SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

June 2003 *Free to members, subscriptions $12 for 12 issues* **Volume 30, Number 06**

This month's cover photo is provided by Jim Windlinger. This image is proof to everyone who went to RTMC and a lesson to all of you who didn't that you really must go there next year. The photo is of a very happy OCA Member Roger Cotton and Maureen Azeltine beside a brand new Meade 14" LX200 GPS Telescope which they won as the grand prize donated by Meade Telescopes.

OCA CLUB MEETING

The free and open club meeting will be held Friday, June 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 Dr Randii Wesson from JPL, who will be presenting on the future of the U.S. planetary exploration program.

STAR PARTIES

The Anza star party in June is on Saturday June 28th. The Black Star Canyon site will be open this month on June 21st. Members are encouraged to check the website calendar, for the latest updates on star parties and other events. Also, please use the Anza Webcam before driving out to Anza to check the weather. It might save you save you some driving time!

If you have a "web capable" phone you can also check the weather conditions at our Anza site while you are travelling. Just use your phone to navigate to our web site at www.OCAstronomers.org.

COMING UP

Beginners class will be held on Friday June 6th, at the Centennial Heritage Museum (formerly the Discovery Museum of Orange County) at 3101 West Harvard Street in Santa Ana. The Astrophysics SIG will be meeting on June 20th. The Astro-Imagers' SIG will meet June 17th. The EOA SIG will meet June 18th. Please check the website calendar for the many outreach events this month! Volunteers are always welcome!

President's Message

By Barbara Toy

With June comes the Summer Solstice, when the days are at their longest – and the nights at their shortest! Of course, that means that the nights will be getting longer again through the summer, but they will still be a lot shorter than the cold nights of January and February. At least the nights are finally warming up, so we don't need the layers of jackets, etc., that get us through those winter nights – this is the season we look forward to being comfortable in shirtsleeves all night long.

Before turning to other matters, I'd like to start with an item that was originally part of last month's President's Message. Although I'm sorry the topic didn't make that issue, I'm delighted to report that the reason it had to be cut was that there were enough articles submitted that our editor, Darren Thibodeau, didn't have room for everything. This is the kind of "problem" that we like to see – so please keep those articles coming!

Quiet OCA Heroes – Don Lynn and Charlie Oostdyk

To me, people who quietly do what needs to be done because they see the need and are in a position to do something about it are real heroes, especially when doing it requires a continuing commitment of time and energy. We are fortunate that there are many people in the club that fit that description, but I'd like to tell you about two in particular whose efforts we too often take for granted.

Don Lynn is "one of the club's greatest treasures."

One of the emails I got about the Sirius Astronomer delivery last month justly commented that Don Lynn is "one of the club's greatest treasures," with particular reference to his monthly column. He monitors a tremendous number of publications, websites, etc., and produces his summary of important astronomical developments every month (even those rare months when it doesn't make it into the SA because of a technical glitch), and they're all posted on our website in either the on-line version of the SA or the "Astrospace Update Online" section of the OCA website. The column is just the beginning of his club activities, though. Many of you know him as the most regular of our "Ask an Astronomer" panel. He's also active in the Astrophysics, ETX and AstroImage SIGs, and he's a regular at Outreach events, even though he works on the other side of LA and has a long, hard drive to get to them.

What a lot of members may not know is that Don also devotes hours of time each month to the unglamorous job of maintaining and repairing things at the Anza site, and he's been doing that for over 20 years. Stephen Eubanks is the Anza House coordinator, but Don has been known to make repairs there on occasion when they were needed, and he works with Steve on needed modifications, such as repositioning the TV antenna. As "Anza Site Maintenance" person, he looks after everything else on the site, including the club observatory, and is usually the one who spearheads projects such as the construction of the stairs below the member observatory level. Recent projects he's done that I happen to know about (and I know there are many more) include replacing the drive chain for the observatory roof, finishing off the electrical outlets in the Football Field, repositioning and filling the protective posts in front of Anza House with concrete, repairing the water pump, dealing with plumbing problems in the observatory bathroom, and reorganizing the eyepiece case and cutting and marking holes for all of the club's current eyepieces. Of course, he's also actively involved whenever we have an Anza Cleanup Day or other major work party out there. Without all that he does, our Anza site would be a lot less of a pleasure to visit and to use, and would be a lot less safe.

Charlie Oostdyk's work is vital to the continuing health of the club.

Another of the club's greatest treasures whose activities are also unglamorous and done without fanfare but are extraordinarily vital to the continuing health of the club is Charlie Oostdyk, primarily known to members as the club treasurer. As treasurer, of course, he keeps track of our financial obligations and expected future expenditures, pays the bills, takes care of incoming money, gets our various tax and other filings in on time, and keeps the board from spending more than we have. Here's a partial list of what he does beyond that: he keeps the membership list current, keeps track of who is supposed to pay when, sends out appropriate dues notices and follows them up when needed, keeps track of the member pads and observatories, takes care of problems on behalf of the club with entities such as our insurance broker, banks and the post office, keeps track of donations and sends out the acknowledgement letters, takes care of our storage lockers, selects and orders merchandise for the sales table at the general meetings, handles sales as well as other business throughout the meetings, takes care of group reservations for the Anza site and also reservations for the observatory, and picks up and distributes the mail from the club mailbox.

As I mentioned last month, Charlie's also the one who labels, staples and mails out each issue of the Sirius Astronomer; our mailing list has around 760 separate addresses on it. For those that go 1st Class, he has to put them in envelopes, label and stamp them before mailing. If anything extra is added to the SA before mailing, such as the ballots in January or important notices that were too late to put in the SA itself, he's the one who physically puts the additional document into each one before processing it for mailing – so we keep those to a minimum! And he's inevitably the one who does most of the work any time we need to do a mailing to the entire membership. And, although he hasn't been able to get out to Anza much in recent years, he was very active in the early development of the site, and is also a great repository of information about the site, the neighbors, etc., as well as of general historical information on the club (as is Don Lynn).

One of the real benefits to me of being on the board over the last two and a half years has been the chance to work with Charlie and Don, and to

get to know them. They both contribute a tremendous amount to the club without much recognition, and I hope, next time you see either of them, you'll let them know their efforts are really appreciated.

Some Bits and Pieces:

Unique Chance To Name An Asteroid: Many of you know that members Minor White and Myke Collins have been engaged in a serious research effort since 1999 to locate and track new asteroids, and they now have 62 confirmed discoveries, many of them using the club's Kuhn telescope. As the discoverers, they have the right to propose names for their discoveries, which have to be accepted by the CSBN before they become official; two names that have been accepted are WilliamKuhn (for the designer and builder of the club's Kuhn telescope) and AlinaFiocca (for the touching explanation of this name, see *www.mpc643.org/discoveries/names/alinafiocca.htm*). They have several confirmed discoveries they have not yet named, and they have now, very generously, opened the naming process to allow members of the public, and particularly club members, to propose names. Check out their website, *www.mpc643.org*, for details and for a lot of information about their research and related areas; the direct link to the "Naming Campaign" is: *www.mpc643.org/namingmain.htm*. The deadline to submit names for consideration is July 31. Proposed names need to conform to the CSBN naming rules, which are explained on the site. I'm sure a lot of you have good ideas for people who should be honored by having a minor planet named for them – here's your chance!

Unique chance to name an Asteroid

Correction re: RTMC: As I write this, RTMC is yet to come, but it should be behind us by the time you read it. I hope that all of you who went had as great a time there as I'm hoping to have. I did make a glaring error in what I wrote in May about RTMC – Camp Oakes is a YMCA camp, not a Boy Scout camp. My apologies to the YMCA for the error, and my thanks as a participant for the use of this great site.

Annual Star-B-Que will be on July 26.2003

Critter warning: Please remember when you are on our Anza or our Black Star Canyon sites that they are in wilderness areas, which means that there's a lot of wildlife about, especially now the weather's warming up. Picturesque bunnies and less picturesque gophers leave holes that can trip the unwary. Scorpions, snakes and spiders (particularly Black Widows) can cause a problem for any hand, foot or other valued body part that comes in contact with them. Mosquitoes, wasps, bees, etc., can also leave a painful reminder of any encounter with them. Coyotes frequent both areas, and there are probably mountain lions, as well as a full roster of rodents, bats, and other creatures. There's no need to be panic-stricken about any of them, but do keep a weather eye out so you can avoid potential problems. There's a list of common sense precautions on the back of the Site Rules that you'll find in the kiosk at the entrance to the Anza site. Some of the basics: Don't wander off into the brush at either site after dark, when you can't get a good view of what's around you, and keep any pets you bring on site leashed and within your view. Make enough noise when moving around to give snakes, etc., warning so they can get out of your way. Don't reach or step into any hole or opening without checking to be sure it's not inhabited. And, before you use them, shake out shoes, sleeping bags, and anything else that is left where a home-hunting scorpion or other unwelcome visitor could get to it. And, when the mosquitoes are out in force, bug repellent can keep the annoyance down to tolerable levels.

Annual Starbecue: Our annual summer potluck party this year will be on the date of the July Anza star party, which is July 26, 2003. We'll have the barbecue going, so bring something to grill or a side dish (or even desert!), and plan to party! We're aiming to gather around 5:30 on the shady side of the observatory, to give plenty of time for food, socializing and cleanup before we all settle into what we hope will be a fine night of enjoying the skies in all our various ways.

We need some volunteers to help with setting up and cleaning up afterwards. Please let me know if you're willing to help out – btoy@cox.net or 714/606-1825.

Sirius Astronomer: From the emails I've gotten about the April and May deliveries, it appears that the new office of the USPS we're using is giving us generally faster delivery times than the old one. However, there were some unexpected delays in the May deliveries outside of Orange County, particularly to LA County, and the pattern of deliveries reported for May was distinctly different than for April. To help us track this further, please send me the date you receive the June issue along with your zip code and city to btoy@cox.net. My thanks to all of you who have sent this information for past months, who have made this study possible. For those who are interested in the outcome, I'll try to include a summary of the delivery patterns we observe in next month's PM. ■

OCA Meeting Friday June 13th 2003 7:30pm

Dr Randii R Wessen of JPL on ***The Future of U.S. Planetary Exploration***

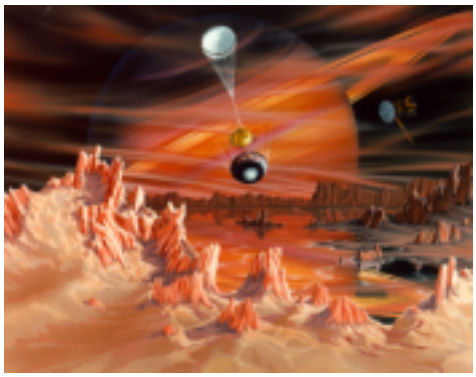


Photo from JPL Image Library

As the millennium closed, so did the era of large-scale planetary spacecraft. Future planetary spacecraft will increase their capability, as compared to their predecessors, while reducing in size and consuming less power. These future spacecraft will be the landers and sample return missions of tomorrow. ■

Report on the IAPPP-2003 Symposium on Telescope Science

by Bob Buchheim (OCA)

The annual Symposium on Telescope Science of the IAPPP (International Amateur-Professional Photoelectric Photometry) Western Wing is held at Big Bear on the Wednesday and Thursday prior to RTMC, to provide a forum for collaboration between amateurs and professionals. This year there were about 60 people in attendance, including quite a few OCA members (John Hoot, Russ Sipe, Liam Kennedy, John Sanford, Bob Gill – who is one of the conference committee members – Bob Buchner, Larry Owings, Jim Thorp ... and I may not have remembered everyone). Here are my notes from the conference:

"Can Amateur Astronomers Do Good Science?"..... "Yes, if.."

Rick Fienberg (Editor in Chief of Sky & Telescope Magazine) addressed the question "Can Amateur Astronomers Do Good Science?" His conclusion was "yes, if...". Experienced amateur astronomers have some very real advantages in this regard. They have intimate knowledge of the night sky, potentially unlimited telescope time, and access to reasonably priced, very effective telescopes and CCDs. But for an amateur to do "real" science, he or she must also have the necessary knowledge of astrophysics, operational procedures, and statistics – or collaborate with someone who does. Astrophysics (or planetary science in the case of asteroid studies) provides the basis for defining a practical set of research projects, and interpreting the data. No amateur is likely to determine the Hubble constant, for example, but a diligent amateur can generate data that will help understand the evolution of a binary star system, or the physical properties of an asteroid. Real science requires real rigor in the procedures that are used to gather the data. Sensors must be characterized and calibrated, relevant observational parameters (e.g. air mass and spectral band) must be recorded, and their effects incorporated in the data reduction. Statistical assessment of the accuracy and precision of the data is critical to interpreting the significance of the results.

Fienberg offered the following steps that we should take in order to "do good science" with our equipment and observations:

- Know your instrument, and the details of what it can (and cannot) do.
- Know the history and review the professional literature on the topic you're interested in.
- Learn from books, magazines, web sites.
- Use the best software and professional reference databases.
- Attend conferences and workshops.
- Don't work in isolation – collaborate with other amateurs and with professional astronomers.

He also opined that the type of contributions that amateur astronomers will make to research efforts is changing – the recent advent of professional survey networks means that rather than discovering new asteroids, comets, and novae, in the future our contributions will focus on making follow-up observations. Nevertheless, there are still plenty of projects in the areas of comets and asteroids, extra-solar planets, variable stars, novae, and supernovae that can benefit from the contributions of experienced and dedicated amateur astronomers.

To help us better understand how to use our CCD cameras; Arne Henden (USNO) conducted a CCD Photometry Workshop. He walked us through a very detailed overview of the factors that can make our CCD-imaging into an accurate, calibrated, reliable photometric instrument. The tricks are not in the acquisition of new expensive equipment, but rather in characterizing and using what we have in a carefully structured, repeatable, scientific way. "Know your equipment" in this context means characterizing your telescope+filter+camera system's linearity, noise, uniformity (vignetting or shading) and defects (hot/cold pixels), so that you can properly take – and interpret – scientific data. Some important tidbits from his talk are:

- If you're using multiple filters (e.g. UBVRI), it is important to make separate flat-fields for each filter you use. He showed that a CCD chip may have dramatically different shading in the UV vs. IR filters.
- If you're using a backside-illuminated chip, particularly for R- and I-filtered images, beware that some Red and Infrared energy can penetrate the thinned silicon chip, and "paint through" a subtle pattern of the chip's gate structure onto your image. This artifact can be significant if you're attempting photometric accuracy of better than 1%.
- If your photometric studies include bright objects – hence short exposures – beware that the camera's shutter-motion may take as long as 10 msec to uncover the chip. This can make a noticeable contribution to image shading (at the 1% level). In this situation it is important that your flat fields be made with the same exposure duration as your images, because the "shading" is exposure-dependent!

"everything you ever wanted to know about eclipsing binary stars"

Dirk Terrell (SRI) presented a Binary Star workshop that I'll summarize as "everything you ever wanted to know about eclipsing binary stars, plus quite a few other interesting things about them that you never thought of asking; and how your data can contribute to the study of these objects". High-accuracy light-curves of binary systems contain a wealth of information, including estimates of their orbital parameters, the temperature and physical sizes of the individual stars, and (if the light curves are monitored over several years) information about the evolution of the binary system.

OCA's John Hoot presented a poster-paper on his

recent activities in this area, measuring accurate light-curves of very short-period eclipsing binary stars.

John Menke described his experiences in gathering and evaluating asteroid light curves (a topic of interest to several OCA members in attendance). Measuring an asteroid's light curve entails taking a continuous series of images (typically 1-3 minutes per image) for the whole night. Comparison of the asteroid's signal with a reference star in the same FOV – frame by frame – enables us to use differential photometry to discover the light curve. Often, observations must be continued for several nights in order to fill in the complete light curve, and since the asteroid moves, it is usual that different reference stars must be used for each night. Menke's procedure is to interrupt each night's sequence of images to make an exposure of a nearby "Landolt field", when it is near culmination. This reference image is then a convenient calibration of the actual magnitudes and color indices of the reference stars in his asteroid's field, and is a practical way of bridging photometric results between two or more nights of observation. (The "Landolt Fields" are small FOV's whose stars have been accurately measured for use as references).

Since differential photometry requires that you measure the asteroid signal, and one or more reference stars, in each image, you're always at risk of accidentally picking a reference star that is itself variable. The standard defense against this mistake is to use 2 to 5 reference stars instead of just one. Bob Stephens and Bob Koff realized that this method contains the seeds for searching for new variable stars, and presented a paper describing their very exciting results. They asked Brian Warner (the developer of MPO Canopus data-reduction software for photometry) to expand his asteroid light curve data reduction algorithm by getting the software to automatically evaluate every star image in the FOV for variability. Brian obliged with a new routine in his MPO Canopus package, with impressive results: during last year's beta testing of the software, the team discovered four new variable stars! This routine is now part of the standard MPO Canopus package.

during last year's beta testing of the software, the team discovered four new variable stars!

Long-term photometric monitoring of specific stars is a project that professional astronomers have a tough time doing, but which is well suited to amateurs. Dale Mais presented the very professional-class results that he has obtained using the SBIG spectrometer to determine the spectra of Mira-type variable stars, and his project of monitoring several of these stars (in V and R bands) in hope of catching one during a flare-up. It turns out that the professional community is not agreed on whether such flare-ups actually happen (the existing data is ambiguous), nor on what spectral features might be seen during such a flare. His was a tour-de-force presentation of the caliber of science that a dedicated and well-equipped amateur astronomer can perform. (Dale also gave us a tidbit about red-giant stars that I had never known. The popular literature often says that stellar fusion stops with the iron nucleus, and that all of the heavier elements are made in supernovae. While it's true that supernovae do make the heavier elements, it's rarely, if ever, stated that about 70% of the universe's heavier elements are made by the s-process (slow neutron capture) in class M, S, and C stars; supernova account for the other 30%).

it's rarely, if ever, stated that about 70% of the universe's heavier elements are (not made in Supernovae)

Roy Tucker described his MOTESS (Moving Object and Transient Event Search System) – a really innovative observatory that he has built for an ongoing sky survey for moving/varying objects. He uses three stationary 12-inch telescope, each with a CCD camera, and aligned so that they are pointed to exactly the same declination, but offset slightly in Right Ascension. He's modified the camera drive electronics so that they operate as a drift-scan system, collecting three complete swaths of the night sky each night. Electronically "blinking" the three images identifies objects that have moved or changed in the time it takes the sky to rotate from one telescope's FOV to the next. This system is a real data-generator! In two years, he's collected over 1000 CD's full of raw images, going as deep as mag 21. Along the way, he has become the 9th most productive asteroid astrometry station, and now has two years worth of photometric data on 1.5 million stars.

The rest of us – with only a single telescope – may find that research projects entail a repetitive sequence of operations: move the scope, take a dark-frame, take an image frame, change the filter, take another image, move the scope ... etc. Bob Denny described how scripting can be used to make your telescope system more autonomous, automatically performing many of the repetitive steps without human intervention. That can be a boon for amateur astronomers who want to gather night-long sequences of data, but who also have day jobs!

Finally, we should all have problems like that described by Peter Ceravolo in his paper, "what do you do with an F/1.5, 1-meter primary mirror?" He was offered such a mirror at a bargain price, but as he pointed out, it presents a tough challenge. Parabolizing such a fast mirror is both very difficult and very expensive, but leaving it spherical will result in nearly 4 inches of spherical aberration. His solution was to design a new type of Gregorian telescope, with spherical primary and secondary mirrors, and using a pair of small doublet lenses near the intermediate focal plane to correct residual aberrations. Yep, he did buy the mirror. Perhaps next year we'll find out if this telescope's performance matches his impressive design predictions.

The IAPPP conference is an exciting venue for those of you who are curious about doing some "real" science with your telescope, and meeting others who are gaining experience with doing such projects. Mark your calendars for next year's meeting! ■

13543 Butler
A new Butler orbits the solar system.

By Liam Kennedy

The rights to officially naming astronomical objects is bestowed upon very few individuals. Newly discovered asteroids can only be named by their discoverers. Therefore having an asteroid named after you is a singularly wonderful and great honor.

Our very own Chris Butler, "What's Up" presenter and Space Artist of international acclaim, has received such an honor.

Chris's asteroid was originally discovered in 1992 by the Spacewatch system on Kitt Peak and is now officially designated as 13543 Butler. Below is the official naming citation as recorded in the circulars from the minor Planet Center

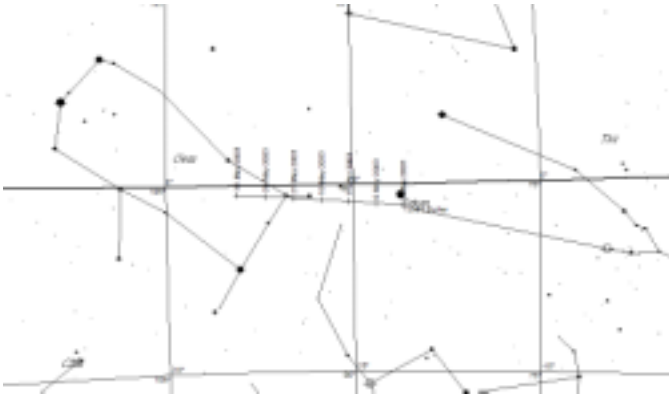
> (13543)Butler 1992 AO2. Discovered 1992 Jan. 2 by the Spacewatch at Kitt Peak.
>
> John Christopher "Chris" Butler (1964-) is a prolific astronomical artist who has painted numerous scenes incorporating fine details and color in works like Apollo Dawn and a sense of humor reflected in such paintings as One Small Mistake for Man and Hooray for Hadleywood. (M 48157)

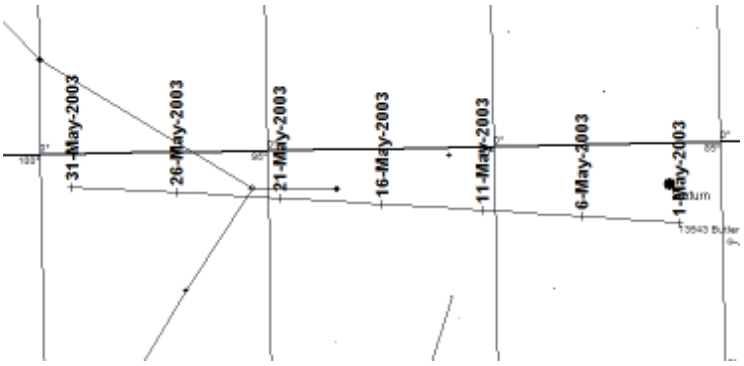
Congratulations to Chris!

Shortly after hearing of the great news I had a call from Chris asking for my help in finding out the precise orbital elements for his new "baby". I think all of us can imagine that Chris needs to know where his precious chunk of rock is right now. Thankfully with a lot of help from people who know a lot more about this than I do (John Hoot, Charlie Oostdyk) I managed to locate the orbital elements for the asteroid. I then converted them into something that Chris could load into his favorite astronomical planetarium program (Starry Night).

Where is 13543 Butler right now?

Quite surprisingly for most of May Chris's asteroid was pretty close to Saturn. However it is way too dim to see visually as it is much dimmer even than Pluto. At magnitude 18.1 (or so) it should be possible for someone in the club to track the asteroid by using a CCD camera. Below I have plotted the position of the asteroid for the month of May 2003.





I happen to have several Planetarium programs on my computer. Most of these programs can be updated automatically with new orbital data from the Minor Planet Center. The plots above were from SkyMap pro.

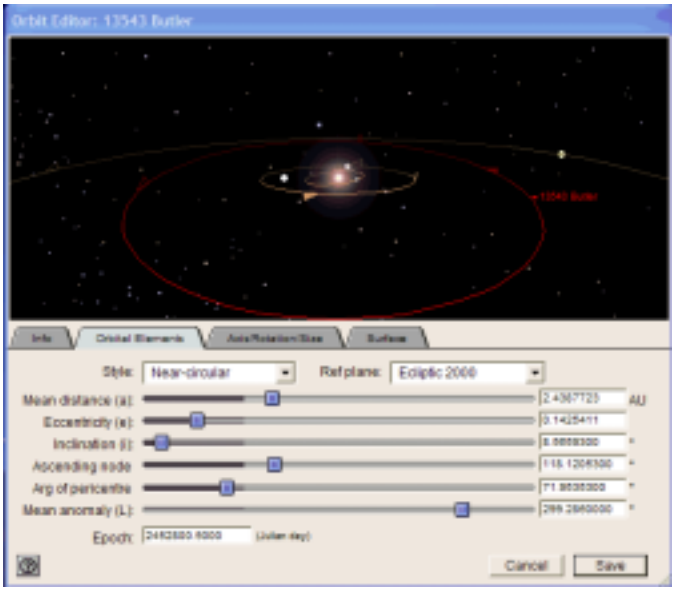
Just for Starry Night users

If you have your own copy of Starry Night you can also manually enter the orbital elements for the asteroid.

Using the "Planet Locator" tool click the add button. On the first tab (info) the only important thing is the absolute magnitude. The Absolute Magnitude = 13.7.

On the second tab you need to enter the information as follows;

Style: Near Circular.
Ref Plane: **Ecliptic 2000**
Mean distance (a) = **2.4387723**
Eccentricity (e) = **.1425411**
Inclination (i) = **8.56593**
Ascending Node = **118.12053**
Arg of pericenter = **71.95353**
Mean Anomoly = **299.286**
Epoch = **2452800.5**



With the above information loaded into Starry Night we can all follow the progress of the new "Butler" that is orbiting the solar system! ■

Eggs in the Air

By Patrick L. Barry

The sky will be filled with flying eggs on May 10, 2003, when a thousand students converge on The Plains, Virginia, for the first-ever national high school rocketry competition.

Called the Team America Rocketry Challenge (http://www.rocketcontest.org), the competition sets the goal of flying a custom-built, two-stage rocket carrying two raw eggs to a height of exactly 1,500 feet, and then returning the eggs to the ground unbroken. The team that comes closest to 1,500 feet without breaking their eggs will win the national title.

The competition is being organized by the Aerospace Industries Association and the National Association of Rocketry (NAR). NASA administrator Sean O'Keefe will attend the final event.

"The idea is to get kids interested in the world of aerospace," says Trip Barber, director of the competition and vice-president of the NAR. "And they will learn some important lessons about the power of math and science-and cooperation and teamwork-along the way."

To develop their designs, the students first used computer simulator software provided by NAR. Then they had to apply old-fashioned ingenuity and craftsmanship to bring the design to life and flight testing to refine it.

Students constructed rocket bodies using a combination of hobby-store rocket kit parts and custom materials. A typical rocket might consist of cardboard tubes from paper-towel or wrapping-paper rolls, a pre-made nose cone, rocket-kit body segments cut to size, and light-weight, balsa wood fins. But the greatest challenge for many was designing the compartment for the eggs.

Some used plastic Easter eggs as casings, padding the inside with bubble wrap, foam peanuts, or even gelatin. Others decided not to "reinvent the wheel," making a cradle from the egg-crate material used for shipping eggs. Some chose to make larger, more powerful rockets big enough to carry the eggs inside, while others made smaller, more efficient rockets that have a bulging egg compartment mounted on top.

A hundred unique designs will be put to the test in Virginia. Only one will win. But for the students, the real prize has already been won: Learning an approach to problem-solving that works, whether you're launching eggs over a field or sending astronauts to Mars.

In the end, it's all about the future: Future technologies and the kids who will grow up to create them. Many advanced technologies are being developed now by NASA's New Millenium Program (nmp.nasa.gov). Who will do that work in the future? Perhaps some kids who spent their weekends launching eggs in the air.

A Boeing Delta II (7326) rocket launched the New Millennium Program Deep Space 1 spacecraft on October 24, 1998.

Are you a kid? Would you like to build your own rocket? Visit NASA's Space Place and learn how to make a bubble-powered rocket! (http://spaceplace.jpl.nasa.gov/rocket.htm.) It won't take you to Mars, but it's a good way to get started.

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

ASTROSPACE UPDATE

June 2003

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.

Titan - New infrared spectroscopic measurements of Saturn's moon Titan were similar to those of Jupiter's moon Ganymede, which implies the surface is icy bedrock. Infrared has to be used to penetrate the cloud layers in Titan's atmosphere, which block visible light views of the surface. Previous infrared images showed that there are dark patches on Titan. This, combined with temperature measurements that showed that it ought to rain methane and other hydrocarbons, had led astronomers to expect methane lakes or hydrocarbon goop to cover much of the surface. It is hoped that Cassini and its lander Huygens may clear up this contradiction when they arrive next year.

Natural Telescope - Astronomers have found that gas clouds in interstellar space can be used as cosmic lenses for radio waves from distant astronomical sources. A small percent of the distant quasars studied show a twinkling (or scintillation) effect, which was found to be caused by gas clouds between the stars. A new study of one of these scintillating quasars shows that a computer analysis of a year's data, while the Earth moved about its orbit, changing our perspective through the gas cloud, can produce an image of the quasar showing extremely fine detail (about 10 micro arcseconds). The technique will be used to try to get images of the jets of very distant quasars, which appear too small to be seen by any other technique.

Intermediate Size Black Holes - It has been well established that black holes come in two sizes: the size of a large star, and those with millions of times the Sun's mass (found at the centers of galaxies). Evidence is growing that an intermediate size exists. Stars have been measured in X-rays and in visible light, orbiting about objects called ultra-luminous X-ray sources (ULXs), allowing their masses to be calculated at hundreds to thousands of times the Sun's mass. The ULXs have been known for 14 years, but their nature is finally being discerned. The X-rays given off by ULXs indicate their temperature (actually the temperature of the accretion disk of material swirling into the black hole) is hotter than either the small or huge sizes of black holes. There are 3 theories on how intermediate black holes can form: 1) collisions of many stars, 2) collapse of an extremely massive star (these may have existed earlier, though they are not found today), 3) collision of small black holes. All 3 have problems explaining all observations, so more work needs to be done.

Exoplanet (planet outside the Solar system) - An exoplanet has been discovered with the shortest period known, revolving about its sunlike star every 28.5 hours. It is about 2.2 million miles from its star, extremely close for a planet, and is consequently very hot, about 2000 degrees on the star-facing side. This is causing the planet to slowly evaporate. The star is named OGLE-TR-3, so-named since it was cataloged in the OGLE-TR catalog, a list of 59 stars whose light shows variations that could possibly be caused by planets passing in front of them. The OGLE-TR list is a by-product of a search (called OGLE) for gravitational lenses that monitored the light from 5 million stars. The planet is roughly half as massive as Jupiter, but is larger in diameter, since hot planets expand. This is the third planet found to pass in front of its star, and it was confirmed by detecting spectroscopically the wobble induced in the star by the planet's orbital motion, the method used to find almost all of the more than 100 known exoplanets.

Milky Way's gas clouds - The Parkes radio telescope in Australia has settled a decades-old controversy about the source of the small, fast-moving hydrogen gas clouds that surround our Milky Way galaxy. The competing theories were that the clouds formed about clumps of dark matter or that they were fragments thrown off small satellite galaxies that orbit ours. The study surveyed the locations of these clouds, including their distances, which had been hard to obtain, and determined that their locations fit the latter theory. In fact, some were definitely identified as having been thrown off by the Magellanic clouds, our 2 largest satellite galaxies.

Chandra (X-ray Observatory) - has observed galaxy cluster Abell 160 and found that as galaxies plow through the tenuous gas that fills the cluster, they leave wakes, similar to a supersonic aircraft plowing through the air. 29 wakes were measurable, and 19 of them were on roughly circular orbits, while 10 were moving radially, that is, toward or away from the center. Galaxies captured by a cluster should move roughly radially, so this says this cluster has a majority of original galaxies fairly undisturbed.

Chandra also imaged the area known as the Lockman Hole, in Ursa Major, allowing it to see a region of galaxies so far that we see them as they were about 5 billion years ago. The area was found to be 7 times denser in active galaxies than what is seen in visible and radio light at that distance. It is thought that this is because the X-rays penetrate dust better, but might reflect more activity that produces X-rays. The greater density allows the large-scale structure of galaxy clusters to be seen better than in other kinds of light. Follow-up images are planned of the same region in visible light with the Keck telescopes. It is hoped to identify many of the same galaxies, and get spectra to show their redshifts, and therefore more precise distances.

Ancient Meteorite Rain - A study of fossil meteorites preserved in layers of limestone excavated in Sweden showed that the rate of meteorite falls hit a peak about 480 million years ago, at about 10 times the rate that meteorites fall

today. It was already known that about 20% of meteorite falls today come from a single parent asteroid that was broken up by a collision with another asteroid about 500 million years ago. It is thought that the known breakup caused the increase in fall rate that was found by the new study.

Black hole - Astronomers have found for the first time a super massive black hole at the core of a pure disk galaxy (NGC 4395), that is, one without a central bulge. Previously found super massive black holes seemed to be proportional in mass to the size of the central bulge, so it was thought that galaxies with no bulge would have no black hole at the core. The newly found black hole was small as super massive black holes go, only 10,000 to 100,000 times the Sun's mass, but certainly not the expected non-existent. It was detected both by X-ray emission characteristics of black holes and by the motion of stars orbiting about the black hole.

Large Survey Telescope - A corporation has been formed to build and operate an 8-meter telescope dedicated to surveying the entire sky to fairly deep magnitudes every week. Planned completion is about 2011. Major universities and research organizations are supporting the plan. It will have a 2 gigapixel CCD on it, and produce 5 terabytes of images daily. Predictions are that it should discover 100,000 supernova per year, and find 10,000 Kuiper Belt objects. It should be able to completely survey all stars within 100 light years for the presence of planets, using the astrometric motion method.

Instant AstroSpace Updates:

Chandra X-ray Observatory has detected a sort of stellar wind blowing away from supermassive black holes at the centers of galaxies, apparently caused by the brilliance of the accretion disk shoving away surrounding matter by light pressure, resulting in a wind at 40% the speed of light.

An atlas of the entire sky in infrared, comprised of 5 million images and a catalog of half a billion objects, has been released on the web, as the final product of 4 years of the 2MASS project's observations with 2 telescopes (Arizona and Chile).

The black hole at the center of the most distant known quasar has been measured at 3 billion times the Sun's mass, using the UK Infrared Telescope in Hawaii; the light we see now left the quasar when the Universe was 6% of its age now, resulting in a redshift of 6.41.

Galileo (Jupiter mission) discovered 7 to 9 space rocks near Jupiter's inner moon Amalthea during the flyby a few months ago, when they crossed the field of view of the star tracker, but no pictures of them were taken; they may be moons of a moon.

Boulby WIMP observatory - is beginning observations with its 3 new WIMP (theoretical massive particles) detectors encased in lead and copper coverings in an English salt mine, where they are protected from cosmic rays and natural radioactivity that would give false detections; it is hoped to prove that the non-baryonic (not protons and neutrons) dark matter of the Universe is composed of WIMPs.

GALEX (ultraviolet [UV] observatory) was launched to begin a 28 month mission to survey the entire sky in near and far UV, the last area of the spectrum without an all-sky survey; it is expected to find how and when hot large stars formed in galaxies, since they give off much UV.

Hubble Space Telescope (HST) - had another gyroscope fail, leaving only one spare; a servicing mission was scheduled for late next year, but that schedule is on hold until the Space Shuttles are flying again.

HST took another deep field very long exposure (7 days), this time of an area of the Andromeda Galaxy's halo, resolving 300,000 halo stars; surprisingly 1/3 of the halo stars were found to be only 6 to 8 billion years old, while the remainder were the same 11 to 13 billion years old that nearly all Milky Way halo stars are.

BeppoSAX (European X-ray satellite) - fell from orbit, spreading debris across the Pacific; it had been out of service since last year due to battery and other failures after a very successful six years of X-ray and gamma-ray burst observations.

Dawn (asteroid orbiter) has been selected as the 9th Discovery mission, to be launched toward Ceres and Vesta in May 2006, and will use solar electric (ion) propulsion.

The landing sites have been chosen for the two Mars rovers scheduled to arrive next January for at least 90 Martian days of exploration: Gusev Crater, which appears to have held a lake in the past and has a dry riverbed entering it, and Meridiani Planum, an area with deposits of the mineral hematite, which usually forms in the presence of liquid water.

Deep Impact's (comet impact mission) launch has been delayed due to budget problems and spacecraft problems; Rosetta's (European comet rendezvous mission) launch has been delayed due to problems with the launch rocket; these in addition to the previously reported loss of the Contour spacecraft (comet nucleus mission) makes for disappointing times for comet scientists and enthusiasts. ■

Astronomy to Go

by Dave Kodama

Last month, I started out on the topic of travel-astronomy by easing into it with the subject of car trips. This month, I'd like to touch a bit on going a bit farther afield with an airplane trip.

Even if you haven't attempted astronomy via an airplane trip, it should be quite obvious that we're dealing with much more severe constraints on what equipment can be taken along. Only the most portable of equipment can fly with you, given the typical restriction of two check-in pieces of luggage and one carry-on bag. This could mean that if you are a visual observer, you will probably have to leave your Dob at home and limit yourself to using binoculars or a small refractor. For a photographer like me, it may mean limiting myself to a 35mm camera and telephoto lens. The problem is even more severe than it seems at first glance since any seasoned airline traveler knows that you must hand-carry any delicate equipment. Since carry-on luggage is typically restricted to a "size" of not more than 45 inches (defined as length+width+height), that is a very tough limitation on what kind of equipment you can bring with you.

For anything other than a pair of binoculars, a mount of some sort will also be necessary. This will have to go into checked luggage, so your only option will be to pack your mount well and pray. Typically, the restriction on checked luggage is a maximum size of 62 inches (combined dimensions) and a weight of 50 lbs per piece. The exact numbers vary depending on the airline, so if you have several legs in your trip, you should check the rules for each airline you will be using. This info should be available through your travel agent or on the web as in this page for Delta Airlines:

http://www.delta.com/travel-agency/library/baggage/checked_baggage/index.jsp

Another concern these days is getting through airport security smoothly. In general, optical equipment does not cause a problem, though it may trigger a hand-search of your luggage if it is not recognizable on an x-ray image. In this case you may be asked to uncap the scope to show that one can see through it. My personal experience is that none of my small scopes (Borg) have triggered hand-searches because the x-ray machines can see completely through the aluminum tube, but if you have a scope with a heavy steel tube, you may be asked to step aside for a hand search.

Another often-asked question is the effect of x-rays on electronic equipment and film. While in theory, x-rays might be able to affect memory devices (e.g. memory cards), and electromagnetic effects from poorly shielded scanning equipment might affect electronics and magnetic storage (e.g. hard disks), I've never seen it happen. At any rate, these days all electronic equipment must be passed through the x-ray scanning checkpoints.

The effect of x-ray scanning on film is, however, a real concern. It is becoming increasingly common for checked luggage to be scanned with high-power x-ray devices, so it is definitely bad idea to place your film in your check-in baggage. Security personnel will tell you that the scanners used for hand-carried baggage do not harm film, but this definitely is arguable for the following reasons:

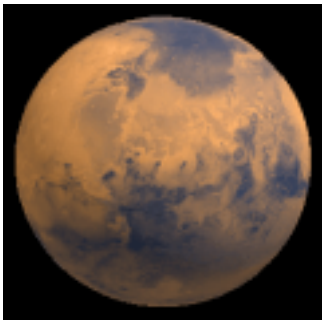
- X-ray exposure effects depend on film speed (worse on fast film)
- Exposure effects are cumulative
- Your bag may be scanned several times at one check-point

The first point is obvious, and generally scanners are said to be OK for film up to ISO 1000. However, the other two points are serious concerns. If you are on an extended trip with many air travel legs or you are not taking direct flights, you may have to pass through security checkpoints multiple times. Traveling out of Hawaii even adds an additional x-ray check for agricultural products. And the worst variable is that your bag may be exposed multiple times at a single checkpoint (and sometimes at higher power) if the scanner operator cannot easily see all of the contents of your bag in the first pass.

So how can we minimize the x-ray problem? My procedure is to put all of the bare film cassettes in a zip lock bag, and ask the security person if the film can be "hand inspected." If this fails (please, no arguments!), I put the film inside a couple of lead-lined film bags (available at camera stores) and put it in the middle of my carry-on bag for the scan. So far, I've not had any problem with film up to ISO 1000, even on multiple segment trips.

You can also minimize the x-ray exposure problem by having your exposed film processed during your trip. Developed film is no longer sensitive to x-rays, so at least some of your efforts will be preserved intact, but more often than not, this can't be done because of a lack of time during the trip or the problem of finding a reliable film processor.

One additional point is that you should unload the film from your camera before going to the airport. The camera will be required to pass through the x-ray scanner and possibly even opened for inspection, so keeping the film separate from the camera to begin with will avoid problems and delays at the airport. ■



A message from the Planetary Society.

Earth will be closer to Mars this summer, when, on August 27, 2003, the Red Planet's opposition brings it nearer to us than it has been in about 73,000 years. In August, The Planetary Society will begin our international Mars celebration with MarsWatch 2003, a program encouraging people everywhere to take a closer look at this fascinating world next door. The Planetary Society has proclaimed August 27 as "Mars Day," for all of Earth. On that day, we hope to turn the world's attention to Mars -- both with educational and observing activities, and information about the five spacecraft going to Mars to join the two already there. We hope you will help us achieve our goal to have half of the world's population looking at, or thinking about, Mars on that day!

The Planetary Society, the Association of Lunar & Planetary Observers, and the Astronomical League urge your organization to join other astronomy groups, planetariums, and science centers in celebrating Mars. Please join us by sponsoring an event during the weeks leading up to August 27. Events might include

- Star parties
- Planetarium shows about Mars
- Lectures
- Family festivals
- Exhibits

The Planetary Society will help advertise Mars Watch events worldwide by

- Sending flyers or e-mails to our local members
- Listing all MarsWatch 2003 events on our website
- Sending you materials for distribution at your event

Additionally, our MarsWatch 2003 web page, http://planetary.org/marswatch2003/, offers a variety of materials for you to duplicate and distribute at your events. You will find Mars fact sheets, games, activities, puzzles, and even recipes.

This year's excitement about Mars will culminate in The Planetary Society's Planetfest '04, which we will celebrate on January 2-4, 2004 in Pasadena, California. This will be a huge celebration of an unprecedented confluence of spacecraft encountering their targets: The Mars Exploration Rover will touch down on Mars; Nozomi will examine the outer atmosphere of Mars; Beagle 2 will explore the Martian surface; and Mars Express will join Mars Global Surveyor and Mars Odyssey, already circling the red planet. Your organization and members can join our co-chairmen, Bill Nye the Science Guy and astronaut Buzz Aldrin, at Planetfest '04, where we will have a live video link from some of the missions, top-of-the-hour updates from leading space explorers, Hollywood celebrities, and much, much more.

Adapted from an email sent by marswatch@planetary.org

AstroTip of the Day

Keep in touch with all the happenings within the club by joining by the more than 90 members who have already signed up to the online OCAstronomers group at groups.Yahoo.com

It is quick, easy and you will benefit from focussed and relevant discussions and notices about things you really care about.

Just go to groups.Yahoo.com and join OCAstronomers

SIRIUS ASTRONOMER
www.ocastronomers.org
The Newsletter of the Orange County Astronomers

Nonprofit Organization
U.S. Postage
PAID
Santa Ana, CA
Permit No. 1468

NEWSLETTER OF THE
ORANGE COUNTY ASTRONOMERS
P.O. BOX 1762
COSTA MESA, CA 92628

RETURN SERVICE REQUESTED

DATED MATERIAL
DELIVER PROMPTLY

HANDY CONTACT LIST

President	Barbara Toy	btoy@cox.net	949-499-3132
Vice President	Joel Harris	eclipse125@earthlink.net	818-575-9580
Treasurer	Charlie Oostdyk	charlie@cccd.edu	714-751-5381
Secretary	Bruce Crowe	bcrowe12@pacbell.net	714-971-8427
Trustee	Bob Buchheim	rbuchheim@compuserve.com	949-459-7622
Trustee	David Radosevich		
Trustee, WAA Representative	Tim Hogle	tim.hogle@jpl.nasa.gov	626-357-7770
Trustee	Tony Obra	tonykathyodieseldr@attbi.com	714-952-8779
Trustee	Gary Schones	gary378@pacbell.net	714-556-8729
Trustee/Press Contact	Russell Sipe	sipe@sipe.com	714-281-0651
Trustee/Webmaster	Liam Kennedy	liam.kennedy@ocastronomers.org	949-552-6187

COMMITTEES, SUBGROUPS, AND FUNCTIONARIES

Sirius Astronomer Editor	Darren Thibodeau	darrent@mwscommunications.com	949-455-0323
Observatory Custodian	John Hoot	jhoot@ssccorp.com	949-498-5784
Anza Site Maintenance	Don Lynn	donald.lynn@opbu.xerox.com	714-775-7238
Astrophysics SIG, Fundraising	Gordon Pattison	glpbmp@cox.net	949-786-7079
Librarian	Karen Schnabel	karen@schnabel.net	949-887-9517
Membership, Pad Coordinator	Charlie Oostdyk	charlie@cccd.edu	714-751-5381
Beginner's Astronomy Class	Antonio Miro	tycmiro@aol.com	714-898-9677
AstroImagers SIG	Greg Pyros	gpyros@cox.net	714-708-3400 x12
Explore the Stars Coordinator	Richard Cranston	rcransto@ix.netcom.com	714-893-8659
Silverado Star Parties	Bob Buchheim	rbuchheim@compuserve.com	949-459-7622
Star Member Training (temp)	Liam Kennedy	liam.kennedy@ocastronomers.org	949-552-6187
OCA Outreach Coordinator	Jim Benet	jimbenet@pacbell.net	714-693-1639
Telescope Loaner Program	Henry Fry	henryfry@hotmail.com	714-635-6056
EOA Coordinator	Ken MacLeod	kenmacleod@earthlink.net	909-674-8877
Anza House Coordinator	Stephen Eubanks	SSEubanks@earthlink.net	714-535-2434

OCA WEBSITE: http://www.ocastronomers.org **STARLINE 24-HR. Recording: 714-751-6867** **ANZA OBSERVATORY: 909-763-5152**