



For my part I know nothing with any certainty,  
but the sight of the stars makes me dream. *Vincent Van Gogh*

**The November meeting will convene in  
Beckman Hall**

**Newsletter of the Pomona Valley Amateur Astronomers**

**Volume 34 Number 11**

*nightwatch*

**November 2014**

**President's Message**

The past month has given astronomy and space aficionados plenty to ponder. On October 28, an Orbital Sciences Antares rocket that was to carry cargo to the International Space Station blew up just after leaving its launch pad. That's a setback for Orbital Sciences, which along with SpaceX is the only commercial company regularly sending cargo flights to the ISS (Orbital has 3 previous successful ISS missions with the Antares rocket and Cygnus capsule; SpaceX has 5 such missions with its Falcon 9 and Dragon). But at least no-one was injured or killed in the incident.

Unfortunately the same was not true just three days later, on Oct. 31, when Virgin Galactic's SpaceshipTwo VSS Enterprise broke up during a test flight. Copilot Michael Alsbury was killed during the accident, and pilot Peter Siebold suffered serious injuries. This is the first fatality on a spacecraft in flight since the disintegration of the space shuttle Columbia during reentry in 2003. After the crash, Virgin founder Richard Branson said, "We do understand the risks involved and we are not going to push on blindly—to do so would be an insult to all those affected by this tragedy. We are going to learn from what went wrong, discover how we can improve safety and performance and then move forwards together....Space is hard, but worth it."

In happier news, we had sunny weather for the partial eclipse of the sun on Oct. 23--see the observing reports elsewhere in this issue for details. Things are going well for humanity's space probes, too. All of the various Mars orbiters and rovers survived the flyby of Comet C/2013 A1 Siding Spring, and some obtained good photographs and other data during the flyby. The ESA's Rosetta spacecraft is orbiting another comet, 67P/Churyumov-Gerasimenko, and preparing to send down its lander on Nov. 12. If it goes successfully, it will be the first controlled landing of a probe on the surface of a comet. The Mars rover Curiosity is climbing Mount Sharp in its continuing quest to unlock the history of the red planet. Our 'senior' Mars rover, Opportunity, continues to chug along, after an amazing 3936 days and counting on Mars. Finally, the New Horizons probe crossed the orbit of Neptune on the way to its Pluto flyby next summer.

Our speaker this month is PVAA member Ken Elchert. Last year Ken published a book titled, "The Star: An Investigative Journey in Search of the Star of Bethlehem"

(<http://www.amazon.com/The-Star-Investigative-Journey-Bethlehem/dp/1434937224>). This Friday he will share his investigation and his findings with us in his talk, "Searching for the Star of Bethlehem".

*Matt Wedel*

**PVAA Officers and Board**

**Officers**

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| President .....     | Mathew Wedel .....   | 909-767-9851 |
| Vice President ..   | Joe Hillberg .....   | 909-949-3650 |
| Secretary .....     | Howard Maculsay .... | 909-624-1667 |
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| Lee Collins (2015) .....    | 626-852-9442 |
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| Jim Bridgewater (2016)..... | 909-599-7123 |
| Karl Rijkse (2016) .....    | 909-428-1884 |

**Directors**

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| Programs .....             | Ron Hoekwater .....  | 909-391-1943 |

## PVAA General Meeting 10/10/14

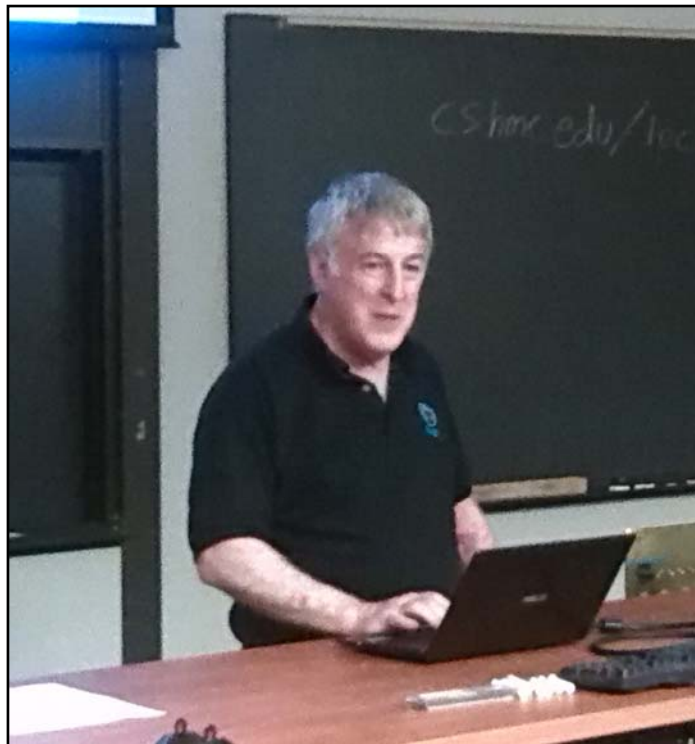
Matt Wedel started off the October meeting with the announcement that our club, the Pomona Valley Amateur Astronomers (PVAA) has officially been incorporated in the state of California. Our non-profit status is still pending. In other news, the Mt Wilson trip was canceled due to overcast skies. We will try to re-schedule it in June. If anyone would like their money refunded, please contact Ron Hoekwater.

Our speaker for the evening was Mike Simmons, the President of Astronomers Without Borders (AWB). Their motto is "One People, One Sky". Their website is:

<http://astronomerswithoutborders.org/>

Mike has been to Iran, China, Iraq, Bangladesh, Nepal, Brazil, Peru, Germany, India, Romania, Easter Island and Morocco to name just a few of the countries (besides being all over the United States). 2009 was the "International Year of Astronomy". During that year he promoted public viewing of the skies like never before. Now, as a continuation, every year April is designated "Global Astronomy Month", but his efforts continue year-round. Currently their website has a 5" collapsible tabletop Dob scope for only \$200.00. (For those in California, you must add sales tax.)

One of the programs that AWB has, that they would like us to consider, is the "Global Pairing Program", where an astronomy club in the US pairs with an international partner and exchange information and ideas.



We as a club can also promote and become involved with the Global Astronomy Month program. You can become a contributing member of AWB for \$30/year or a sustaining member for \$150/yr.

I would encourage everyone to visit their website. For those who can afford it, this is a good investment in humanity. Mike Simmons and staff are doing great work

*Gary Thompson*

### Goldstone Deep Space Network Tour

Laura Jaoui has reserved a tour of the Goldstone Deep Space Network for the Club on Tuesday, December 2nd, at 1pm. It is a 2 hour tour and We should leave at least 3 1/2 hours before the tour. So far, at least 15 PVAA members showed interest in going. Laura needs to submit a list of names of attendees, please let her know as soon as possible. so she can submit your name. Her email is [ljjaoui@yahoo.com](mailto:ljjaoui@yahoo.com).

## What's Up? - A Black Sun?

It's what the Aztecs called a solar eclipse. They thought it was a special appearance of that Black Sun that went beneath the Earth every night. Total solar eclipses were usually seen by ancient cultures as bad omens caused by evil forces. It's frightening, the Sun going black in the middle of the day. Especially since the Sun has always been a god in many cultures.

Today we know that a total solar eclipse happens at new moon when the Sun and Moon are lined up in syzygy. There are also annular eclipses when the size of the Moon's in its elliptical orbit causes it to be smaller than the Sun giving it an annular ring around the edge. There are also partial eclipses when the viewer isn't directly beneath the center of the eclipse. Such an eclipse occurs this October 23. The next total eclipse visible in the United States will be on August 27th, 2017. One will have to go to northern states to see it, but it will be the last one until 2023.

The Moon's orbit is elliptical, tilted away from the orbital plane of the Sun. If it was perfectly circular there would be a solar eclipse every month.

The totality path of the solar eclipse is limited in width and time (about 8 minutes). As a result eclipse chasers or unbraphiles travel to remote locations to view it. It's no longer a fearful event but one to be sought after. They know to use special eye shades when viewing the sun or a pin hole to cast an eclipse image on a white surface. Visual effects seen during a total eclipse are the glowing corona and the diamond ring effect.

Mysterious gravity-related phenomena have been observed during total eclipses. Such as sudden changes in the motion of torsion pendulum. A possible cause could be a blocking of the Sun's gravity by the Moon.

Sometimes a solar eclipse occurs with the conjunction of a planet. Then that planet will be visible, along with bright stars. Years ago observers searched for a planet closer to the Sun than Mercury which they named Vulcan. But it has proven to be a myth (except in Star Trek).

Because of the dramatic nature of a total solar eclipse it has often been used in fiction. Mark Twain in "A Connecticut Yankee In King Arthur's Court" employs the most common eclipse device. A lad is magically transported back in time to Medieval England. He soon gets in deep trouble and is about to be burned at the stake. Being from the future he knows that an eclipse is about to take place. He announces that he will blot out the Sun if he isn't freed from his execution. The eclipse happens, he's set free. This release from entrapment has appeared in books, movies and T.V. many times since. See a movie about Inca sacrifice called "Apocalypto".

The other most common use of eclipses in fiction is that the darkness comes at a moment of terror, murder, or insanity. Stephen King has used it in horror novels such as "Dolores Claiborne" which became a movie. Sometimes it's comical as in the film "Little Shop Of Horrors". Science Fiction has used it in "2001: A Space Odyssey" and an Isaac Asimov story called "Nightfall". This tale takes place on a fictional planet in a stellar system having six suns which keep the planet always illuminated so that total darkness is unknown. But every 2049 years the one sun visible is eclipsed by a moon resulting in the legendary appearance of points of fire called stars. When this frightening nightfall occurs everyone goes crazy. They set fire to all the buildings in an attempt to bring back the light. The result is the collapse of civilization. Of course the story ends this way with everyone driven mad by the darkness and a realization that the appearance of billions of stars means the universe is infinite.

But an eclipsed or "occulted" Sun wouldn't frighten our civilization. Much more is known about the Sun now. It was once thought to be a small dim star among giants stars like Betelgeuse and Rigel. But since the discovery of multitudes of dim red and brown dwarf stars it's now recognized to be brighter than 85% of stars in the Milky Way. Its spectral class G2 classifies it's surface temperature (about 9,941° F).

It takes solar light (and heat) about 8 minutes and 20 seconds to travel 93 million miles to Earth. It generates its radiation by a nuclear fusion of hydrogen nuclei into helium. Its solar core fuses some 620 million tons of hydrogen every second. Its hot corona expands out into space radiating a solar wind which forms a vast heliosphere. Of interest are sunspots which are areas of intense magnetic activity that reduce energy rising to the surface producing a relatively darker spot. Sunlight is the basis of all life on Earth through plant photosynthesis. All other life forms depend on that process.

*Lee Collins*



Image from National Geographic Magazine



## Club Events Calendar

**November 7, General meeting**

**November 22, Star Party**

**December 2, Goldstone Tour 1 – 3 pm**

**December 4, Board meeting, 6:15**

**December 12, Christmas Party, Sizzlin' Skillet 7:00pm**

**No scheduled Star Party**

**No January Board meeting**

**January 9, 2015, General meeting**

**January 17, 2015, Star Party, Afton Canyon**

**January 29, 2015, Board meeting, 6:15**

**February 6, 2015, General meeting**

**February 21, 2015, Star Party, Mecca Beach, Salton Sea**

**February 26, 2015, Board meeting, 6:15**

**March 6, 2015, General meeting**

**March 21, 2015, Star Party, Cottonwood Spr, Joshua Tree**

**March 26, 2015, Board meeting, 6:15**

**April 3, 2015, General meeting**

**April 18, 2015, Star Party**

**April 23, 2015, Board meeting, 6:15**

**May 1, 2015, General meeting**

**May 21-25, 2015, RTMC (anticipated date)**

**No scheduled Star Party.**

**May 28, 2015, Board meeting, 6:15**

**June 5, 2015, General meeting**

**June 13, 2015, Star Party**

**July 18, 2015, Star Party**

**July 23, 2015, Board meeting, 6:15**

**July 31, 2015, General meeting**

**August 15, 2015, Star Party**

**August 20, 2015, Board meeting, 6:15**

**August 28, 2015, General meeting**

**September 12, 2015, Star Party or Annual Mt. Wilson**

**September 17, 2015, Board meeting, 6:15**

**September 25, 2015, General meeting**

**October 10, 2015, Star Party**

**October 22, 2015, Board meeting 6:15**

**October 30, 2015, General meeting**

**November 12, 2015, Board meeting, 6:15**

**November 14, 2015, Star Party**

**November 20, 2015, General meeting**

**December 3, 2015, Board meeting, 6:15**

**December 11, 2015, Holiday Party, Sizzlin' Skillet 7:00pm**

## Space Place 3-D Gallery

What's it like to be standing on the surface of Mars? What about floating outside a Space Shuttle or walking the surface of a massive asteroid? Well, the Space Place can't take you to these places, but we've got the second best option—3D images of them! Pick up a pair of red-blue 3D glasses and take a look at our latest image gallery. It's got pictures from all around our solar system and from right here on Earth, too.



<http://spaceplace.nasa.gov/3d-gallery>.

The Space Place is a NASA educational website about space and Earth sciences and technologies. It targets upper-elementary-aged-children.

[NASA's Space Place](http://spaceplace.nasa.gov) is a NASA educational website about space and Earth sciences and technologies for upper-elementary-aged-children.

## Coriolis Effect

Every tropical cyclone (hurricanes and typhoons) in the history of tropical cyclones has spun counter-clockwise in the northern hemisphere and clockwise in the southern hemisphere. That's because of an important physics principle called the Coriolis Effect. It may be important, but it is still pretty weird and confusing. Learn all about it by reading SciJinks' latest article! <http://scijinks.jpl.nasa.gov/coriolis>.



Did you know that some satellites keep an eye on space weather?



### Looking Back at October: 2 Eclipses and My Favorite Star Party

October was busy! I stayed up into the early morning hours of October 8 to watch the total lunar eclipse--the first I had watched since February, 2008. My 9-year-old, London, didn't stay up that late, he went to bed at the usual time and I got him up about 3:00 AM. We spent about half an hour together, watching the Earth's shadow gradually overtake the moon until the moon was entirely eclipsed. I took most of these pictures with a 4-inch refractor and 8-24mm zoom eyepiece; the photo of the unshadowed full moon was taken through a 2-inch GalileoScope.

On October 23 I went to London's school, Oakmont Elementary, to show the partial solar eclipse to the kids in the B.L.A.S.T. program (Best Learning After School Time). I took along the GalileoScope with a full-aperture filter made from Baader solar film, London's AstroScan with a homemade Sun Funnel, a couple dozen pairs of eclipse glasses, and a pack of index cards. The index cards were for making pinhole projectors, and that was a huge hit with the kids. Our views of the eclipse were given added spice by AR 2192, the largest sunspot group seen in 24 years. It was easily visible to the naked eye through eclipse glasses. All in all, I got to show the eclipse to about 90 students, teachers, and parents.

Two days later, on October 25, London and I were off to the Arizona desert for the 2014 All-Arizona Star Party. This has become a minor tradition for us--we first went in 2010, and we've been back three times now, in 2012, 2013, and now this year. With us was Terry Nakazono from the Santa Monica Amateur Astronomy Club. Terry had been out to the AASP with us in 2012, too. All three of us had great views of the young crescent moon. After the moon set, London started watching for meteors, and counted 17--probably the tail end of the Orionids--before he fell asleep. Terry and I both spent most of the evening chasing southern galaxies in Cetus, Sculptor, Fornax, and Eridanus. My last object of the night was Jupiter, at about 3:00 AM. Terry pushed on until dawn. He slept in while London and I went on a 5-mile hike (another tradition), where we saw a horned lizard and a western diamondback rattlesnake. We also caught up with some old friends from the Saguario and East Valley astronomy clubs. All in all, a great star party--I'm already looking forward to next year.

*Matt Wedel*

ps - Check out the write-up about us at Londons school in the Courier - <https://www.claremont-courier.com/articles/news/t13301-eclipse>





Here's a few handheld "grab shots" using a Canon G11 and an Orion 5" Mak. All shot from the balcony of my apartment in La Verne. Both eclipses were perfectly placed to watch in comfort! A focal w a 26mm eyepiece. Lunar totality 1/8 sec. exp.

*Jeff Schroeder*



Partial Solar Eclipse, October 23, 2014. Camera, Canon Digital Rebel XTi, 300mm Tamron lens with x2 adapter, making total focal length 600mm. Exposure, 1/640 second at f8, ISO 800. Taken by Raymond Magdziarz. I liked the large sunspots

*Ray Magdziarz*



I just held up a point and shoot to the lens and took a few shots. Only this one came out. This eclipse took place during working hours so I took the telescope to work. All the co-workers thought it was neat and the visible sunspot/solar flare was a bonus.

*Ron Spencer*



# Where does the sun's energy come from?

Every 1.5 millionths of a second, the sun releases more energy than all humans consume in an entire year. Its heat influences the environments of all the planets, dwarf planets, moons, asteroids, and comets in our solar system.

National Aeronautics and Space Administration



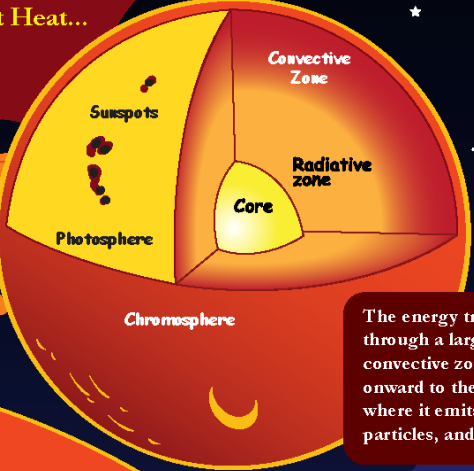
And that light travels far out into the cosmos—just one star among billions and billions.

Create a 'solar wind' that pushes against the fabric of interstellar space billions of miles away.

Allows gases and liquids to exist on many planets and moons, and causes icy comets to form fiery halos.

Powers the chemical reactions that make life possible on Earth.

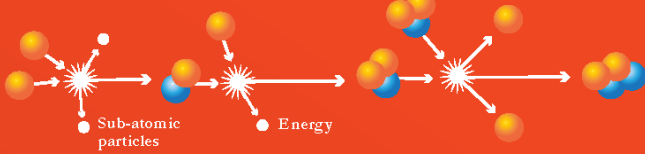
That Heat...



The energy travels outward through a large area called the convective zone. Then it travels onward to the photosphere, where it emits heat, charged particles, and light.

How does a big ball of hydrogen create all that heat? The short answer is that it is big. If it were smaller, it would be just be a sphere of hydrogen, like Jupiter. But the sun is much bigger than Jupiter. It would take 433,333 Jupiters to fill it up!

That's a lot of hydrogen. That means it's held together by a whole lot of gravity. And THAT means there is a whole lot of pressure inside of it. There is so much pressure that the hydrogen atoms collide with enough force that they literally meld into a new element—helium.



This process—called nuclear fusion—releases energy while creating a chain reaction that allows it to occur over and over and over again. That energy builds up. It gets as hot as 15 million degrees Fahrenheit in the sun's core.

Nuclear Fusion

