SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

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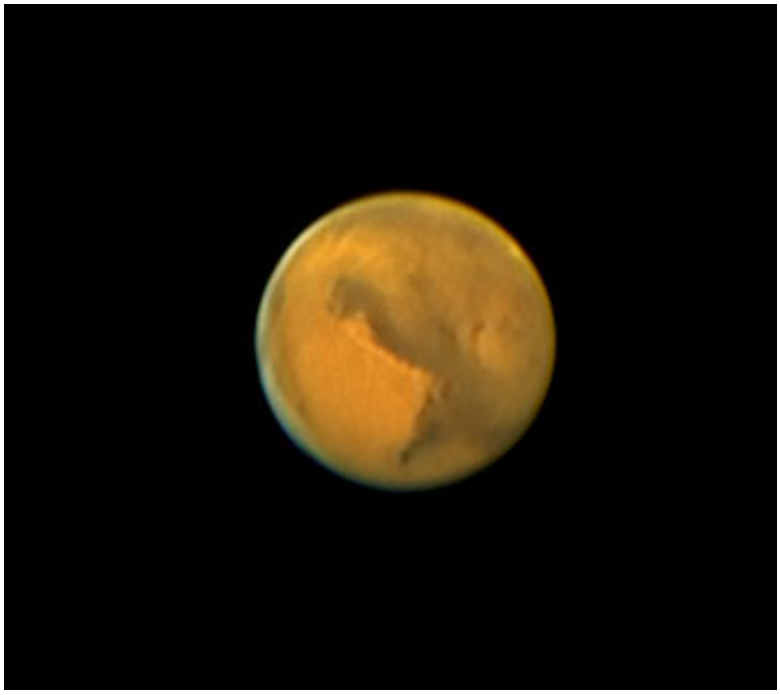
MARS PHOTO CONTEST WINNERS!!!



FIRST PRIZE - $50 - Craig Matthews

ADDITIONAL WINNERS INSIDE

Many thanks to all who participated!

OCA CLUB MEETING

The free and open club meeting will be held Friday, January 13th 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 yet to be arranged as of press time. Please check www.ocastronomers.org for more details

NEXT GENERAL MEETING:

January 13th

STAR PARTIES

The Anza site will be open this month on January 28th. The Black Star Canyon site will be open this month on January 21st. 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, January 6th (and next month on February 3rd) at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.
GOTO SIG: Jan. 6th (in conjunction w/Beginners Class)
Astrophysics SIG: Jan. 20th, Feb. 17th
Astro-Imagers SIG: Jan. 17th
EOA SIG: Jan. 23rd, Feb. 27th
Dark Sky SIG: TBA (contact coordinator for details)

2006 CANDIDATE STATEMENTS

[Organized By Position Sought and Order Received. Candidate statements not posted by press date may be found on the OCA Website at www.ocastronomers.org]

PRESIDENT:

Dave Radosevich

It has been my pleasure to serve the OCA as President for 2005. Its my hope to continue to serve our great club. This past year, I have focused on several fronts that I would like to continue in 2006. Its no secret that my main focus has been on our observing site Anza. We have re-established the Anza Site Committee and opened its doors to the membership. We hope to accelerate past years efforts in developing new areas on the property such as more Pads, Private Observatories, and a new Members Observatory. Other focused area's like our General Meetings need more work. I will continue to improve and organize our meetings as they have become a hallmark for other Astronomy Clubs. I hope you have enjoyed aspects of our meetings with the acknowledgement of members deserving recognition. We have so many "behind the scene" members who really deserve our thanks. Many challenges await us in 2006. With careful planning and a responsible fiscal budget, I will assist in these issues like: The observatory roof replacement - The development of the North West Territories (Anza expansion) that will add some 75 Pads and 28 Observatories - The introduction of ASCR's (Anza Site Code of Regulations) - and the Fence repairs. I look forward to your trust in allowing me to serve again.

Barbara Toy

OCA is a diverse club whose members are engaged in an amazing array of activities – and all out of an interest in astronomy. I've been fortunate to have the time and interest to become involved at some level with all of our Special Interest Groups as well as our outreach program and Beginners Class – which has been a great way to learn a lot more about astronomy as well as about the club! I've also been involved in the Anza planning process from the beginning, and have taken on a number of projects at our Anza site, including getting the septic tanks pumped (a truly memorable experience!), painting the white edges on the various stairs on the site to make the steps more visible at night, and, more recently, overall responsibility for the club observatory and the Kuhn telescope. I got involved with many of these activities during the four years I was on the OCA Board – one as a trustee, one as Vice President, and two as President – and the combination of all of these activities has given me an unusually broad as well as detailed view of the club's interests, needs and activities.

This last year away from the Board has given me a better outside perspective on overall club concerns and on the relationship between the Board and the general membership than I could get as a Board member. One reason I am running again for president is that I am now aware of things I would like to do to improve member accessibility to the Board that I can do most easily as President, such as establishing firm procedures so agendas are regularly posted on the website before Board meetings, making minutes of Board meetings easily available to the general membership, and establishing a regular practice of reporting Board actions to the general membership. I would also like to develop a regular process to ensure that any member whose interests would be affected by a proposed Board action automatically receives direct notice of the proposed action and has a meaningful opportunity to participate in the discussion leading to the final decision. This has been done on a rather hit-or-miss basis in the past, but, as we increase the variety of activities our members are engaged in, and as we increase the numbers of pads and observatories at our Anza site, we have more and more members who could be directly affected by Board actions. Having a more formalized process will help ensure that rights of individual members are protected, and will also get more complete information to the Board as it considers these issues, which should lead to better decisions overall.

Besides these procedural goals, I will continue to work on the replacement of the observatory roof and the other major projects still pending at our Anza site, such as completion of the perimeter fence, improvement of the roads on site and leading to it, and the Anza planning process, and on such upcoming events as the AstroImage 2006 conference next August. This is going to be an eventful year for the club, and I hope I will have your support to see it through as OCA's president.

VICE PRESIDENT:

Craig Bobchin

My name is Craig Bobchin and 2006 will mark my 4th year as a member of the OCA. I'm running for the Vice president's spot again this year. During the past year, I've had the pleasure to meet and interact with a great number of our members. I've also brought a wide and interesting variety of speakers to this past year's meetings. I have several ideas for more speakers this year that I am working on.

I have been active in many of the club's SIGs and activities, I'm a member of the Astroimagers sig, The Go-To telescope SIG, and I participate in many outreaches and beginner classes.

During my tenure as Vice President, I have also had the pleasure of using my business travel to meet and interact with other astronomy clubs across the US and spread the exposure of the club far and wide.

I feel that you, the members are the club's greatest asset, and I look forward to meeting and working with as many of you as

AROUND OCA

By Barbara Toy

As I write this, Christmas is approaching with its usual breakneck speed – and by the time you see this in the Sirius Astronomer, we'll be in a new year. I hope a lot of you were able to celebrate New Years Eve at the Anza star party – what better way to ring in the New Year than a fine night of astronomy with good friends?

Board Election for 2006 –

As you may have noticed from the last issue, we're also celebrating the New Year in our usual way by electing a new Board for the club. The ballot has been posted on the website and a copy should be enclosed with your January issue of the Sirius Astronomer. The instructions on how to vote are on the ballot itself – besides clearly marking the candidates of your choice (no hanging chads on these ballots!), please be sure to print your name clearly on the outside of the envelope so Bob Evans can validate your ballot and so it can be counted.

All members who are 18 or older can vote, so if you have more than one eligible member in your household, each one should send in a ballot in a separate envelope, or turn it in at the January general meeting. You can copy the ballot that comes with the newsletter for any additional voters, or download enough copies for all of them. There will be ballots available at the January meeting as well, so you can get one there if you haven't been able to get one by other means. If you have any questions or concerns about the process, please feel free to contact me at btoy@cox.net or 714/606-1825, and I'll do my best to get you an answer.

Almost all of the candidates have submitted Candidate Statements, which are posted on the website and should be appearing elsewhere in the January issue of the Sirius Astronomer – please do read them to get a better idea of the candidates' interests and backgrounds if you haven't yet done so. In my last column, I gave a brief introduction of the first two new candidates for the Board. I didn't include the current Board members, partly because I've talked about all of them in the past, and partly because they are more familiar to the general membership than the new candidates because of their current Board positions. Since then, Steve Condrey has also decided to run for a trustee position, so we are in the enviable position of having three more candidates for trustee than we have positions to fill. If Steve's name is familiar, it's probably because he's the current editor of the Sirius Astronomer, and he also often helps out with the club's library during the general meetings – so he's a great addition to our group of contenders for the trustee positions.

The candidates have done their part by agreeing to run and agreeing to serve if elected – it's now up to all of you to do your part and vote!

Anza Site – Issues on Developing the Northwest Territory

First, a Bit of History…

The Anza Site Planning Committee is currently working out the details of implementing the general plan for our Anza site that Riverside County recently approved. This plan includes areas for further member pads and observatories as well as space for other club facilities. A couple of issues that have recently created a lot of discussion on the committee is how we should approach development of new observatories and the degree to which the general membership should cover the costs of developing new areas at the Anza site and how much of those costs should be borne by the pad and observatory licensees in that new area.

One of the reasons the club bought the Anza site years ago was to be able to provide a safe and dark observing area for members that they probably couldn't afford if they had to provide it on their own. This was seen as an important service of the club to its members, and it was generally felt that even the members who didn't go out to Anza got indirect benefits that justified continuing to fund the development of the site from the club's general funds. There are a lot of members who joined the club specifically because we had the Anza site, and this increase in the size of the club has definitely encouraged the wide variety of activities sponsored by the club, which benefits all members. What members do at Anza also regularly enriches the club's activities in Orange County – the ever-expanding image gallery on our website and slide shows of recent images at the general meetings are very visible signs of this effect. Based on this philosophy, in the past the club itself has paid for grading the new areas and other such development costs.

The understanding of club and of the original pad and observatory holders in the early days at Anza was that, when the rights to a pad or observatory were transferred to a new holder, the original licensee was entitled to recover his/her costs to construct

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the pad or observatory from the new holder, but the transfer price was not to be used as an opportunity to make a profit – in other words, the opportunity to have use of one of these sites was a member benefit, not an investment opportunity. Up to this point, the club itself has not been involved in negotiating the terms of license transfers other than to provide names of people who have expressed interest in obtaining such an interest on request. Anecdotally, at least, the club leadership has become aware that more recent transfers of license interests, particularly for pads, have been at prices high enough that at least some of the transferors have obtained a significant profit from the transaction, even though what has been transferred is merely a license to use a particular pad or observatory and there is no obligation on the part of the club to compensate any of the pad or observatory holders for the loss of their pads or observatories if we had catastrophic damage to the site or if the club ever decided to sell the site.

In the past, the club has generally encouraged innovation, particularly in the design and building of observatories; as a result, we have quite a varied collection of member observatories on our site. The club has also provided people with chances to try types of work that they don't generally do in other parts of their lives. A lot of people get pleasure from building things themselves, and a lot of our facilities at Anza are the direct result of the physical efforts of club volunteers – the club observatory itself is a prime example, and those who were involved in that work still get pleasure from reminiscing about it. Some of the newer observatories and pad areas have been built with the help of club members who also are construction professionals – mainly Gary Schones – but the licensees still seem to enjoy getting involved in the process and doing a lot of the work themselves.

Current Considerations…

The reason for going into this history is that we are now at something of a crossroads on Anza development issues. One area of serious concern is how the grading and other infrastructure (such as new electrical service) will be financed, given the major projects the club is already committed to and its ongoing operating expenses. Replacing the observatory roof and finishing the perimeter fence at our Anza site are both significant upcoming expenses, and the upgrading of the on-site broadband network so we will again have Internet access throughout the Anza site has been a recent significant expense. The road approaching the Anza site also needs a lot of work, as do several of the roads on site and the entrance area to the Football Field – because they are all dirt, maintaining the roads is an ongoing necessity so our members and guests can use the site in safety. These items are all priorities, and the club doesn't have unlimited resources. On the other hand, there has been a lot of pressure for the club to get started on the new development from members who are interested in getting a pad or observatory, especially as it has taken so long to get the overall site plan approved. So, one issue the committee has to consider is how the financial burden of the new development should be handled, and whether we should change our past approach to one that will shift all or a significant percentage of the burden to those who will be benefiting most directly from the new development, i.e. the new pad and observatory holders.

Concerns have also been expressed about building standards for any new observatories that are approved. One suggestion that has been made is that the club require that the actual construction of any new observatory would have to be by a licensed contractor, not by the licensee and other volunteers, as has often been done in the past. At the least, any new construction will have to pass county inspections, and the club may feel the need to specify some standards beyond that.

At least three different proposals have been made for standardizing the building of any new observatories. One is that the club would provide a standardized plan or set of plan options, and any new observatory would have to be built according to that plan or one of the approved plans. Another is that, in addition to the approved plans, the club would actually provide a kit or make arrangements so a new observatory licensee could obtain a kit from an approved vendor for an approved observatory structure, most probably for a steel observatory with a roll-off roof.

The most involved proposal is that the club would itself build a set of approved steel-structured observatories with roll-off roofs (these would consist of the underlying slabs or foundations, the outer walls and the roof, and the licensee would then finish off the interior to meet his or her needs). The new licensees would then pay the club an appropriate amount instead of undertaking the construction themselves. The club itself would have to oversee the construction, though it would either have to get a qualified member to act as general contractor for the work or hire a general contractor. According to the initial proposal, the club would also have to carry the costs of the construction up front, though the members who ultimately obtained the license rights would be paying an amount that would cover those costs, and potentially such costs as the grading and new power service. Variations on the theme include having the ultimate licensee for these observatories pay the club up front to cover the costs of construction; this would probably require that the funds be held in escrow and that the costs of construction be paid out of the escrow account, which would be an additional burden to Charlie Oostdyk or whoever else the club designates. One attractive feature of having a group of observatories built this way, however, is that we may be able to bring the cost of the

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individual observatories down by ordering the parts and doing the construction of the group together – but that would only work if the observatories are identical.

At this point, individual members of the committee have their own opinions about what would be in the best interests of the club in these areas, and some have claimed an insight into what other members of the club feel in these areas based on whoever they happen to have talked to, but we don't have any real information about what the bulk of the members in the club think about these issues. Since the decisions made by the planning committee will undoubtedly influence the Board in its ultimate decisions in these areas, and since whatever the Board adopts regarding this new development will have a major effect on the club for years to come, I think it's really important that all of you let us know your thoughts on these issues. I am not speaking for the committee in any way in bringing these matters to your attention or in asking you for information, but I would like your feedback on the following questions, and expect to share it with the other members of the Anza Site Planning Committee:

1. Are you interested in obtaining a pad or observatory license in the area we are planning to develop, that is, generally the northwest portion of the Anza site? (If so, and if you aren't yet on the "interest list" for whichever you are interested in, please email me to be put on the appropriate list.)

2. Do you feel that the club should continue to bear the cost of grading and other general infrastructure needed for the development of the new area, as it has in the past?

3. Do you feel that the licensees for pads or observatories in the new area should bear all or some of the cost of grading and other infrastructure in the new area on some appropriate pro rata basis? If you feel that they should bear just a part of the cost, how much?

4. Please give us whatever suggestions you might have for what the club could do to ensure that appropriate building standards are met in any new construction on the Anza site.

5. Do you believe that the design of any observatories that are built in the new area should be handled along the same lines as in the past, which is that individual members seeking a license bring their own proposed designs to the Board and seek approval based on those designs?

6. Do you believe that the club should mandate one or a few specific designs for observatories in the new area?

7. Do you believe that the club should mandate the use of approved kits for the building of observatories in the new area that would be from one or a few specific manufacturers?

8. Do you believe that the club should be involved in building a group of observatories that would later be turned over to licensees in return for an appropriate payment?

9. Would you be interested in obtaining the license for a steel observatory built by the club, consisting of foundations/slab, outer walls and a roll-off roof, as one of a group of identical observatories? If so, would you be interested if the price was around $15,000? If it was around $25,000? [Please note: at this point we don't know what the price would reasonably be, but it appears that the range is probably $15,000 to $25,000.] If you are interested in obtaining such a license and want to be put on an interest list for such an observatory if the Board ultimately decides to do this, please email me at to be put on the list.

I am very interested in any comments you might have in these areas. It would be easiest for me if you could email them to me at btoy@cox.net; if you want to mail them, please send them to me at the club's address, P.O. Box 1762, Costa Mesa, CA 92628. Of course, if you want to discuss these things with me in person, I would be very pleased to talk to you about them, but it will be harder for me to give an accurate report of your opinions to the committee or, if appropriate, the Board.

TECHNICAL ASSISTANCE NEEDED FOR OUR WEBSITE

We need someone to handle the technical side of the OCA website. Hassi Norlen is our Website Editor, and deals with content and a lot of the day-to-day maintenance, but we need someone who can deal with the "down-and-dirty programming" aspects of the website. If you have knowledge of VBScript, JScript, Javascript, Access Databases, Microsoft IIS (Internet Information Server) and ASP (Active Server Pages), as well as HTML, and understand and are able to code dynamic web sites running under Microsoft IIS developed using ASP and Microsoft Access databases, you have the necessary skills for this, and we could really use your help.

If you can help us out with this, please contact Hassi Norlen (hassi@norlens.net or 714/710-9444) or Barbara Toy (btoy@cox.net or 714/606-1825).

CRADLE OF LIFE

A Book Review by Gordon Pattison

Cradle Of Life (1999) by J. William Schopf, UCLA Professor of Paleobiology and Director of the Institute of Geophysics and Planetary Physics.

The oldest fossils ever found on the Earth are 3 ½ billion years old. The Earth was only one billion years old at the time they originated. These fossils are found in chert and are microscopic prokaryotes (organisms without a cell nucleus), which fortunately produced oxygen in their life process.

Prof. Schopf dedicated his life to the search for these fossils showing Precambrian life and finally found their oldest forms in chert deposits in western Australia. In this wonderful book he describes the search for Precambrian life from Darwin to the present day. Science has learned a great deal about Precambrian life in the last 35 years, which is expertly described in this book. Everyone needs to know the Earth's history in its very earliest years.

As an additional area of particular interest to people interested in other planets and in the quest for extra-terrestrial life, Dr. Schopf includes an account of the recent controversy over the markings in certain Martian meteorites that were claimed to be fossil evidence of life on Mars. Naturally, Dr. Schopf's expertise in finding extremely ancient life forms caused NASA to ask for his advice in the study of these Martian meteorites. Among other things, he describes his reluctant participation in a crazy press conference resulting from the claims that these meteorites contained signs of life on Mars.

This book is an excellent read for anyone interested in the development of the earliest life forms on earth and in the application of the expertise obtained in learning about them to evaluating what might be signs of life outside of our planet.

The Orange County Library has copies of this book.

possible should you choose to re-elect me as Vice-President. *(continued on page 7)*

SECRETARY:

Bob Buchheim

2005 marked my 20th anniversary as a member of the OCA. During those years I've taken advantage of many of the opportunities that OCA offers, participated in several outreach events, and made quite a few friends. I've shared my enthusiasm for astronomy in general, and amateur research in particular. During 2005 I was the club's Secretary, and in that role I hope I was of some help to the Trustees and the members. I would be honored to continue in that position for another year. During 2006, I will endeavor to bring our plans for further development at Anza to fruition, to get the Minutes and action items from Board meetings prepared on time, and support the ongoing activities of the Special Interest Groups."

TRUSTEE AT LARGE:

Steve Short

Thank you for electing me to the OCA Board last year. I have tried to keep the best interests in mind for all the club members as Board decisions have been made which affect every aspect of the club . The decisions made next year will be particularly important for members regarding our Anza dark sky site and the new developments that are planned to be made.

Since it was not all that long ago that I was a just an astronomy beginner, I am particularly interested in seeing that we provide the best club resources for newcomers. That is why I try to attend all the OCA Beginners Classes, help at the OCA public outreaches and run the nearby Black Star Canyon star parties for the club.

If elected, I promise to try and attend every future board meeting and scrutinize each issue that arises in the biggest and finest Astronomy club in California, if not in the USA!

Alan Smallbone

My name is Alan Smallbone and I am running for a trustee position. I have had a long time interest in astronomy and science in general. My background is in electrical engineering and I currently work with aircraft flight controls. I have been an active member of the OCA for just over 1 year, in that past year I have been active in the AstroImagers SIG. I have given presentations at the meetings related to beginning Astrophotography. I have also volunteered to be a presenter at AstroImage 2006. I am an active imager and frequent Anza, which has led me to be a member of the Anza Site Committee helping to plan and implement future development of the Anza site. I feel that my background and skills can be beneficial to the club and that is why I am seeking a position as trustee.

Tom Kucharski:

My name is Tom Kucharski. I have been an amateur astronomer for forty years, an OCA member for the past eight years, and a Trustee for the past two years. I have been active in OCA-TV, the AstroImagers SIG, the planning group for AstroImage 2006, and the Anza Site Planning Committee.

Next year will be an important year for OCA as we try to prioritize critically needed improvements at Anza with the interests of all club members. If elected, I will continue to provide support for members' individual concerns while being sensitive to OCA's overall strategic requirements. Thank you for your past support.

Leon Aslan:

My name is Leon Aslan and I'm running for a Trustee position. I have been an active member of the OCA since joining in the late 90's. I work as a Sr. Mechanical Engineer for a large aerospace company by day and am an astronomy junkie by night. Aside from my technical skills, I'm also very savvy in the art of negotiation and getting things done efficiently.

I have been a member of the OCA AstroImager's SIG since its inception and continue to image from the Anza site regularly. I have learned quite a bit about the hobby and have met a lot of outstanding people since joining the OCA. I feel that this position would provide me with the opportunity to give more back to the club, so get out there and ROCK the VOTE!

Bill Hepner

I am running for re-election for a seat on the OCA board as a trustee. During the past year I've looked out for the interest of the members. I have backed some proposals sent to the board and have expressed dissatisfaction to some also. I have made proposals as well. We as board members run the club for you. You are the club not us. If you want me to continue to look out for your interest then please vote for me. I have enjoyed working for you and look forward to doing it again.

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ASTROSPACE UPDATE

January 2006

Gathered by Don Lynn from NASA and other sources

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

Dark Energy – Preliminary results have been announced from analysis of the first 1/10 of the data to be collected in the Supernova Legacy Survey, which is determining distances of supernovas out to such distances that the light from them has been traveling to us for half the age of the Universe. One of the factors measured is called w, and different theories of dark energy predict different values of w. The measured value from this survey is –1, within 10%. A cosmological constant (unchanging repulsive force) predicts –1, while multidimensional, cosmic string and quintessence theories of dark energy predict w would be –0.9 to –0.7, and the Big Rip theories require w to be substantially less than –1. By the end of the survey they hope to pin down the value of w within 3 to 5%.

Dark Matter – A team of astronomers used Hubble Space Telescope images taken to study 2 large very distant galaxy clusters to measure how much gravity is bending light (as per General Relativity). The result is a map of gravity within the images. Since dark matter possess gravity, we can then map where dark matter exists. The galaxy clusters were found to coincide with the densest regions of dark matter. This bolsters the theory that galaxies and galaxy clusters formed early in the history of the Universe at places where the gravity of dark matter attracted enough ordinary matter to form those galaxies. The dark matter map also told us a property of dark matter: that dark matter particles are essentially collisionless, somewhat like neutrinos, which very rarely collide with anything. This was inferred from the lumpiness of the dark matter, and the fact that collisions of particles tend to smooth out lumps of particles. The study is scheduled to continue mapping dark matter for at least 15 galaxy clusters.

Integral (orbiting gamma-ray observatory) has discovered a new class of X-ray fast transient binary stars. Such a star is composed of a compact object (black hole or neutron star) with an orbiting companion star that is a very luminous supergiant. A few such pairs were known to exist before Integral found a characteristic pattern of fast bursts in X-rays, lasting only a few hours, produced by material falling into the compact star. Integral's observations have found this pattern to be common, implying that this class of binary is common, but not easily detected by other means than fast X-ray observations. This will cause astronomers to rework theory, which said that such pairs should be rare because the lifetime of a supergiant is quite short. Bursts from matter falling into other classes of stars typically takes months, so theorists also need to explain how the matter can fall in just hours for this class.

Cassini (Saturn mission) imaged Enceladus in such a direction that it was backlit by the Sun, and it revealed fountain-like sources of fine spray towering up to 300 miles above the area known as the tiger stripe fractures. This proved what was suspected, that material is geysering from the fractures. This requires higher temperatures than theory said should exist inside Enceladus. Theorists are working on explanations involving either tidal heating or radioactivity. Cassini also took the most detailed pictures of the tiny (52 miles) moon Pandora, the moon that shepherds the F ring, during a relatively close pass. It is covered with icy debris, partially filling in its craters.

Cassini has been imaging the rings edge-on as its orbit crosses the plane of the **rings**. One image shows a bulge at one spot. Three theories have been proposed to explain the bulge: scarce material shows up only at this low angle of view, a tiny moon is stirring up the rings matter there, or collisions with a tiny moon are throwing off the material seen. Further observation is needed to distinguish which of these theories applies. Another image shows a dark lane lengthwise across the ring. This probably means that there is darker material extending farther out than the bright material of the rings.

Huygens (Titan lander) – The results of a year of analysis of the landing data were announced: The descent went through treacherous winds up to 270 mph, and experienced temperatures from minus 333 to –154 degrees F. The surface was –289. Electrical activity was detected at about 37 miles altitude that was probably caused by lightning. The temperature and density in the upper parts of the atmosphere were higher than predicted. Two layers of ionosphere (electrically charged layers) were found, where only one had been predicted. The surface had the resiliency of sand, mud or somewhat packed snow, but definitely was harder than powder snow. The lander probably hit an icy pebble like the ones in the surface pictures. The ground around the landing site varied in height by only about 1 yard, and was relatively smooth. The surface was damp with liquid methane, and the heat of Huygens caused it to vaporize. Such organic compounds as cyanogen and ethane were detected in the surface, but not in the atmosphere above it. The atmosphere generally rotates faster than the planet, resulting in the high-speed winds, but this effect drops toward the surface so that winds below 3 miles altitude are only a few mph. The amounts of certain isotopes of gases, such as argon, indicate that Titan's atmosphere originally had about 5 times the nitrogen that it now has, so much of that was probably lost to space during the life of the moon. It was also shown that methane is leaking to space fast enough that there must be a source of it on Titan to explain the methane there now. The best theory is that water and ammonia exist in liquid below the surface and are added to the atmosphere by cryo (cold) volcanoes.

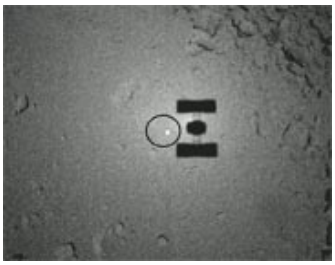
Mars Express – Preliminary results are in from the first radar observations of the subsurface of Mars. A large (150 miles) circular structure, believed to be an impact crater, has been found buried under the northern lowland plains. It may contain a thick layer of water ice. A section of the north polar layered deposits was observed, and found to be a nearly pure water ice layer thicker than 3000 feet, overlying a deeper layer of basaltic regolith (pulverized lava). There was no indication of a liquid water melt zone, as predicted by some scientists. In fact, no liquid water has yet been found by the radar, but the search has just begun.

Second Place ($30) Mars photo by Daniel Schechter

Martian aurora – Mars Express recently observed in ultraviolet an aurora occurring on Mars, but not at either pole where the auroras occur on Earth. This is to be expected, since Mars does not have a global magnetic field like the Earth, but instead has patches of magnetic field at many places on its surface. The observed aurora was found to be associated with a pattern of electrons detected by the electron reflectometer instrument on the Mars Global Surveyor (MGS) spacecraft. So scientists combed through the 6 years of electron data gathered by MGS to look for other aurora, and found 13,000 occurrences. This means that auroras are far more common on Mars than thought. We were just missing them because they apparently do not show up in visible light, only ultraviolet. This is probably a result of the atmosphere being nearly all carbon dioxide, which glows in ultraviolet light when excited by electrons. The locations of all the electron incidents were mapped, and found to

coincide with the edges of the magnetic patches known on the surface of Mars. This proves that these magnetic patches are causing the aurora as solar wind particles hit the planet.

Hayabusa (Japan's asteroid mission) has continued having problems. It still has to use its jets for all attitude control, since 2 of the 3 gyros failed. The tiny surface probe Minerva, which had just been released from the mother spacecraft as last month's column was written, missed the asteroid, drifted away, and contact with it was lost. Some sort of guidance failure occurred on Hayabusa just before it released the probe, which was supposed to then coast to the asteroid. So the spacecraft were not moving the correct direction at release, causing the miss. The practice landing of Hayabusa on the asteroid was not successful, getting quite close but not making contact. The next attempt to land was aborted by a sensor that (probably erroneously) detected a hazard, but moving away from the asteroid (normal response to landing abort) was also aborted by another sensor that detected another hazard. So the spacecraft landed because it couldn't do anything else, bouncing twice before settling, but without ever energizing the contact detector. So the first reports were that landing did not occur, although later examination of data from the spacecraft showed landing did occur, and why contact was never detected. Unfortunately, the soil sample mechanism is triggered by the contact sensor, so no sample was taken. After about a half hour on the surface, the spacecraft controllers commanded it to back away from the asteroid because they were worried that contact had never been detected, and so it might be drifting and risk collision. After everything was sorted out and a safe mode was corrected, another landing was commanded a few days later. This time all went according to plan, except the bullet appears not to have fired. Its purpose is to shoot into the asteroid to splatter material into the soil sample collector. If the landing kicked up enough dust, a very small sample may have been collected anyway. No more landings could be attempted after this because the landing guidance depends on aiming at a landing marker, a sort of harpoon with a target on it, and the spacecraft has shot all its landing markers. Hayabusa suffered a safe mode that lost attitude control and contact. There is probably also a propellant leak. Emergency measures were taken to regain contact and orientation, and to shut the main valves on the propellant system, though power and temperatures had already dropped dangerously low, since the solar panels were not pointed correctly at the Sun. New attitude control processes were developed using excess ion engine fuel vented as attitude control jets. The spacecraft suffered another loss of attitude control and contact (something vented or hit the spacecraft) during the time when it was supposed to have fired up the ion engine in order to rendezvous with Earth in 2007. As I write this, spacecraft controllers are considering an alternate orbit that requires less fuel and can be started as late as 2007, but returns to Earth 3 years late. If a sample is returned, it will be the first one taken from a body beyond the Moon, which was sampled by the Apollo missions and unmanned Soviet spacecraft long ago.



Shadow of Hayabusa at asteroid Itokawa. The circle indicates the landing target marker on the surface (JAXA)

Smallest forming planetary system – Astronomers using 6 telescopes have announced that they found the smallest known protoplanetary disk, that is, a disk that could form planets, about a brown dwarf star. They are calling it a brown dwarf based on it forming the same way as a star, but without sufficient mass to start the nuclear fusion process that powers ordinary stars. Some astronomers would classify it as a planet, since its mass in only 8 times that of Jupiter, and so never even achieved the temporary burst of fusion that brown dwarfs do. If it is considered a planet, then the discovery becomes the largest system of moons forming instead of the smallest system of planets.

Buffy – An unusual icy body has been discovered beyond the apparent outer boundary of the Kuiper Belt. It is designated 2004 XR 190, but has been nicknamed Buffy. Although a few objects are known beyond about 50 AU (and AU is the Earth's distance from the Sun), the apparent out edge of the Kuiper Belt, all of them have very elliptical orbits, which indicate a close encounter, probably with Neptune, reshaped their orbits to protrude so far. But Buffy's orbit is roughly circular, ranging from about 52 to 62 AU from the Sun, and never gets anywhere near Neptune's orbit (at 29 AU). In addition, Buffy's orbit is tilted 47 degrees from the plane of the planets, an extremely unusual tilt. So theorists cannot figure out how Buffy could possibly have formed or moved into such an orbit. The object is roughly half the diameter of Pluto, somewhere in the 300 to 600 mile range, and so is one of the largest half dozen or so objects known beyond Pluto.

White dwarf mass – The Hubble Space Telescope was able to separate the light of the dim white dwarf companion of Sirius (called Sirius B) from the overwhelming light of that main star, and take a detailed spectrum of the dwarf for the first time. The amount of red shift caused by the light climbing against the gravity of Sirius B (as predicted by General Relativity) was used to accurately measure its mass for the first time. It is 98% the mass of our Sun, and it is packed into a star slightly smaller in diameter than the Earth. Its surface gravity is 350,000 times that of Earth. The surface temperature was more accurately measured than ever before, at 44,900 degrees F.

Chandra (X-ray space telescope) studied the Perseus galaxy cluster, one of the most massive objects in the universe, containing thousands of galaxies immersed in a vast cloud of multimillion degree gas. The X-ray images show bright loops, ripples, and jet-like streaks, as well as filaments left by a galaxy torn apart while falling into the giant central galaxy Perseus A. Huge low-pressure regions in the vast gas cloud were discovered. They appear to be expanding plumes cleared out by jets of particles from near the supermassive black hole in Perseus A. The venting from the black hole's region produce sound waves that heat the gas cloud and reduce the infalling of material, thereby slowing star formation in the galaxy.

Second Place ($30) Mars photo by Wally Pacholka

Colliding galaxies – Analysis of two of the deepest sky surveys ever conducted shows that over half of a sample of 126 nearby red galaxies show evidence of having collided and merged with another galaxy in the past 2 billion years. This is much more common than collisions were thought to be, and supports the theory that large galaxies formed early in the history of the Universe by merging of smaller galaxies. This theory had been criticized on the grounds that not enough merging would occur to create as many large galaxies as have actually been observed soon after the Big Bang.

Spitzer (infrared space telescope) has imaged a group of dwarf galaxies that were obviously formed by a collision of two large nearby galaxies, in an attempt to understand the differences between dwarf galaxies formed recently and those formed in the infancy of the Universe. The dwarf galaxies studied were found to foster much star formation, though such was not the case for the large colliding galaxies. Warm molecular hydrogen and polycyclic aromatic hydrocarbons (PAH) were found in the studied dwarfs.

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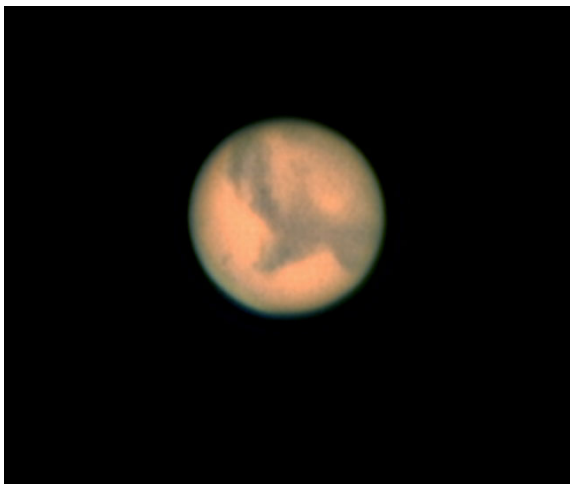
Spitzer also has been used to image the plane of our Milky Way galaxy as part of a long-term study. This plane is filled with gas and dust that obscures stars in visible light and ultraviolet, but infrared penetrates this well. About 100 **star clusters** were discovered in the images, each containing tens to hundreds of stars. Study of the images showed that there are nearly twice as many star clusters in the southern parts of the Milky Way as the northern parts. This information may help astronomers better map the location of the spiral arms of our galaxy.

Spirit (Mars rover) took time-lapse images of Phobos during a (Martian) lunar eclipse. The images will be analyzed to see if Phobos turns red during eclipse like the Earth's Moon does. There was definitely some sort of Mars-shine dimly illuminating Phobos during the eclipse. Spirit also took images at night during a meteor shower, but results have not been announced. Both rovers have now completed one Martian year on the surface, and will complete 2 Earth years during January. Spirit is still on Husband Hill, where it found conclusive evidence of rocks formed by abundant water, but is now descending. The next major target is a flat area called Home Plate, but lots of interesting rocks are being examined on the way. During the exploration, Spirit has found rocks of these types: once molten debris blasted out of meteor impact craters, material from violent volcanic explosions, lava flows, and sedimentary rocks formed by wind and by water. The rovers together have sent over 70,000 images from the surface.



Third Place ($20) Mars photo by John Castillo

The other rover **Opportunity** has experienced some problems with the "shoulder" motor in its instrument arm, but controllers hope to work around the problems. It has located a rock layer younger than those found in Endurance Crater, and this layer appears to be petrified sand dunes, similar to the oldest layer in Endurance. Both these are thought to have formed during relatively dry eras on Mars. Layers in between in age show clear signs of abundant water during their formation. This indicates Mars may have experienced alternating wet and dry eras.

New Horizons (Pluto mission) is scheduled to launch January 11. It will leave Earth at the largest speed of any spacecraft ever launched, passing the Moon in 1/8 the time Apollo missions took. It will reach Jupiter in just 13 months, faster than any of the 7 spacecraft that have been there before. This speed is necessary to get to Pluto in a reasonable amount of time (9 years). Recall that Voyager 2 took 12 years to reach Neptune, about the same distance as Pluto, and that was with 3 gravity slingshots. Pluto is the only planet not yet visited by a spacecraft. Pluto represents the outer part of the solar system, beyond the inner rocky planets and the gas giant planets, where we have in the last decade found hundreds of icy bodies in what is known as the Kuiper belt. So it is not just the planet Pluto, but a whole region of the solar system that remains unexplored until New Horizons arrives. After the flyby of Pluto, the spacecraft will be targeted to Kuiper Belt objects.

Instant AstroSpace Updates:

Early continents – Analysis of radioactive hafnium in ancient rocks found in the Jack Hills of Australia showed that the Earth's continents, that is lighter rock rising above the average surface, had formed within 100 million years after the Earth formed. The rocks had previously shown that the oceans had formed within 200 million years, both figures being earlier than many scientists thought.

Gravity Probe B has completed collecting data from its precision gyroscopes to measure the space warping effects of General Relativity from the Earth's gravity and its rotation. It is expected to take a year to analyze the data.

Hubble Space Telescope (HST) images taken 5 years apart were used to create a movie of material being thrown out in jets spewing from the poles of a newborn star. It shows clumps moving at different speeds colliding and forming shock waves that travel trillions of miles.

NASA is making plans for a Space Shuttle mission to upgrade and **repair HST** in late 2007 or early 2008, if it gets official approval. It is expected that will occur if the next shuttle mission goes smoothly and if analysis shows that safety goals can be reasonably met with a repair mission.

Space Shuttle – The cause of cracks in the foam insulation is believed understood, which should help return the Space Shuttles to flight. Apparently filling the tanks with liquid oxygen and hydrogen causes parts to contract and crack the foam over the plumbing and wiring tunnels along the tank sides.

Smart 1 (European lunar orbiter) has been looking for lunar peaks near the poles that are always in sunlight, and deep spots that are always in darkness. These could be important for future missions, since water ice may be found in the shadows and continuous solar power could be obtained at those peaks.

SOHO (solar observatory) has completed 10 years in space making great strides in our understanding of the Sun. Perhaps the most surprising discovery has been over 1000 comets found as they passed close to or into the Sun.

NASA competitions have been announced to develop robots that can assemble blocks using only direction from controllers simulating control on the Moon, and another competition to develop an unmanned aerial vehicle to automatically fly a predetermined roller-coaster-like path using only cameras to guide it.

Stardust, the spacecraft that collected dust near a comet, will land in the Utah desert soon. ■

Artist's impression of Stardust returning to Earth (NASA/ JPL)

Matt Ota

I am running for a second term as a trustee at large in order to complete projects that I have worked on in the past year. I am interested in seeing the continued development of our Anza observing site.

In addition I would like to continue participating in the planning for the future of the club, especially in projects to promote the club to further increase its membership and visibility to the public.

I regularly attend the Astrophysics, Astroimaging, Beginner's Class and GoTo SIGS as well as Black Star Canyon and Anza star parties- so I am one of the most visible and accessible trustees in the OCA.

Gary Schones

I have been a member of OCA since 1995. I have been a board member for the past 7 years. I took the lead position and along with the pad members built Mars Hill. I also donated and installed the Anza house; the club paid for grading, improvement and materials, and I supplied the labor and tools. I also do most of the tractor and heavy repair work to the Anza site and Bonny Lane.

I get a lot of enjoyment and satisfaction from all that the OCA has to offer. Working as a board member or at Anza allows me to give back to the club. The board has a lot of exciting plans and ideas in the works and I would like to part of them. With my general contracting background and construction experience I think I can bring a lot ideas and stability to the table. Your vote will allow me to continue to work for the club.

Thank you, OCA.

Steve Condrey

Most of you only know me through the newsletter and my occasional e-mails exhorting you to submit material, although I have been a member since 1994. I can honestly say however that I am completely committed to the success of OCA and its dual mission of bringing dedicated amateur astronomers together and providing a valuable science education resource to the communities of Orange County and surrounding areas.

My involvement in OCA has mainly been behind the scenes: in addition to the newsletter, I've also assisted in the management of our club library and was involved in the early stages of OCA TV. Outside OCA, I was involved in the Telescopes In Education program for two years before it left Mt. Wilson last year. In addition, I have five years of experience in labor negotiations, which provided me with valuable training in 'putting my ear to the ground' and bringing the concerns of rank-and-file members to a senior leadership body. As a private tutor specializing in science education, I'm also dedicated to supporting and expanding our educational outreach activities.

In my capacity as editor of the newsletter I've always tried to be prompt and thorough in addressing concerns brought to me by you, the members of OCA. I intend to continue that trend should I be elected, and I would like the opportunity to be your voice on the board.

Third Place ($20) Mars photo by Craig Bobchin

Special thanks to our judges, Matt Ota and John Sanford, and to Jim Benet for coordinating this first-ever OCA Mars Photo Contest!

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