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Newsletter of the Pomona Valley Amateur Astronomers

The true delight is in the finding out rather than in the knowing. ***Isaac Asimov***

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President's Address

Those of you who have been around a few years will remember former PVAA president Alper Ates. I heard from him recently. After leaving southern California he went to Wyoming where he worked on his PhD and did research on super massive black holes with a 2.3 meter telescope. He is now living in Izmir on the western coast of Turkey with his wife and two really cute kids. Alper has been chosen to be the director of a new planetarium in Izmir. He spends his spare time visiting some of the archaeological sites in the area and recently bought a 12-inch telescope to use for variable star photometry. Many of us miss Alper, but it was good to hear that he is doing well.

While on the subject of past PVAA presidents, Roy Schmidt will be speaking to us in March (around St Patrick's Day) on "The History of Astronomy in Ireland." Roy still lives here locally and we do get to see him once in a while (when his employer allows it).

Has anyone read a good book on astronomy, astronomers, or space exploration lately? If so, consider giving a short (5-10 minute) book report on it to our club some Friday night. Let me know and I will arrange it.

That's all for right now so happy stargazing!

Ron Hoekwater

Our next club star party will be **December 1st** at **Mecca Beach** on the east shore of the Salton Sea. This site has an excellent southern horizon. It is about as dark as Cottonwood Spring and quite a bit warmer. Cottonwood Spring can be a mite chilly in December. The Salton Sea is also a area for great bird watching. From my house Mecca Beach Campground is exactly 120 miles, which makes it nearly 10 miles closer than Cottonwood. There are some lights at the site, but it is difficult to find a site with absolutely no lights. To get to Mecca Beach, take the 10 Freeway east to Indio/Coachella. Take Hwy 86S south to Hwy111. Mecca Beach is the second state campground that you will come to, the first being the Headquarters/Visitor Center/Campground.

On Tuesday, **December 4th** we have a school star party at **Hollyvale Elementary** School in Victorville. Since this is kind of far for a school star party you may want to car pool with someone. If you need someone to carpool with let me know and I will try to arrange it.

December 14th, the date of our annual holiday dinner is fast approaching. Be sure you sign up and join us a **Jounnie's** in Upland. This is a chance to visit with people you might previously have only seen in the dark, enjoy a good meal, and win prizes in the big drawing. I hope that many of you can be there.

Site Legend

(CC) Cow Canyon Saddle, near Mount Baldy Village
(CS) Cottonwood Springs campground, Joshua Tree Natl. Pk
(CW) Claremont Wilderness Park parking lot
(KD) Kelso Dunes
(MB) Mecca Beach Campground
(MS) Mesquite Springs campground, Death Valley National Pk
(RA) Riverside Astronomical Soc. Landers site
(WM) White Mountains (Grandview)

PVAA Events Calendar

Month	Star Party	General	Board
November	10(KD)	16	29
December	1(MB)	Annual Holiday Party	
January	5	18	10

General Meeting

It was another good meeting for visitors as we were joined by Larry of the Idyllwild Astro Camp who was invited by members Ken Crowder and Bill Connelly. Mark and Mike Blodgett also attended, past members who decided to join us again for our science lecture. Ken Crowder has been working with Larry to find us a cooler location for our Club star party next August. Larry arranged for us to have our event at the Idyllwild Astro Camp on August 30, 2008. The site is at 5,500 feet and so should provide us with a cooler climate as well as great views of the sky. Thanks to all for your work on this. There will be more details available in the months before the event. Ludd has some 2008 Astronomy calendars available for sale at the much-discounted price of only $7 each. See him to get your copy or to buy extras for gifts.

September's Featured Speaker

Our main speaker for the evening was Dr. Laura Woodney, physics professor at Cal State San Bernardino. Her topic was comets; what do we know about them and how have we discovered more about these solar system wanderers.

There are two main sources for the comets we observe, all collectively referred to as trans-Neptunian Objects (TNOs). All orbit the sun beyond the orbit of Neptune. Kuiper Belt objects are the closest and reside between Neptune and up to 55 AUs from the sun. The most famous of these objects is the dwarf planet Pluto. It is thought that the Kuiper Belt is the main source of relatively short period comets, those with orbital periods of less than 200 years.

The Oort cloud lies a thousand times more distant, some 50,000 AUs away – or around one light-year distant. They are the source the over-200 year period and Halley's type comets. Even though Halley has a current period of 75-76 years, it is believed to have originally been a long period comet that was captured by the gravity of the large planets in the solar system and now orbits within the inner planets with this shorter period. Halley's perihelion or closest distance to the Sun brings it to between the orbits of Mercury and Venus and its aphelion, or farthest distance from the sun, is 35 AU, about the distance to Pluto.

In addition to the fame Halley has gained over the last 2000 years from its periodic sweeps through our neighborhood, it is the parent body for two meteor showers – the Eta Aquarids in early May and the Orionids in late October. No wonder then, that the first mission to observe a comet up close was done to this famous visitor to our night skies. In 1986, the European Space Agency (ESA) sent the Giotto spacecraft on a flyby mission. It was joined on its visit by two probes from the Soviet Union and two from Japan and got within about 350 miles from Halley. Numerous pictures and data were obtained from the comet and showed an irregularly shaped object about 4 x 6 x 9 miles. About 10% of the surface was active and three jets were seen outgassing material into space. The ejected material was made up of 80% water, 10% carbon monoxide, and 2.5 % a mix of methane and ammonia with other hydrocarbons, iron and sodium in trace amounts. While Giotto survived the flyby and even conducted observations of another comet in 1992, it did have a rough ride when it was hit by a piece of comet Halley dust estimated to be between 0.1 and 1 gram. It was sent spinning off into space until it re-stabilized 32 minutes later.

Since this first encounter, there have been others. The next effort was in 1998, when NASA launched Deep Space 1, which not only tested the new electrostatic ion thruster technology but also flew by Comet Borrelly in 2001. It was able to take much more detailed images of this comet, due to the higher resolution cameras it carried on board. It also conducted studies with a Plasma Experiment for Planetary Exploration instrument, which was able to determine chemical composition with infrared and ultraviolet observations.

In 1999, Stardust was launched by NASA and flew through the tail of comet Wild 2, gathering material in its aerogel collector. The sample capsule returned to Earth in January 2006 and over one million photos have been taken of small sections of the gel. Interestingly enough, home computer users have been asked to help study this data, which became available in August 2006. The program is called Stardust@home and can be found at http://stardustathome.ssl.berkeley.edu.

Dr. Woodney participated in NASA's latest effort, the more ambitions Deep Impact mission. It was launched in January 2005 and due to the direct path it followed, arrived at its target, Temple 1 on July 4 of the same year. It fired an 800 pound copper impactor into the comet with observations taking place from both the flyby craft and from the impactor itself. The projectile that hit Temple 1 was made of copper as this element is not found in comets so its presence wouldn't taint the observations.

This very well publicized mission was observed not only from the Deep Impact crafts themselves but from many ground and space based observatories around the world. It is estimated that a cumulative total of over 500 nights of observations were made. Dr. Woodney was observing for radio wavelengths at Mauna Kea, Hawaii. Unfortunately the impact wasn't bright enough to see anything in that band but sometimes the lack of data can still be informative when you assemble the pieces to see what we can find out about these objects located so far away. The crater formed remains somewhat of a mystery since the flyby craft couldn't see

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through the thick ejecta from the impact as it sped past.

Fortunately, there is currently another visit scheduled to Temple 1. The Stardust spacecraft that gathered comet dust in its aerogel collector and saw it return safely to Earth for study is planning a visit. It will return to the comet visited by Deep Impact in the hopes that more detailed data can be gathered from the crater now that the obscuring dust from the impact is gone. Its extended mission goes by the new name NExT for New Exploration of Tempel 1 and is set to occur on February 14, 2011.

The ESA is returning to the study of comets with their 2004 launch of Rosetta that will study comet Churyumov-Gerasimenko when it meets up with the traveler in 2014. It will enter into orbit around the comet then release a lander which will settle on the comet's surface. Interestingly, to keep the lander anchored on the very light gravity surface; two harpoons will be fired into the comet to secure the spacecraft.

Thanks so much to Dr. Woodney for an interesting lecture and for taking time out from her busy schedule at the college to speak to us – after a one-week closure of the school due to nearby fires since so many staff were affected by evacuation orders. What an exciting time to be involved in comet studies, with all the missions taking place and data to analyze. It will be interesting to follow the state of our knowledge over the next few decades as we learn more about our occasional visitors.

Claire Stover

References:

http://en.wikipedia.org/wiki/Halley_comet
http://en.wikipedia.org/wiki/Deep_Space_1
http://en.wikipedia.org/wiki/Rosetta_space_probe
http://en.wikipedia.org/wiki/Giotto_mission
http://en.wikipedia.org/wiki/Stardust_%28spacecraft%29
http://en.wikipedia.org/wiki/Deep_Impact_%28space_mission%29

Project Bright Sky's 4 Week Course For Blind Individuals

Since 2004 Project Bright Sky has conducted very successful star parties for the blind clients of the Los Angeles Braille Institute and the Junior Blind Of America. In April of 2007 our project received a new challenge. The Orange County Braille Institute requested that that Project Bright Sky conduct a series of astronomy courses for their adult blind clients. The first in the series of four week courses would be held at their Anaheim center and would be titled "High Speed Impacts And Explosions On The Moon." Seven blind students, two of whom were totally blind, (one since birth), would study lunar crater morphology, the crater main sequence, stratigraphy, lava flooding of impact basins and the role that high speed impacts played on shaping the early moon and other rocky planets, such as Earth.

Volunteer lunar imagers provided night time support for our daytime classes. PVAA's Craig Mathews, Danny Perry of www.californiastars.net, and Gedas from Yahoo's digital astro group all took time to image requested lunar features. These lunar images were then forwarded to the Yerkes Observatory where Vivian Hoette converted our images into tactile lunar prints. Low vision students as well as totally blind students all greatly benefited from these efforts.

Chris Buchen, Judi Mc Allister. and Peg Peterson (members of the Orange County Astronomers) conducted a class titled, "Please Don't Eat The Planets." They created a scale model of the solar system made of mostly edible things: seeds, un-popped popcorn, chocolate covered malt balls and macadamia nuts. Uranus and Neptune were symbolized by two different sized nectarines. Jupiter was represented by a basketball and Saturn by a soccer ball. Our model the sun was created with a telescopic tent pole arched up from one end of an 8 foot table to the other, creating a half of a sphere. The students studied the flatness and shape of Saturn's rings by examining LP records.

During the four week lunar course we conducted eight tactile labs. Lunar Regolith (top debris lunar surface) was simulated by pulverizing Graham Crackers. Crater morphology was demonstrated utilizing Play-Doh. It revealed how the lunar mountains were not created by the same process that created the mountains on earth, but were the results of high speed impacts.

Bright Sky cont. The next in our series of astronomy courses, "Exploring a Tactile Universe," will commence on November 2nd 2007 at the Orange County Braille Institute. During this four week lunar course we will conduct eight very tactile labs including Lunar Regolith (top debris lunar surface) created by pulverizing graham crackers and Crater morphology utilizing Play-Doh. Play-Doh made it clear to the blind students how the lunar mountains were not created by the same process that created the mountains on Earth, but were directly or indirectly the results of high speed impacts.

Our affiliation with Astronomers Without Borders will soon take Project Bright Sky's mission statement world wide: "Providing the optics and the technology needed by blind individuals to see and enjoy the universe."

Frank Busutil

What's Up Now? - Scary Variable Stars

At the last meeting my star chart centered on a region of the sky often called "The Sea" because of the watery constellations located there. There's Cetus the sea monster, Aquarius the water bearer, Piscis Austrinus the southern fish, Pisces the fish, Eridanus the river, and even Capricornus the "sea goat." This area contains fewer bright stars but more remote galaxies because one is looking into deep space through the "bottom" of the Milky Way Galaxy. Here in the dim constellation of the Sculptor is the South Galactic Pole. Sculptor, and the nearby Fornax the furnace, are uninspired constellations added by chart makers in the 18th century. They should have been sea shells or sea slugs. In this deep, dark "sea" the first magnitude star Fomalhaut (fish's mouth) shines out like a lonely lighthouse beacon. Fomalhaut is an example not of an unstable variable star but of a close (only 25 light years) stable star. Observations reveal it to contain a dusty disk of debris and possibly planets. Two other close stars in the region are Epislon Eridani (11 ly) and Tau Ceti (10 ly). They also have dust disks orbiting them. These two sun-like (G-class) stars have long been used by many science fiction writers as a location for planets inhabited by intelligent aliens. Epsilon Eridani is said to be the home of Spock the Vulcan in Star Trek. Unfortunately, while studies indicate a possibility that both stars have orbiting planets, all that debris dust suggests a high bombardment scenario unfriendly to life. Still, the joke is that aliens land in an Iowa field and contact a farmer saying, "Greetings Earthling, we are from Tau Ceti." To which the dumbfounded farmer replies, "Is that anywhere near Mason City?" The hope of discovering a nearby terrestrial planets capable of life continues.

Now let's discuss some prototype scary variable stars in this region. These stars are members of multiple star systems so changeable that their light outpus varies. In such shifting unstable systems life would be all but impossible.

Scary variable stars come in two basic types, intrinsic variables and extrinsic variables. The first type are intrinsically pulsating variables that expand and contract their surfaces causing their luminosity to vacillate. The most famous prototype of an intrinsic variable is Mira, the miracle star. This star in Cetus the sea monster fades from a brightness of 3.5 magnitude down to an "invisible"10 magnitude in a long period of 332 days. It's a distant red giant (418 ly) with a smaller companion star, Mira B. Recent Galaxy Evolution Explorer satellite ultraviolet photos show Mira to have a remarkable 13 light year long trailing "tail." It represents 30,000 years of gas blown off from this restless star.

Mira is one of several types of agitated intrinsic variable stars systems often given to explosive behavior. The worst type are eruptive or cataclysmic stars, here the interchange of gases between two stars in a binary system causes them to explode into novas or supernovas. Suddenly a new bright star will appear in out skies and then fade away. Soon there is nothing left but a planetary nebulas or a ghostly gassy shell.

However there is a good guy in this group represented by the Cepheid variable. The first prototype is Delta Cephei in Cepheus the King. These massive stars have a luminosity linked directly to their variable period. This makes them a yardstick for judging distances. Their discovery in 1925 in the Andromeda Galaxy allowed Edwin Hubble (of Mt. Wilson Observatory) to announce in that this remote "island universe" was far outside our own Milky Way Galaxy.

The second basic type is the extrinsic variable represented mainly by eclipsing binaries. Here one huge dim star is orbited by a brighter smaller star. The most famous eclipsing prototype is Algol, which literally means The Ghoul. This "Demon Star" varies from 2.1 magnitude to 3.4 magnitude about every three days. Located in Perseus the warrior hero, it has long been seen as representing the chopped off head of Medusa the Evil Gorgon. In the Greek legend, Perseus uses his shield as a mirror to behead Medusa since her glance can turn living creatures to stone. He then flashes the severed Gorgon head to Cetus the sea monster. This petrifies him before he gets a chance to gobble up the lovely helpless Andromeda. This is a good turn of events, nevertheless in astrology Algol is seen as an evil, bad-luck star.

Scary Algol's binary eclipsing secret was correctly guessed in 1783 by astronomer John Goodricke. Its fiendish name dates from dark ages when an inconstant star was a frightening sight. On the other hand, Mira's wonderfully optimistic name was bestowed by astronomer Johannes Hevelius in 1662. Since then astronomers have discovered dozens of types of variable stars. Some are "flare stars" others are non-spherical ellipsoids. Tens of thousands of fluctuating variable star systems have been catalogued. So, although variable stars can be intrinsic miraculous or extrinsically ghoulish they are all very scary.

Lee Collins

In the Mail from Jane

When you look at Mars, have you ever wondered where the rovers are at that moment? I do, and it adds to the fun of looking at Mars when I know the rovers are facing Earth as I am looking up at that bright ruddy planet. Wow is it ever getting bright!

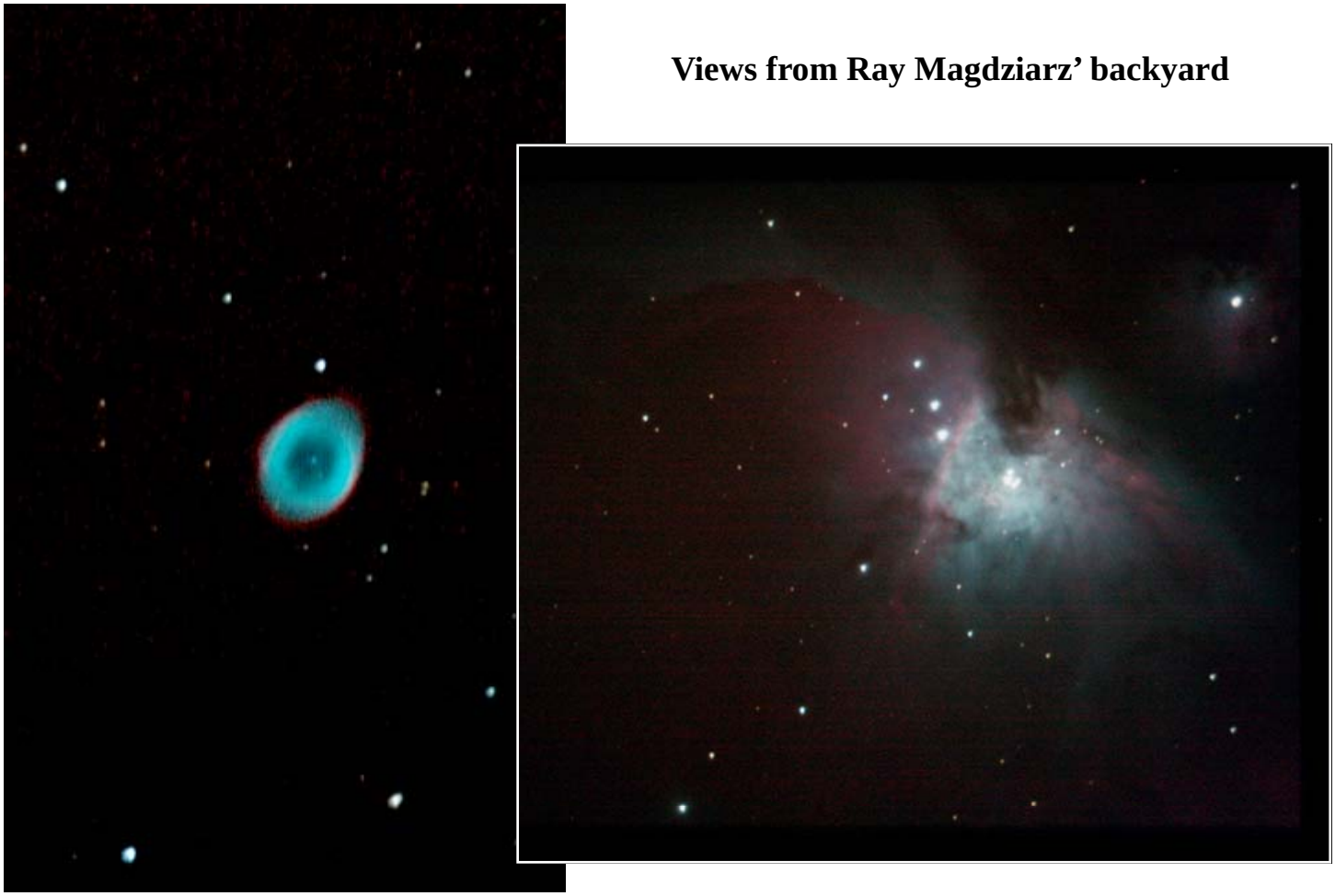
Where and when to see the Rovers is part of the topic of my November's What's Up. That and how to find a wonderful star, Mira, which was captured in a fascinating image by the Galaxy Evolution Explorer in August. Connecting stargazing to NASA missions adds some complexity and extra enjoyment, at least it does to me. I hope you enjoy this one!

Have a look at Comet 17P/Holmes if you haven't. If history repeats, it will only stay bright for 20-30 days. That is what happened in 1892 when it was discovered during a similar outburst. And we're on day 16 now!
http://www.jpl.nasa.gov/news/features.cfm?feature=1514 The star chart on this feature is still accurate.

Jane Houston Jones
Senior Outreach Specialist, Cassini Program

Here is where to find Jane's What's Up: http://education.jpl.nasa.gov/amateurastronomy/index.html
The GALEX image (and related links) of Mira: http://www.jpl.nasa.gov/news/news.cfm?release=2007-090
Jane's favorite Mars Map showing the locations of the rovers: http://www.damianpeach.com/images/mars/mars_2005dp_labeled.jpg

Views from Ray Magdziarz' backyard



11th Annual Holiday Dinner

In just a few weeks we will again have the PVAA Holiday Dinner, which takes the place of our December General Meeting. Your Astronomy Club would like to invite you to our annual Holiday Dinner at 7:00 PM, Friday, December 14th at Jouni's Cafe on Central Ave. in Upland, near Foothill Blvd. Please feel free to bring along a spouse, family member, or guest. We will have a raffle and everyone will win a prize. We plan a pleasant evening of getting to know one another and sharing some holiday cheer. The menu choices and prices are at this link, so please reserve the date now on your calendars, make your meal choice and put your check in the mail (or to Ludd at our next meeting). I look forward to another fun gathering for our 11th - I hope to see many of you there. *Claire Stover*