



## President's Address

There is a lot going on with PVAA activities. First, our solar star party at the Claremont Village Venture went well. We were able to set up near the train station. The weather was perfect. The Sun wasn't very active but we could see a few prominences and some other features. We had fun and gave many Claremonters a good look at the Sun. Thanks to all the PVAA members who brought scopes or stopped by to help out.

The November 22<sup>nd</sup> star party will be at Cottonwood Springs. This is a good dark sky site. My experience has been that Cottonwood is often clear when most other southern California sites are clouded over.

On Thanksgiving weekend (November 28, 29, and 30) the Riverside Astronomical Society will be having a special star party to celebrate the expansion of the GMARS (Goat Mountain Astronomical Research Station) in Landers. PVAA members are invited to attend. We made a contribution to aid RAS in the acquisition of their new property.

We have a couple of school star parties coming up in early December on the 5<sup>th</sup> and the 8<sup>th</sup>. Check the club calendar for more information: <http://www.pvaa.us/CalendarPage.asp>.

Our annual holiday party is December 12<sup>th</sup> this year. There will be music, pleasant conversation, good food, and a drawing with prizes for everyone in attendance. Come meet with your fellow club members in a setting other than a star party or a lecture hall.

You will not want to miss the February 13<sup>th</sup> general meeting! Mark your calendars now, this is a biggy. February 2009 will be PVAA's 40<sup>th</sup> birthday and our speaker will be a founding member of Pomona Valley Amateur Astronomers. Tony Cook, who now works at Griffith Observatory, will speak to us on the early history of PVAA. Several early PVAA members have gone on to careers in astronomy and science. We will have a rare opportunity to learn something about how this all started.

In late spring or early summer 2009 we will  Pg2

## October General Meeting

We welcomed a couple of visitors to our October meeting and shared plans to try a new location for our November 1<sup>st</sup> Club Star Party – Mojave River Forks Regional Park. As you will know by now, our plans were undone by bad weather and the threat of rain but we hope to schedule this new spot again in the future. We had much better luck sharing the sun with the public at Claremont's Village Venture on October 25<sup>th</sup>. After we spent hours last year waiting for about 15 minutes of clear weather, this year we were treated to a full day of blue skies and almost too warm temperatures. We shared solar astronomy with many passers-by. A few were interested enough in learning more about our hobby that they may join us at future events.

The Club has some other plans in mind for the coming months. I will start to investigate a trip to Mt Palomar where we can hold a star party as well as have a daytime tour of the telescope facilities on the mountain. Since many members showed an interest, Ron will work on another Club trip to Mt Wilson. Located as close as we are to these two venerable observing centers and their historic instruments, it seems fitting we should plan some trips to learn more about them. At Mt Wilson, its 60" telescope is available for the Club to rent. The cost per member will be about \$90 and for that paltry sum we will be able to spend the whole night looking at what we'd like through this massive telescope where so many discoveries were made by Hale, Hubble, and others as many as 100 years ago. In addition to wonderful views of the planets, Ron hopes that we can see light from some of the farthest objects visible through this scope from Earth – gravitationally lensed quasars. To get you in the mood for a trip to Palomar, please look out for *The Journey to Palomar*, a documentary on your local PBS station. Those of us at PATS heard a presentation from the filmmakers and it looks like a fascinating story.

Roy Schmidt gave a product review of a unit that  contains a green laser light, a red flashlight with three **Pg2**

**Pg1**  be touring the Palomar Observatory. Palomar is the observatory which contains the fourth and final of the great telescopes built by George Ellery Hale, the 200-inch telescope on Palomar Mountain. We will have more information soon on our guided tour. (Also, watch for the movie *Journey to Palomar* on PBS this month.)

Speaking of Hale's telescopes, I am trying to arrange another observing session with the second of those scopes, the 60-inch on Mount Wilson. If it works out we will have the 60-inch one night near the end of next spring.

Well, it's past my bedtime and my deadline. I'm out of time. I hope to see many of you at some of these activities. Happy stargazing.

*Ron Hoekwater*

## PVAA HOLIDAY DINNER PARTY

The 12th Annual PVAA Holiday Dinner Party will be held on **Friday, December 12, 2008**, at 7:00 pm.

Party location is [Jouni's Cafe](#), 922 N. Central Avenue, Upland. Please sign up soon, by mail or at our next meeting.

## Club Events Calendar

November 14, General Meeting  
 November 22, Star Party - Cottonwood Springs  
 November 29, Celebration of GMARS east with RAS

December 4, Board Meeting  
 December 8, School Star Party - Oakmont  
 December 12, Holiday Party - Jouni's Café 7 pm  
 December 27, Star Party - Claremont Hills Wilderness Park

January 8, Board Meeting  
 January 16, General Meeting  
 January 24, Star Party - Mecca Beach Campground - Salton Sea

February 3, Star Party - Ontario Library - Main Branch 7-9 pm  
 February 5, Board Meeting  
 February 13, General Meeting  
 February 21, Star Party - Cottonwood Springs, Joshua Tree  
 February 24, School Star Party -  
 Hollyvale Elementary - Victorville

March 5, Board Meeting  
 March 13, General Meeting  
 March 21, Star Party - GMARS at Landers with RAS

April 2, Board Meeting  
 April 2 - 5, 100 Hours of Astronomy public outreach.  
 Details at [www.100hoursofastronomy.org](http://www.100hoursofastronomy.org)  
 April 10, General Meeting  
 April 25, Star Party  
 April 28, Star Party - Ontario Library - Main Branch 7-9 pm  
 April 30, Board Meeting

May 8, General Meeting  
 May 22 - 25, RTMC



**Pg1** different intensities, as well as a white light source all conveniently contained in a compact package which includes a neck lanyard. The company, HoTech, also makes telescope collimators and other laser pointer units. Check out their products if you are in the market for one of these astronomical tools.

<http://www.hotechusa.com/>

## Featured Speaker

Steve Edberg was our speaker in October. Steve is working for JPL on the development of SIM, NASA's Space Interferometry Mission. Originally scheduled to launch in 2005, budgetary constraints and the juggling of mission priorities has moved this project off until at least 2015. Meanwhile, the development of the project continues.

SIM will use optical interferometry, where light is gathered through two separate instruments located far apart from one another on the spacecraft. The signals are then combined so the results are as if observations were done using one, much larger mirror. The interference between the combined light waves is called interference and enables the more accurate measurement of distances and angles. The effective sizes of the instruments on SIM are two 7.2-meter guide interferometers and one 9-meter science instrument. Using these huge detectors, distances can be measured down to an accuracy of between 1 and 20 microarcseconds.

The instrument will look for minute wobbles in the motion of stars, which indicate they have companion objects, whose gravity affects their movement. This will let it detect planets of as little as four Earth-masses up to 33 light years away from us and even smaller for those few stars located closer to our sun.

Through its study of binary star systems, SIM will be able to more accurately measure the masses of the different types of stars found in our galaxy. Scientists will then use this data to better model the evolution of the universe and of the stars themselves. SIM will also use its more accurate measurements to explore our galaxy as we strive to map the sea of stars we are floating within. We hope to learn as much about the structure and motion of our own galaxy as we know already about those located much further away.

It is also hoped that SIM will shed some light on the dark matter mystery. Galaxies are observed to rotate much faster they should based simply on their visible matter. More precise studies of the motions of nearby galaxies may better determine their total mass and more accurately determine where this unknown material is distributed.

Thank you so much for sharing the design and goals of SIM with us, Steve. We are now more informed and better able to advocate for the specific benefits of this mission that we hope to soon see more firmly scheduled to launch and to start operations.

*Claire Stover*

References:

[http://en.wikipedia.org/wiki/Space\\_Interferometry\\_Mission](http://en.wikipedia.org/wiki/Space_Interferometry_Mission)

## If It Quacks Like a Planet...

*This month we conclude our "debate" over whether or not Pluto counts as a planet.*

The way I prefer to define a planet is to use the regional approach. This is based on looking at how much a planet dominates its region of the solar system. After all, Ceres stopped being called a planet when people realized it was part of swarm, so maybe we can continue to use this sort of criterion. In fact, we can do this by simply comparing the mass of a potential planet with the masses of all of the other bodies in an "orbital zone" (a region around the planet defined by its gravity and distance from the Sun). When we do this in our own solar system, there is a clear break point. The eight largest bodies orbiting the Sun (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune) all completely dominate their orbital zones. There may be other material in the area, but it's a tiny fraction of the mass of the planet. On the other hand, large asteroids (like Ceres) and Kuiper Belt objects (like Pluto and Eris) are much smaller than the mass of the material around them.

So this is what folks in the IAU had in mind in 2006 when they came up with a new definition of a planet. This definition was based on the idea that a planet "clears out its orbital zone". By clearing out, they were not referring to completely eliminating every last speck of dust around a planet. Instead, they meant removing the vast majority of the surrounding material, so that the planet dominates its region of the solar system. With this definition, there are eight known planets in our solar system.

It's possible to imagine cases where this definition won't work so well (especially in very young solar systems where the planets are still forming), but it's hard to come up with a definition that will successfully handle every imaginable situation: it's hard enough to come up with one that works in the case we already know about.

Lastly, we shouldn't assume that anything that isn't a planet is therefore uninteresting or not important. As we get a closer look at these smaller bodies, we are almost certainly going to find much that is fascinating and unexpected about them, just as we did when we got the first close-up looks at the moons of the giant planets in the late 70's and early 80's. That experience taught us that moons could be just as complex and active as any planet, and the same will almost certainly prove to be true with the largest asteroids and Kuiper Belt objects.

So, when someone says they think Pluto should be a planet, I ask them what they think the definition of a planet is, and whether they understand all of the implications of that definition (e.g. arbitrary boundary lines, dozens of new "planets", etc.). Once they appreciate this, they begin to wonder if keeping Pluto really does "quack" like a planet.

*Dave Kary*

## Project Bright Sky Completes Our Best Year

In 2008 I had no idea that the simple question, "can a blind person enjoy the universe", would lead to the adventure that Project Bright Sky has provided. Out of all the years since we started our project in 2004, this year has exceeded all expectations.

In April 2008 the 5th annual Desert Adventure Star Party for the blind clients of the Los Angeles Braille Institute was held at Joshua Tree National Park. We had a record attendance. Twenty blind individuals participated in visual astronomy and in a one mile desert ecology hike.

Our 2008 Summer Skies Star Parties for the children of the Junior Blind of America were very successful. Project Bright Sky conducted 2 star parties at their summer camp, Camp Bloomfield, located in the Malibu hills. Over 150 blind campers from across the United States touched, saw, and learned about the universe.

For the first time astronomy classes were conducted at the Orange County Braille Institute, in Anaheim. Project Bright Sky instructors from The Pomona Valley Amateur Astronomers and the Orange County Astronomers taught adult blind students about lunar crater morphology, created tactile solar system models, studied the affects of black holes, and learned about many celestial deep sky objects which made up a tactile Milky Way galaxy. The classes started in September 2007 and continue today, every Friday.

Project Bright sky has partnered with its third Braille Institute. During the month of October 2008, Bright Sky volunteers completed 4 weeks of astronomy instruction and one desert star party for the blind clients of the Rancho Mirage Braille Institute. Instructors Frank Busutil and Bob Perone (Braille Institute instructor) covered topics which included tactile studies of the moon and our solar system. With the help of Jim Bridgewater, Joe Hillberg, Frank Busutil, and the Joshua Tree National Park rangers, the class work ended with a desert star party. The skies were full of bright sky objects and once again blind individuals saw the universe.

Amateur astronomy is a tremendous hobby as it lends itself to so many interests. Some amateurs spend years searching for and observing the faint light emitted by galaxies millions of light years away. Others are content much closer to home and spend their nights studying planets in our solar system. Some study variable stars. Others study just one star, our sun. For those who have participated in Project Bright Sky our thrill is when we observe a blind individual, who can barely see glued to the eyepiece on our telescopes or enjoying the live views provided by one of our monitors connected to a telescope. They enjoy and appreciate every photon gathered by our equipment. Just this past month we received a request from a blind student's teacher in Florida, wishing her student to take part in astronomy. One e-mail to the Treasure Coast Astronomical Society in Florida and a project will soon be forth coming. Join us in the future as we take astronomy outreach to new levels.

*Frank Busutil*

## What's Up? – A Queen, A Chained Princess, And A Severed Head

The tumultuous tale of Queen Cassiopeia, King Cepheus, and their chained Princess Andromeda is a sensational mythic background to an area which looks out away from the galactic center. Near the constellation of Perseus (the hero –carrying his severed Medusa head) we look out through the spiral arms of our Galaxy. The Milky Way is not a thick curtain of stars as it is toward the Galactic Center but is broken up into patterns of open star clusters, the largest being the very visible Perseus Double Cluster. Looking beyond into deep space we can also see the brighter galaxies of our Local Group such as M31 (Andromeda Galaxy) and M33 (Triangulum Galaxy).

But first let's find out how Princess Andromeda got to be naked and chained to a seaside rock waiting for a monster to come and eat her. That monster is either the constellation Cetus (sea monster) or Draco (dragon), depending on which version of the tale you read. Here also is Perseus, returning from a quest to behead the evil gorgon Medusa. He will heroically rescue Andromeda. He's riding on another constellation Pegasus (flying horse) and munching on yummy pieces of Pisces (fish). That brings to eight the number of constellations involved in this melodramatic story. This was the way entertainment starved ancients viewed the meaning of starry constellations.

Queen Cassiopeia bragged of her and her daughter Andromeda's beauty so much that the Nereids (sea nymph daughters of Poseidon) become wildly jealous. So they convinced their powerful father to chain Andromeda up for sea monster food.

Then along came Perseus, having just beheaded the gorgon Medusa whose snake haired head turned all who looked at it to stone. Perseus beheaded Medusa by using his shield as a mirror. Then looking at her reflectively, he chopped away with a backward stroke. Returning home he spied the naked, chained Princess Andromeda. "She needs rescuing and marrying," he declared. So he used his newly acquired severed head weapon to turn the monster to stone and rescue her. In one version, Cassiopeia and Cepheus complain about Perseus' maverick background, so he turns them to stone too.

A Hollywood action film version can be seen in *Clash of the Titans* (1981).

Astronomically, Medusa's spooky severed head is represented by the variable star Algol (the ghoul, or demon star) in the constellation of Perseus. This double eclipsing variable star can be seen changing eerily from 4th to 2nd magnitude in about 2 days.

Queen Cassiopeia continues to be punished by Poseidon by having her M or W shaped throne turned upside down as it swings around Polaris (the North Star). Cassiopeia contains many excellent open clusters, including my favorite, NGC 457 (the Night Owl cluster) which resembles a cartoon-like E.T. figure. It's always popular with children looking through a telescope for the first time and expecting to be entertained.

Cassiopeia also contains the site of the first recognized supernova (exploding star) spotted by the Danish astronomer Tycho Brahe in 1572. Tycho was very excited by this "nova" (new star) since the church preached the belief that stars were fixed and unchanging. His follower Johannes Kepler

spotted another supernova in 1664, causing him to comment that perhaps they appeared every generation but no one had ever noticed them. But no supernovas have exploded in the Milky Way Galaxy since 1664.

Tycho Brahe was a wealthy eccentric nobleman, the last astronomer to work before the invention of the telescope. He was famous for having lost part of his nose in a drunken late-night duel. He wore a replacement nose bridge made of gold for special occasions, and an everyday one of copper. He kept a "clairvoyant" dwarf named Jepp, who would applaud his master's statements. Tycho died suddenly and mysteriously during one of his elaborate dinner parties. He might have been poisoned by those who disagreed with his theories. He was replaced by the mathematically brilliant but less colorful Kepler.

Near by, between Queen Cassiopeia and King Cepheus lies the totally weird Bubble Nebula (NGC 7635). This is a 10 light year in diameter "bubble" caused by the stellar wind of a massive star pushing against the surrounding gaseous cloud. It looks like something created by aliens to disturb human astro-photographers.

Nearby in Cepheus is the remarkable orange Garnet Star (Mu Cephei). It is a dying red-supergiant that could contain millions of our suns. In our system its solar surface would lie out near the orbit of Saturn. It's about as big as a star can get.

Next door in the "chain" portion of Andromeda we go from red to blue. Here's a striking planetary nebula called the Blue Snowball (NGC 7662). Seeming remote and cold in a telescope, it is really a violent ball of exploding gas. Its center holds a collapsed blue-white star that's 75,000 degrees Kelvin. It's about as hot as a star can get.

At the other end of Andromeda is another planetary nebula, the Little Dumbbell (M76).

Returning to Cepheus, we can locate Delphi Cephei the original cepheid variable star. In the 1870's an affluent amateur astronomer, John Goodricke discovered this star's variable cycle. Born a Dutch aristocrat, Goodricke was a sickly and reclusive deaf-mute. He spent his short life (22 years) skillfully measuring many variable stars, including Algol.

In 1908 an American, Henrietta Leavitt, discovered the cepheid variable's fixed period-luminosity relationship which allows them to become a yardstick for measuring distances in space. However, as a woman assistant to astronomer Edward Pickering, she received no true credit for her accomplishments during her lifetime. Interestingly, Leavitt was deaf like Goodricke. Astronomer Edwin Hubble later said Leavitt really deserved a Nobel prize.

It was Hubble's study of cepheid variables in the Andromeda Galaxy at Mt. Wilson Observatory in 1925 that allowed him to proclaim it a separate galaxy, 2.5 million light years beyond our own Milky Way Galaxy. This established a basis for recognizing the vast distance of galaxies, of which over 800,000 are known.

So we see that this region contains a deep space violence of exploding supernova, overheated planetary nebulas, and even a wierd "bubble" nebula. A turmoil reflecting the severed head vehemence of Andromeda myth. The stars are not as peaceful as they look.

*Lee Collins*



PVAA at Village Venture - Claremont  
October 25, 2008  
Images by Ron Hoekwater





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