through the tall brush and soft dirt of the meadow. It took perhaps 5 seconds to confirm that whatever it was, was headed in my general direction from the far side of the meadow. Oh, boy, my mind riffled through the rolodex of creatures that might live in this wilderness: we've got deer, probably moose, certainly bears, plenty of mountain lions, maybe Bigfoot, and who knows what else. I stamped my feet, hollered a couple of times, and began giving serious attention to the problem of how to use a 13-inch Dobsonian as a defensive weapon, as the clumping and swooshing approached, passed by, and (happily) moved away from me. I was just calming down, when the horses in the corral at the other side of the ranch started setting up a yowl, mixing whinnies with kicking of the stalls and all sorts of equine objections to whatever it was that had entered their neighborhood. I never did find out what it was, but I guarantee that I'll be able to recognize those footsteps if I ever hear them again!

A few years ago, contributors to the internet newsgroup sci.astro.amateur shared their stories of encounters with critters in the night. Here are a few. (I hope I've given credit to the correct witnesses).

- *Jeff Medkeff shared two stories:*

One night (at about 4:00 AM actually) I went to bed, leaving a dewed-up Newtonian set up in my back pasture, the idea being that the dew would dissipate and I would come out and cap up the telescope once I woke up some hours later. When I arrived out there the following noon I found that a bird had begun to build a nest in the OTA. I discovered this by swinging the telescope to the northward-pointing 'stowed' position, and finding the telescope severely out of balance. I executed a German flip and found it still out of balance, but heard something rattling around in there when I moved the scope. I pointed the telescope at about 40 degrees above the horizon and stuck my head in front of it so as to look down the tube. The bird, apparently seeing me in the primary mirror, exploded out of the top of the tube in a Mach 3 panic! (I ducked – it's amazing how fast reflexes are in true emergencies). Bryan Greer, maker of Protostar spiders and secondary holders, has a bird proof product there, among their considerable other virtues!

My logbook reveals that at the beginning of one night I tossed my heavy coat on the ground for convenient storage until I got cold. I later put it on then took it off much more rapidly on account of the snake that had taken up residence in one of the arms. In rattlesnake country, this can be more dangerous than unnerving, but in this case, the snake was a fine specimen of darter, so more unnerving than dangerous. On another occasion I found a field mouse in my coat. Presumably the latter is thankful not to have met the former..."

- *Jim (no last name recorded), told a cautionary tale:*

About 6-7 years ago, I went up the Blue Ridge Parkway about 20 miles from town, to get away from the city lights. To "enhance" the C-8+, I also took a drive-thru supper, hot chocolate in a thermos, and a couple of oatmeal cookies. I set the 'scope up behind the car in the twilight, ate a couple of tacos, then spent several pleasant hours observing, with the hatch back open (it makes a handy table, you can hear the stereo, etc.) stopping a couple of times to munch on the goodies lying in the hatchback. I packed up about eleven, and headed back down the mountain to town. Less than half a mile from where I'd been observing, I saw a

large shaggy dog run across the road in the headlights. He turned and ran parallel to the road, and as I passed him, I realized that his back was a bit higher than the lower window-line on the car (944), and that he was *not* a dog! Hello, Mr. Bear! My, you're out late tonight! That's the last time I'll be found snacking while observing, at least while outside of town..."

Jim presumably pays more attention to his surroundings at night now!

· *Mark Wagner (from the San Francisco Bay Area astronomers) shared the following tales:*

We've had coyotes, cattle, wild pigs, rattlesnakes, attack squirrels and threatening hummingbirds in the observing site. "Exactly how does an attack squirrel attack?" you ask. Read on:

The attack squirrel and the threatening hummingbird were part of a bad weekend that a fellow observer from Castro Valley California had at Fremont Peak a number of years ago. The observer's name is Dan, and after arriving began along telescope row toward a friend's camper. As he approached, the friend's Doberman Pincer, tethered to the camper, "leaped" at Dan, and latched onto his pant leg.... dog tether fully extended out. Lots of yelling, thrashing and dancing around, but no damage other than torn pants.

Later he began to set up his SCT. The tripod was put up, and as Dan was carefully setting the scope onto it, the attack-squirrel leapt out of nowhere (from Dan's perspective) landing right on the tripod! Scared the daylights out of Dan.

After he was done observing, Dan sacked out in his sleeping bag right on the ground next to his 'scope. The following morning, he was awakened by the sound of a loud, low flying "airplane". He opened his eyes and there, hovering inches above his nose was a very curious hummingbird. I'm sure you can imagine how startling that had to be.

I don't think I've seen Dan since!

You are probably thinking about sleeping in your vehicle as protection from such encounters. Mark Wagner's final story warns us that being sleepy in the dark presents mechanical risks, too.

We also had one observer, asleep in his truck, accidentally kick the gearshift into neutral (was sleeping in the cab of the truck), starting him on an uncontrolled ride down the mountainside. He thought it was an earthquake as he awakened in the cab. I had awakened in time to see the truck rolling out of the parking lot and heading toward the wooden guard-rail alongside the road out. Nobody was hurt, even though the truck became airborne stopping in a bunch of poison oak a couple hundred yards downhill (the occupant had actually been thrown clear when the truck launched into the air).

Talk about heart failure!

· *OK, now remember that firearms are prohibited at Anza while you read this next one:*

Allan Mayer reported, "I had a bobcat stalk me once in the middle of the Allegheny mountains once. I was by myself in the middle of nowhere, there wasn't a person around for miles. Anyone who has ever heard a bobcat SCREAM will never forget it! This pesky critter kept screaming, and getting closer. Knowing that they normally avoid humans at all costs made me a little worried... so I finally fired a shot over its head. That must have angered him, because he made even more noise and got within 10 yards of me. At that point I emptied the whole cylinder at him directly. He backed off to around 30 yards or so, but wouldn't go away. This is *very* unusual activity for a bobcat, definitely not normal behavior! Something was wrong here. I left, and the bobcat was still screaming.

Bob May offered an explanation for this curious behavior, but it probably didn't make Allan feel much better: "From the actions, I would say it was a female in heat. If she was hunting you, you'd never hear her." Oh, my.

Finally, if there was some sort of medal for presence of mind under extreme stress, it would go to the astronomer (whose name I've lost) who described the night that he was staring into his eyepiece, when he felt something rub against his ankle. Like a cat would, except he didn't have a cat. Luckily, he looked down before moving, and what he saw was a skunk, snuggling up to his leg! Several moments of frozen terror followed, with him standing like a statue and barely breathing. At long last, the skunk wandered off, and our intrepid astronomer nearly fainted from the sudden release of tension.

Happy stargazing, and remember, astronomers may be the top of the evolutionary tree, but we're not the only creature that inhabits the darkness!.

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