SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

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GET READY FOR RTMC MAY 27TH-29TH!!!

RCW 79 is a bubble of ionized gas and warm dust in the southern Milky Way, 17,200 light years from Earth. The infrared eyes of NASA's Spitzer Space Telescope have spotted at least three generations of stars forming along the edge of this expanding envelope. Credit: NASA/JPL-Caltech/E. Churchwell (Univ. of Wisconsin - Madison)

OCA CLUB MEETING

The free and open club meeting will be held Friday, May 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 Scott Kardel of Palomar Observatory.

STAR PARTIES

The Black Star Canyon site will be open this month on April 30th. The Anza site will be open May 7th. 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, May 6th (and next month on June 3rd) at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.
GOTO SIG: June 6th
Astro-Imagers SIG: May 17th, June 21st
EOA SIG: May 23rd, June 27th
Astrophysics SIG: May 20th, June 17th
Dark Sky Group (new!): TBA (contact coordinator for details)

President's Message

Dave Radosevich

Welcome to the May edition of the Sirius Astronomer.

RTMC 2005:
Time is running out and we still need a volunteer. It will be unfortunate if we are not represented in one of the largest Astronomical events of the year. Other members will provide some help in transport but we need a Booth Coordinator! The volunteer will need to bring back tables and leftovers so a small truck or van would be in order. Contact me @ Dave.Radosevich@ngc.com for more info.

Messier Marathon:
Our May meeting will bring participants' certificates so come and congratulate all who saw many Messier Objects in one night! Also, we will announce the winner of the Best Photo/Image Messier Montage and present the winner with a $50 gift certificate.

Anza Notes:
Cleaning efforts continue and it looks like our weed situation is going to be a real challenge this year. April Star Party despite its cold temperatures shows the sprouting of many weeds. By May, weeds will be well underway and clearing will be necessary. Please come out Saturday (May Star Party) for weed clearing and general cleanup! **

Don Lynn continues to make progress on our fence issue. Approximately 1500 feet of poles and wire are left to re-string. Don has done the clearing so the hard work is done. If you would like to help us, contact me @ Dave.Radosevich@ngc.com.

Vance Tyree has started our broadband efforts by assessing conduit and Anza House issues. Gary Schones purchased and brought out supplies to re-locate the satellite antenna to Anza House. The satellite move will probably happen in early May. Some downtime will be expected and we will keep you posted! **

Many thanks for all the work done in April!

Anza House:
Our coordinator Tim Hunt is asking for an "Outside" cleanup of Anza House. Lots of construction debris and trash are strung about the parameter and will require a dump run. The May Star Party will yield the best time to pick up this trash! All who use Anza House are encouraged to participate! I will provide the truck and trailer for all general cleanups at Anza. If you use the Anza House and notice issues or supply shortages, please contact Timothy @ hunt_Timothy@msn.com

Pad Licensees:
This is the month! Some progress was made on pad cleanup but I fear much needs to be done. Some of you have received an update to your pad/observatory cleanup and what the board expects of you. Take notice that this is priority one and May 31st is quickly coming! Questions or concerns - contact me @ Dave.Radosevich@ngc.com or call (310) 813-9021 to talk about your specific tasks.

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

MEMBERS ASSISTING THE LIBRARY

The OCA library would like to thank the following members for their contribution:
Bob Buchheim donated a brand new copy of "The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus".
John Hoot donated an amazing space and astronomy library consisting of 37 videos and 1 DVD.
All donated items will be available for checkout from the library at May's meeting

AROUND OCA

Barbara Toy

Due to space considerations – which I guess should be a lesson of some sort to me – the end of the last column had to be pruned. In case you got that far and thought the ending was a bit abrupt, I'll begin here with a slightly modified version of the complete ending from last month (the entire unpruned column for April is posted on the club's website):

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

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

So very true! Please remember that both Anza and Black Star Canyon are in rattlesnake country – and there are other troublesome beasties out there as well (Black Widow spiders and scorpions come to mind). No need to panic – just keep a weather eye out, don't put any unprotected portion of your anatomy any place you can't see into and haven't checked first for inhabitants, don't be shy about advertising your presence so snakes can get out of your way (especially if you're moving through brush) and watch where you put your feet, and don't leave sleeping bags, clothing, shoes or other inviting refuges out where the local critters can get into them. Basically, take reasonable precautions, so you can enjoy your time under the stars in safety and we as a club can continue our record of no poisonous bites at either viewing site.

Now that we have that timely warning out of the way, let's talk about

The Astronomer's Guide to Dealing With Shyness and Stage Fright

You may (especially after last month's historical excursion) be wondering how this is relevant to amateur astronomers. One way and another, a lot of my club activities involve talking to people, club members and others, especially since I joined the Board in 2001. Over the last three years in particular, I've talked to a lot of people about doing a "What's Up" when Chris Butler couldn't, or giving us a talk as a featured speaker, and about less intimidating activities, such as going to star parties, RTMC, outreaches and other events. A surprising number of people have said that they couldn't come to different events because they didn't have anyone to go with them; they wouldn't go alone because they were afraid they wouldn't know anybody. Less surprising, but no less sad, were the people who went into panic mode at the idea of standing up in front of the group and giving a presentation of any type, even though they clearly had a lot to say that would be of great interest to us all. To my mind, anything that gets in the way of full enjoyment of our hobby deserves attention – and shyness and stage fright seem to stop a lot of people from participating in the local astronomy scene as much as they might like.

So why should you think I have anything useful to say on this topic? I'm not a credentialed expert, but I am an exceedingly shy person, to the point of panic attacks at times. If you had known me back in high school – well, the point is that you probably wouldn't have, as I spent most of my free time propped against any handy wall, reading (though, I'm sorry to say, generally not anything that was particularly high-brow). Reading is a great way to avoid having to talk to people around you, and, at that point, talking to people I didn't know made me acutely uncomfortable. In those years, just the idea of speaking in front of a group would be enough to paralyze both my brain and my vocal chords. The fact that I was able to get up in front of 200 or more members and guests at the general meetings every month during the two years I was president and the year I was vice president and produce – for the most part – reasonably intelligible statements concerning the topics at hand, and even enjoy the experience, shows that stage fright can be overcome. The same is true of shyness – fortunately for me, as otherwise I'd miss out on some of my favorite club activities, such as getting to know fellow members and sharing information with all those great people who come to our Outreaches.

So change is possible – how do you do it? In my particular case, I have to thank Prince Charles for an interview that I read when I was in high school. The major points that struck me were that all of the Windsors (including Queen Elizabeth) were afflicted with intense shyness, and that he decided a few years before that he was going to overcome this family problem. The idea that one could successfully overcome intense shyness was a revelation to me (as was the idea that a queen and her family could all suffer from that condition). He gave a kind of roadmap of what he was doing to combat this problem, which was a form of desensitization training – he started with situations that caused him milder discomfort, and deliberately put himself in those situations until he became reasonably comfortable handling them, then started the same process with situations that caused him a bit more discomfort. It was a continuing process, but the skills and confidence gained in learning to deal with the easier situations made it easier to deal with more difficult situations, as well. He also challenged himself periodically by putting himself in situations that were beyond his current comfort level, which often showed that he could handle them better than he expected, and, if not, showed him areas to work on more before trying another "test" at that level. *(continued next page)*

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I figured, if this approach worked for a prince, why not for a commoner? I've generally tried to follow it ever since – and, along the way, discovered that there are a lot of nice people in this world who are great fun to talk to, and an incredible array of activities out there that can really enrich your life if you choose to participate. One of the "tests" I gave myself years ago was taking a comparative legal systems tour of China where I knew nobody at the start of the tour – I enjoyed it and learned so much that I took a similar trip to the Soviet Union a year later, with a lot fewer concerns about not knowing anybody on the tour in advance (I had a great time on that trip, too). Those and other "tests" over the years helped embolden me to come to my first OCA meeting five years ago – when I walked into Irvine Hall that first time (once I found the place), I didn't know anyone in the club at all. If I'd waited until I could convince a friend or family member to go with me, most likely I'd never have made it to a meeting, or any of the other club events, and, to put it mildly, I'd have missed out on a lot.

Now, one test case (two, if you count Prince Charles) doth not a scientific study make – but at least it lets you know that the approach has had a successful field-test. I can't say I've done a formal survey of research in the area, but I've done a lot of reading in the years since Prince Charles gave that interview, and one of the email groups I've been on for several years is the Harplist (for both folk and pedal harps), where dealing with stage fright in all its manifestations is a recurrent topic. These are issues for my profession, too, as we all have to deal with clients, colleagues, witnesses, etc., as well as (for litigators) periodically appearing in court. So the comments given below are drawn from a variety of sources in addition to my own experience.

General Principles:

Since both shyness and stage fright are expressions of insecurity in the form of extreme self-consciousness, tactics that increase self-confidence or refocus your attention to something outside yourself should help defeat them. The desensitizing process described earlier works by building self-confidence in at least a couple of ways. The more obvious one is that, whenever you make it through a particular situation successfully, that positive experience makes it easier to take on any similar situation you're faced with after that. Another important aspect of the process is making it clear to yourself that you are *choosing* to do a particular activity – when you do it by choice, that means that you are in control of whether you do it or not. When you feel in control, you generally feel more self-confident, which makes any activity easier – which further builds self-confidence.

It's also important to avoid feeling trapped whenever you're pushing yourself beyond your particular comfort zone, as that can quickly undercut your confidence level. One way is to give yourself an easy escape in case you find the situation too hard to handle – such as sitting where you can make an unobtrusive exit when you go to a meeting for the first time, or parking where you can leave early without causing problems for other attendees when you first go to a star party. It's a bit harder if the challenge you've set yourself means that other people are relying on you, such as a commitment to do a talk, or if it puts you physically in a position you realistically can't get out of, such as a trip to a foreign country – the best response I've found when I've started to feel trapped in situations like that is to focus on the fact that I *chose* to do the activity, and on the positive reasons for making that choice.

Which gets us to the tactic of focusing outside yourself – if you're like most of us, when you feel insecure in a situation, you tend to focus on yourself, becoming increasingly self-conscious as your discomfort level goes up. This can become a feedback loop that's hard to overcome – but, if you can direct your attention to something other than your own reactions and internal concerns, you can stop the process, or at least minimize its effects. If you're with a group of people, you can do this by making yourself really listen to what's being said and focusing on a topic they're discussing or on one or more of the other participants in whatever conversation is taking place, eventually perhaps contributing a question or a relevant anecdote of your own to the discussion. In situations where you're the only one talking (maybe you're speaking to a group, or you're a member of the audience publicly asking a question of the speaker), you can do this by consciously focusing your attention on your topic, putting whatever discomfort you might be feeling to the side as much as possible (the stronger your interest in your topic, by the way, the easier it is to get this to work).

To give Steve Condrey a fair chance of fitting this into the May issue, I'll hold off on how you can use club activities to help you overcome shyness and stage fright, as well as specific tips to help out in different situations, until next time. In the meantime – RTMC is at the end of May, so, if you haven't been there before, give it a try as a way of pushing the boundaries of your personal comfort zone – as well as for the fun of it! (And, if you want more information about what RTMC is all about and what to expect, please see the President's Message for May, 2003, and the article specifically on RTMC on Page 5 of the May, 2004, issue of the Sirius Astronomer, which should be updated and posted on the website by the time you see this).

In Closing – With Einstein…

As a complete change in topic, the club's group excursion to the Einstein Exhibit at the Skirball Cultural Center took place on April 16, and was a great success. The show ends on May 29 – it's well worth seeing, and I strongly recommend that you go if you haven't seen it yet. It makes a serious and pretty successful attempt to demonstrate Einstein's theories and explain their significance, but it also shows his human and political sides in the context of his time, so you end with a much broader appreciation for him as an admirable person on many levels, but also as a human being with human weaknesses.

ASTROSPACE UPDATE

May 2005
Gathered by Don Lynn from NASA and other sources

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

Cassini (Saturn mission) flew by the moon Enceladus and discovered that it has an atmosphere of water vapor. It was detected by the magnetometer, which found that Saturn's magnetic field was being bent in the manner that would result from an atmosphere containing charged particles. Oscillations in the field were characteristic of ionized water vapor. Voyager had looked for an atmosphere at Enceladus in 1981, but did not discover it, probably because it was weaker than detectable with Voyager's instruments. Because Enceladus does not have sufficient gravity to retain an atmosphere for (astronomically) long periods of time, the water vapor must be continuously replenished. This is not a surprising discovery, since Enceladus is already known to be producing the water ice found in Saturn's E ring. Geyser activity is suspected to be the mechanism by which the atmosphere and E ring particles are produced, though geysers have not been seen on Enceladus. However, the surface of the moon is covered with a brighter coating of ice than on any other moon in the Solar system, and geyser activity could do that also. During the flyby many images were made to study the large number of huge fractures in the surface of the moon. Tectonic movement of the surface is believed to have caused the fractures. Some areas contain more craters, though often eroded, while others have almost no craters, and some areas are known as wrinkled terrain because of relatively parallel grooves and ridges.

Cassini also flew by **Titan** again (it does so about monthly for the entire 4-year mission) and obtained images in infrared of many dark and light areas on the surface. In some places the boundary of dark or light areas is quite sharp, which remains unexplained. Features that appear to be streamlined continue to be found, indicating wind transports much surface material, leaving these shapes behind any high spots. A few possible impact craters were found, but they remain rare, supporting the theory that much erosion takes place on the surface, which obliterates craters. Some dark linear markings appear to be faults. Dark wandering features that appear to be drainage channels continue to be found. Data from the Titan lander show these are caused by liquid methane rain running down to lower elevations. As new swaths of both infrared images and radar images are made with each flyby, the areas covered by both methods are starting to overlap, and scientists are comparing the results to find differences and similarities. These give clues to surface material composition and roughness.

Cassini has been taking images of the moon **Hyperion**. It is probably the largest (165 miles across) irregularly shaped moon (not even close to spherical), and images confirm that it is tumbling chaotically, rather than rotating smoothly. Also imaged was an eclipse of the moon **Janus** by Mimas. NASA released a movie made from many still images taken during the eclipse.

Spitzer (infrared space telescope) has for the first time captured the light from planets (2 of them) orbiting stars other than the Sun. It was not able to resolve the planets from their stars, since they were too close, but by subtracting the light seen during an eclipse of the planet from the light of both the star and planet, the difference was the planet light. It turned out to be easier to perform this feat in infrared than visible light because the brightness of planets in infrared is much closer to the brightness of stars, and so the planet light is less easily overwhelmed by the star light. Both planets were previously known eclipsing "hot Jupiters", that is, massive planets like Jupiter, but orbiting much closer to their star, causing them to be quite hot. "Eclipsing" means that the tilt of the orbit happens to take the planet behind its star for part of each orbit, as seen from Earth. Hot Jupiters should glow quite brightly in infrared, helping the light-overwhelming problem. One possible planet has been identified in visible light (by the Hubble Space Telescope), but all other attempts at capturing an exoplanet's visible light have proved to be failures. But using the new infrared technique should separate any eclipsing planet within 500 light-years of us. However, these 2 are the only ones known so far, though more are expected to be discovered in coming years. Further observations by Spitzer at different wavelengths will be made to try to determine the planets' atmospheric compositions and wind speeds.

Spitzer has observed extremely **distant galaxies** that were found in the Hubble Space Telescope Deep Field images, and whose redshift (and therefore distance) was precisely measured by the Keck Telescopes in Hawaii. Some are so far that the light has taken 13 billion years to reach us. Some of the Spitzer images show well developed galaxies that had to be at least 300 million years old, pushing back the formation time of the earliest galaxies closer to the time of the Big Bang than had been previously thought. In a couple of cases the early galaxies were nearly as massive as galaxies of today. This is surprising because the evidence is mounting that large galaxies form by the merging of smaller galaxies, and this process should have taken longer to produce galaxies so large.

Dark Energy – Previous evidence for dark energy, a force that accelerates the expansion of the Universe, has come from very distant places – supernovas in distant galaxies, the structure of distant galaxies, and the cosmic microwave background. Now evidence has been found relatively locally. A team of researchers has modeled on a computer the evolution since earliest times of the galaxies surrounding the Milky Way, and have been unable to produce the current motions of galaxies without adding the influence of dark energy. With dark energy, the motions match perfectly.

Dark Energy survey – Scientists have begun a collaboration to begin a survey, starting in 2009, that would eventually collect data on about 300 million galaxies, out to distances such that the light left them 2/3 of the way back in time to the Big Bang. Observations are to be made on a planned 520-megapixel camera *(continued next page)*

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to be put on the 4-meter Blanco Telescope in Chile. It is to collect 4 types of data that should distinguish between the 2 leading theories of dark energy: a cosmological constant or changes in laws of gravity at large distances. The 4 data types are: counts of galaxy clusters, distance and mass of galaxy clusters, gravitational lensing, and distances to supernovas. Data from the South Pole Radiotelescope, to begin observing in 2007, will augment the survey with measurements of how galaxy clusters distort the cosmic microwave background.

Mars rover Opportunity has stopped using its infrared spectrometer while mission controllers investigate a problem with it losing data. All other instruments, including the other 2 spectrometers, are working perfectly. The ailing instrument measures infrared light in 167 different wavelengths, providing information on the composition of any target it can see. The other 2 spectrometers have to actually touch the rocks that they analyze. Even in the current condition, the infrared instrument could get some useful data. Opportunity continues its trek towards an area of chaotic terrain, stopping to analyze interesting rocks and soil. Opportunity has now traveled over 3 miles, surpassing the other rover. The design goal was to be able to travel about 1/8 of that distance.

The other rover **Spirit** continues its climb toward the summit of Husband Hill. Its sticky wheel mysteriously started working normally. Just when spacecraft controllers began to worry about Spirit's energy dropping too low as the Sun moves south with the changing season, and the rover is continuing to tilt away from the Sun because of the terrain it is on, strong winds blew most of the dust off Spirit's solar panels, and the power output doubled. When Spirit reaches the summit, it will be able to see into the Inner Basin, which appears (from orbiter images) to have terraces of sedimentary rock layers that should thrill geologists. The rovers have operated for over 15 months (they were built to last 3 months), and have returned well over 70,000 images. NASA approved an 18-month extension of their missions, provided that they keep working, which now seems plausible.

Mars Express (European orbiter) has found evidence that glaciers formed in 2 different equatorial regions less than 5 million years ago, relatively recently in Mars' history. This would require vast climate change for the glaciers to form, contrary to the theory that billions of years ago the atmosphere thinned out too much to allow tropical regions to receive snow. Also found is evidence of a volcanic eruption that occurred only 350,000 years ago. This is so close to now, geologically speaking, that volcanic activity could occur now, contrary to the belief by some scientists that the planet has long been dead volcanically. Five other volcanoes on Mars were found in the past year to have erupted only a few million years ago, so it is looking more and more like Mars may still be volcanically active.

Helium-rich stars – It has been known for some time that the globular cluster Omega Centauri, unlike any other known globular, has 2 different types of stars, one bluer than the other. A study was made with the multi-object spectrograph of the VLT 8-meter telescope in Chile to determine the composition of these 2 types. It was believed that bluer stars should have lower heavy-element content, but the opposite was found. The bluer population of stars had much higher helium content, in fact the highest known (39%), and a little higher content of elements heavier than helium. It appears that the redder population are the original stars of the cluster, and that for some reason the cluster retained much of the helium produced by the first round of supernovas when the more massive stars of that first round ended their lives. Then a second round of star formation took place, with that retained helium, to form the bluer population. It still has not been explained why Omega Centauri is the only globular where this second round of star formation took place with a very high helium content.

Sedna, the huge distant icy asteroid in the Kuiper Belt, was at first thought to have a moon in order to explain its very slow rotation, which had been measured to be 20 days. Asteroids and planets generally form with rotation times of several hours unless something, like a moon, slows them down. But Hubble Space Telescope images could find no moon at Sedna. The mystery has been solved. New extremely precise measurements of Sedna's brightness, made with the 6-meter MMT telescope in Arizona, show tiny variations in brightness every 10 hours. So that is its real rotation period, and the previous rotation measurement was wrong because it was not sensitive enough.

Super star clusters are open star clusters that contain hundreds of thousands or millions of young stars, far more than is usual for open star clusters, packed in a very small space. They are classified as open clusters because of their star ages (young), star constituent elements, and locations within galaxies rather than orbiting outside, even though the numbers of stars in the super clusters more resemble globular clusters. All known super star clusters were very far away, usually in colliding or interacting galaxies, until now. Observations with large telescopes at the European Southern Observatory in Chile of the Westerlund 1 cluster, nearly hidden by dust and gas even though it is part of our own Milky Way galaxy, showed that it definitely contains about 200 extremely massive stars. The true members of the cluster had to be carefully sorted out from foreground stars by their spectra. By the rule of thumb that there are more than 100 ordinary stars for every extremely massive star in a given open cluster, it can be concluded that this is a super star cluster, even though the intervening gas and dust keep us from seeing those ordinary stars in visible light. This is great news for astronomers who study super star clusters or very massive stars, since it is the first super cluster close enough to study individual stars. The study identified several Wolf-Rayet stars, OB supergiants, Yellow Hypergiants and Luminous Blue Variables, all somewhat rare very massive stars. The mass of Westerlund 1 is estimated to be over 100,000 Suns, its age is about 3.5-5 million years, and it is less than 6 light-years across. Further study will be made in infrared, which penetrates dust and gas clouds better than visible light.

Quark plasma – It appears that that Relativistic Heavy Ion Collider at Brookhaven Lab has produced the long-sought quark gluon plasma, a form of matter that has not occurred since about a microsecond after the Big Bang. At first the observations did not match theory, but after taking into account an effect called chiral symmetry restoration, the observations have matched theory. This state of matter is so energetic that the quarks and gluons, normally bound within protons and *(continued on page 8)*

2005 WAA G. Bruce Blair Medal recipient

Tim Hogle, OCA WAA Coordinator

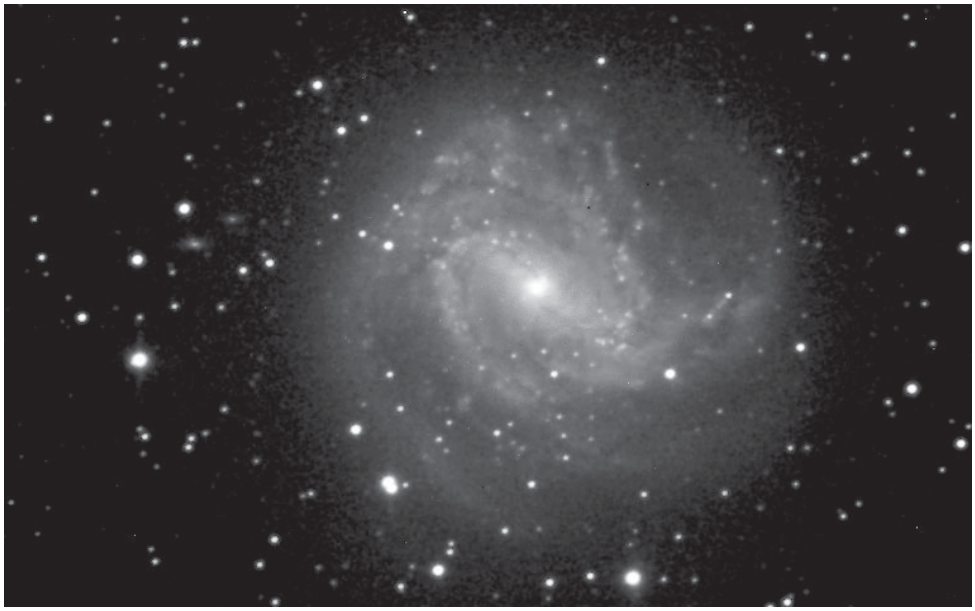
The prestigious G. Bruce Blair Medal is awarded annually by the WAA to an individual who has made truly outstanding contributions to amateur astronomy. This year's recipient is Dr. David L. Crawford, for his many years of active leadership in support of the preservation of dark nighttime skies for astronomy and the general public, for promoting the use of quality outdoor nighttime lighting as essential for the nighttime environment, and for his continuing public relations efforts in support of astronomy and science education.

Dr. Crawford is a co-founder of the International Dark-Sky Association and has been its volunteer Executive Director for many years. He is a widely acclaimed public speaker, not only within the astronomy community but within the lighting industry, and frequently serves as an advisor to communities and local groups working to establish lighting ordinances.

In his professional life, Dr. Crawford is an Emeritus Astronomer at the National Optical Astronomical Observatories. He received his doctorate in astronomy at the University of Chicago and worked most of his scientific career at the Kitt Peak National Observatories and NOAO. His research was in observational stellar photometry and galactic structure, with well over a hundred published papers. He was the Project Manager for NOAO's two 4-m telescopes, at Kitt Peak and at Cerro Tololo, in Chile. He is also a co-founder and member of the Board of Directors of the Global Network of Astronomical Telescopes.

He was a member of the Council of the American Astronomical Society and of the American Association for the Advancement of Science (and a Fellow). Dr. Crawford is a member of the International Astronomical Union and many of its commission activities, as well as the Astronomical Society of the Pacific, the Astronomical League, and other organizations in professional and amateur astronomy. He is an Honorary Member of the Royal Astronomical Society of Canada and a Fellow of the Illuminating Engineering Society. Dr. Crawford has been honored with a number of their awards for his work with IES. He has received the AAS's van Biesbrock Award for service to astronomy and an honorary doctorate in 2004 from the New England College of Optometry for his work in improving the nighttime environment.

The award will be presented at the Riverside Telescope Makers' Conference in May.



M83 taken through TEC 8" Maksutov w/ST-8xe camera (Dave Radosevich)

(continued from page 6) neutrons, are loosened and drift in a plasma. Chiral symmetry restoration predicts that particles (in this case pions) behave as if they have less mass while in a plasma, and this changes their behavior from gradual escape from the plasma to explosive escape. The Relativistic Heavy Ion Collider smashes the nuclei of gold atoms into each other at extremely high speeds.

High Energy Stereoscopic System (HESS) is a group of 4 optical telescopes of 13 meter diameter recently built in Namibia that are specialized to search our atmosphere for the flashes caused by collisions of very high energy (VHE) gamma rays with air molecules, and so works as a gamma ray telescope, even though the gamma rays do not reach the Earth's surface. HESS has begun the first ever sensitive survey of the heavens to locate sources of VHE gamma rays, an extremely short wavelength of light. So far 8 sources have been found, all in the plane of the Milky Way, implying they all lie within our galaxy. Two of the sources are where no counterpart can be found in visible or X-ray light. It is believed that VHE gamma rays result when an astronomical object accelerates charged particles to extremely high energies, and then the particles collide with other matter to produce the rays. It was known that supernova remnants and pulsar winds should be able to produce VHE gamma rays, and the 6 sources seen at other wavelengths appear to be these. But the 2 not seen at other wavelengths, now being called "dark accelerators", must be some other kind of object. The HESS observations measured for the first time the size of VHE gamma ray sources, and they are found to be about a tenth of a degree. The distances to the newly found sources are not yet known, but assuming they are spread about our galaxy, they must be several thousand light-years away, and therefore several light-years in diameter.

Solar flares – Analysis of the data from the SOHO solar observing spacecraft gathered during a very massive flare on the Sun in 2002 has solved how such flares can be so energetic. The previous models showed such flares getting their energy from magnetic field lines reconnecting high in the Sun's corona (atmosphere). But the SOHO data show that a snowball effect spread the reconnecting over a very large area near the Sun's surface. The wide area means more magnetic field, and therefore more energy, was involved.

Deep Impact (comet collision mission) – The 12-inch telescope onboard the flyby part of Deep Impact has been found to have trouble focussing. A team has been assembled to investigate the cause and possible fixes. Even if the problem is not fixed, the mission will get the sharpest pictures that have ever been taken of a comet nucleus. This is the largest telescope that has been launched well beyond the Earth's orbit. There is also a 5-inch telescope on board, which is working perfectly. When the impactor hits the nucleus of Comet Tempel 1 on July 4, it is expected to create a crater the size of a football stadium, and raise a cloud of debris for several minutes, which will be watched by the instruments on the flyby part of the spacecraft and by the Hubble, Spitzer and Chandra space telescopes and many large ground-based telescopes. This should tell us a great deal about what is inside a comet nucleus. Since comets are leftovers from the formation of the Solar system, knowing what is inside a comet should tell us more about how the Solar system formed. The flyby part can then be targeted for other comets, though without the benefit of the impactor knocking the stuffing out of the nuclei.

Early starburst galaxies – A team of scientists has studied, in infrared, X-ray and radio light, remote starburst galaxies that had been found in one of the Hubble Deep Field images. Because of their great distances, the galaxies are seen as they were when the light left them 6 billion years ago and more. The galaxies were forming stars at least 50 times the rate seen in active star-forming regions today. The regions of star formation were tens of thousands of light-years across, much larger than those found today. This implies that the Universe now has considerably less material for star formation, and so has slowed down in the rate and size of star forming regions. The radio images, because of their great resolution, were able to distinguish between starburst galaxies and galaxies with active black holes at their centers, both of which could produce the kinds of images seen in the Hubble Deep Field image. A surprising result was that the brightnesses of the star forming regions varied greatly and independently in radio and X-rays. This would imply that the cause of radio waves and X-rays in star forming regions are 2 different phenomena.

New satellite galaxy – Another dwarf galaxy orbiting about our Milky Way has been discovered, this one in Ursa Major. It is about 1/10 the brightness of the next smallest Milky Way satellite, and is about 300,000 light-years away. Its stars are metal-poor, implying it formed before enough supernovas had occurred to distribute elements heavier than helium about the area. It was found by searching the Sloan Digital Sky Survey for areas with statistically more red stars than other areas. Then spectrographic data were taken on the area to locate foreground stars and determine that the red stars remaining formed the dwarf galaxy. Many current simulations of galaxy formation predict that the Milky Way should have many more satellites of this small size, so discoveries of more are likely.

Pioneer Anomaly – Both Pioneer 10 and 11 spacecraft, when last tracked a few years ago, were found to be a bit closer than the best computer predictions, indicating that some unknown force was slowing them down slightly. Quite a few explanations have been offered, and a few explanations have been ruled out, but proof for or against is lacking for any of the remaining explanations. These have included dark matter, dark energy, String-theory membranes, and various new gravity theories. A new study suggests that the Kuiper Belt, those icy asteroids mostly outside Neptune's orbit, could gravitationally cause the slowing if the belt is somewhat more massive than thought, if it is thicker, and if its mass is concentrated toward the inside of the belt. The authors of the study believe that there are reasons that these 3 "ifs" could be true. Particles larger than dust but smaller than the asteroids we can detect, combined with the extra thickness, may account for the extra mass. Solar system formation models tend to favor concentrating the mass toward the inside of the belt. This theory should also affect Neptune's orbit slightly (about a mile per Neptune year), so very accurate measurements of its orbit may be able to prove or disprove the theory.

Reignition – A white dwarf star known as V4334 Sgr, one that had ended its nuclear burning (fusing of hydrogen nuclei) and was slowly cooling off, was observed to flare up in 1996. Continued observations, particularly with the Very Large Array radiotelescope, since then have ruled out that the flare was caused by infalling material, and so must be the result of resumption of nuclear burning.

New computer simulations show how leftover hydrogen near the surface can sink to the depth where the star remains hot and dense enough to cause the reignition. Previous simulations did not agree with the speed of flaring up that was observed, but the new simulation does agree. A cloud of material thrown off long ago by the star was also studied. It showed ratios of isotopes of carbon that match some carbon grains found in meteorites. So the process of ending nuclear burning and becoming a white dwarf may be an important source of the carbon that becomes part of the next generation of planet systems to form.

Space Shuttle Discovery has been transported to launch pad 39B for the Return-to-Flight mission to the International Space Station, scheduled for the window from May 15 to June 3. 41 modifications were made to Discovery in response to the recommendations of the Columbia Accident Investigation. The shuttles have been grounded for 27 months.

Swift (gamma ray burst observatory) – Since its launch last November, Swift has been detecting gamma ray bursts, and within seconds autonomously turning its visible light, ultraviolet and X-ray telescopes to the location to search for afterglows. Of the 24 bursts discovered through March, several had X-ray afterglows, but only 2 have had visible light afterglows. So the problem with finding so few afterglows in visible light before Swift was not a problem of taking too long to look, but was an indication that most gamma ray bursts really don't have visible light afterglows. The 2 detected were immediately measured for red shift, indicating that their light took 9 and 11.6 billion years to reach us. Neither had significant afterglow in ultraviolet. One of the visible light afterglows was so bright that it could be seen in amateur telescopes.

Chandra (X-ray telescope) has found that distant galaxies undergoing bursts of star formation are likely to have large black holes at their centers that are actively growing by pulling in matter. Theorists say that collision of galaxies is likely causing both star formation and the growth of central black holes, and that is why they often occur together. The X-ray observations also showed that the black holes are surrounded by dense shrouds of gas and dust. They also showed that most of the distant galaxies that are bright in submillimeter light (which is between radio waves and infrared) are actually pairs of colliding galaxies.

Fossil galaxies – Researchers have used X-ray telescopes to study fossil galaxies, those that have merged with most of the galaxies of their cluster, and so are the only remaining substantial galaxy of their respective cluster. Galaxy NGC 6482 and 2 more distant fossil galaxies were studied. Observing the X-rays from the hot gas surrounding the fossil galaxies allows the concentration of matter to be calculated. Assuming the ordinary matter (that is, matter consisting of protons, electrons and neutrons) was heated evenly in the surroundings gives the amount of ordinary matter (which produced the X-rays). The difference between these measurements represents dark non-ordinary matter. Both the ordinary and dark matter was found to be 5 times more concentrated at the fossil galaxies than it would for a normal galaxy cluster of the same mass and halo size. This supports the theory that galaxy clusters that eventually become fossil galaxies collapsed by gravity very early after the Big Bang, when the Universe was much denser, and that density persists in the centers of those clusters today.*(continued next page)*
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Stellar winds of massive stars – Astronomers using the Very Long Baseline Array radiotelescope have tracked the collision area of powerful stellar winds from 2 very massive stars, one 20 times and the other 50 times the Sun's mass, which orbit each other every 8 years. The less massive star is a Wolf-Rayet star, one nearing the end of its life and will soon (astronomically speaking) explode in a supernova. The more massive star has been found to have the stronger wind. The collision zone moves as the stars orbit, and was found to become weaker and stronger in its radio emission. The details of the observations do not agree well with theory, so the theories will have to be modified. Further observations are planned.

Instant AstroSpace Updates:

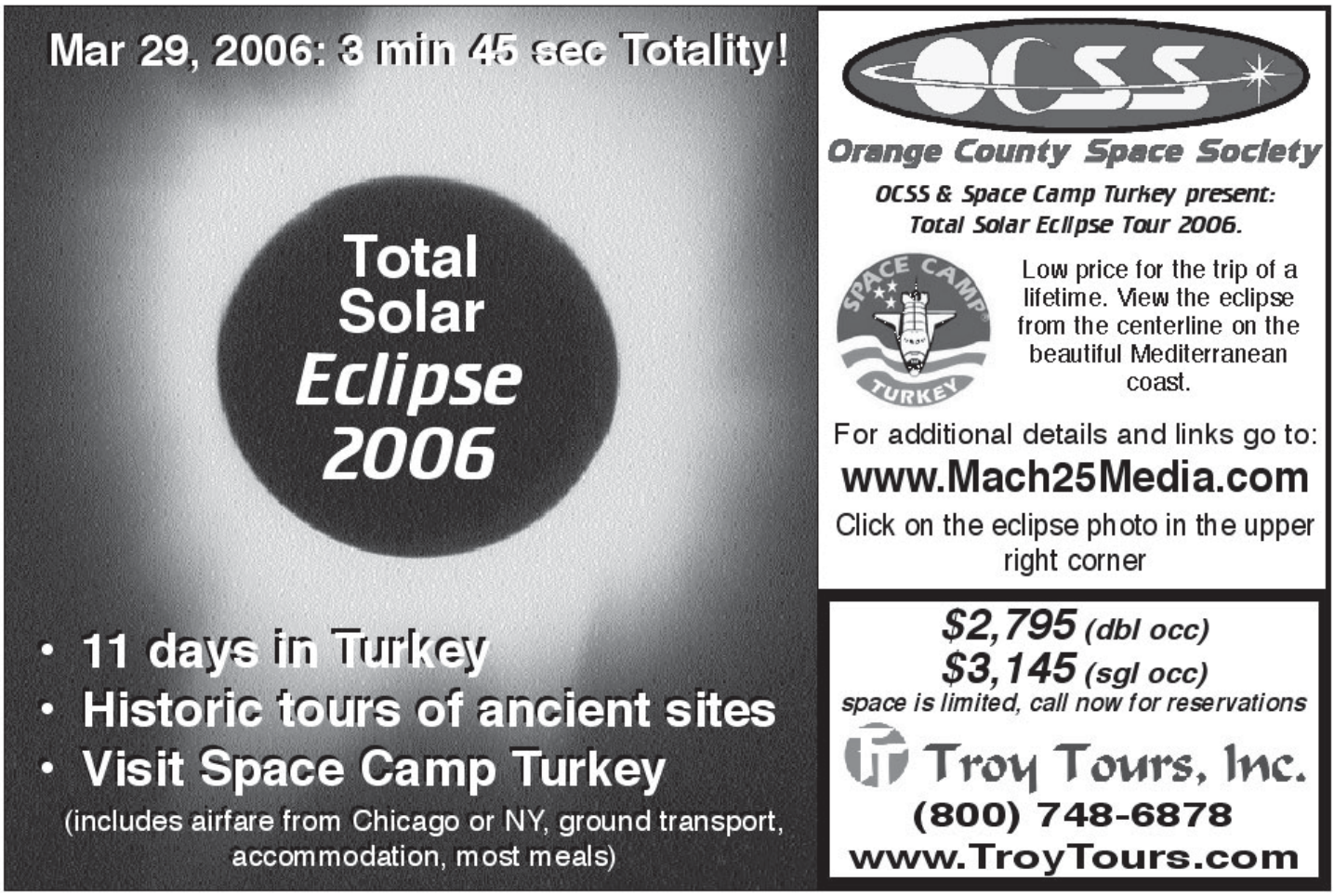
NASA has announced the first of its **Centennial Challenges**, prizes for developing the best solutions to technical challenges of exploring space. These first ones are to develop lightweight strong tethers to attach separate spacecraft, and to transmit power to a remote machine.

Chandra (X-ray telescope) has spotted X-rays of the type characteristic of a black hole within the galaxy M74, with a period of variation of the X-rays that indicates the mass of the black hole is about 10,000 Suns. If confirmed, this will be one of the very few known **black holes of intermediate mass** between the stellar mass (up to about 10 Suns mass) formed by an collapsing star, and the supermassive (with mass of millions or billions of Suns) that form at the centers of most galaxies.

A recent study showed that stars during their red giant phases would produce a zone with Earth-like temperatures on any planets in that zone for long enough times (as much as billions of years) for life to form. Previously it was believed that Earth-like **conditions for life to form** could only occur during the normal Sun-like phase of a star's life.

New theoretical work on the stability of planets with Earth-like orbits in planet systems that resemble the more than 100 known systems shows that as many as half of such systems could harbor an Earth-like planet. Presumably when the technology improves so as to detect small planets, many **Earth-like planets** should be found.

Scientists using telescopes in Chile and Hawaii have detected for the first time the **stellar wind** and dust in that wind from a star that later became a type Ia supernova. The supernova energy reached the previously thrown dust and heated it until it glowed brightly enough in infrared to be detected. *(continued next page)*



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Astronomers using the European XMM-Newton X-ray telescope have found a **vast loop-like structure** 20 light years across next to the most massive star-forming region (the Arches cluster) known in our Milky Way galaxy. This is the only object like this in size, structure and spectrum, and is hidden in other wavelengths by thick clouds of gas and dust.

By the time you read this, the Expedition 11 crew of Krikalev and Phillips should be aboard the **International Space Station**, and the 10 crew of Chiao and Salizhan will be back on Earth. Both used Russian Soyuz vehicles for their flights.

Scientists have been watching the **northern and southern aurora** simultaneously with the Polar and IMAGE spacecraft, and have found differences: they shift in opposite directions when solar particles strike, apparently because of the opposite magnetic fields; they shift different amounts, apparently depending on the tilt of the Earth's magnetic field; and sometimes only one shifts and not the other.

NOTICE: A black beret was left behind at the April General Meeting. If you are the owner and wish to claim it, please see Charlie Oostdyk at the May General Meeting

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

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

For Sale: 8" Coulter (red tube) Dobsonian. The scope is in excellent condition and has only been used a handful of times. $260.00. Contact Richard Passmore at (714) 558-7714 orRadMD80@aol.com

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

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

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

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

We need your help!

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

Some Suggested Types Of Items

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

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

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

To setup a pickup time call Larry McManus at Clearpoint.

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