



Newsletter of the Pomona Valley Amateur Astronomers

For it is the duty of an astronomer to compose the history of  
the celestial motions through careful and expert study.  
*Nicolaus Copernicus*

Volume 29 Number 7

*nightwatch*

July 2009

## President's Address

Well, it is that time of year again, time for elections. At our July 10<sup>th</sup> general meeting nominations for PVAA board positions and club offices will be accepted. Be thinking of who you might want to nominate. All of our current board members have consented to run again. Of course, you can nominate anyone who is a current member. The elections will be held at our August 7<sup>th</sup> general meeting. Please try to attend both meetings if you can.

One thing that I have noticed about the most successful clubs around is that they have many volunteers working on many different things. If you have a suggestion, if you would like to help with club activities, if you have an idea for an article for the *Nightwatch*, let your board know about it. We can always use more help at our public events. Volunteer! More people participating makes a better PVAA for all.

Joining PVAA and becoming an active member has been one of the best decisions of my life. As a member, I have been afforded so many opportunities to enjoy this hobby which I would otherwise surely have missed. Examples are the many interesting guest speakers at the general meetings and the tours of the Big Bear Solar Observatory, Mount Palomar Observatory, and Mount Wilson Observatory in which I have been privileged to participate.

As a child I dreamed of some day having a chance to see the historic instruments of discovery of which I had read so much. To be inside the domes of these great telescopes, close enough to touch them, was a thrill, which I never expected that I would have. But, to actually have the opportunity to observe through the Mount Wilson 60-inch telescope, the first great reflector and the brainchild of George Ellery Hale, was more than I could ever have believed possible. Yet, observe with the 60-inch is exactly what I have been able to do (on multiple occasions) as a member of Pomona Valley Amateur Astronomers. This is the telescope, which at last proved that large mirrored telescopes could be

successfully built and put to useful service. It is the telescope which was employed by the likes of E.E. Barnard (superb observer and cataloger of dark nebulae), Ejnar Hertzsprung (Hertzsprung-Russell diagram), Harlow Shapley (director of Harvard Observatory), Walter Adams (director of Mount Wilson Observatory), Harold Babcock (detected Sun's general magnetic field), Milton Humason (red shift / cosmic distance scale), and Edwin Hubble (red shift / cosmic distance scale).

The celestial knowledge that I have gained, the observing lessons that I have learned, the opportunities for astronomical adventure, and the wonderful people that I have met in PVAA have made my club membership one of the most rewarding investments of time and (a paltry amount) of money that I could ever have made.

As president of PVAA, I would like to pass these gifts on to others. And I would appreciate your help.

*Ron Hoekwater*

## NASA Returns to the Moon

If all goes as scheduled, two NASA spacecraft will slam into the moon at 4:30 AM PST on October 9, 2009, in the hope of finding water there. When the LCROSS rocket stage and shepherding spacecraft slam into the moon's south pole, an army of professional telescopes on earth will record the event. But do amateurs stand a chance of seeing the impact? Mission scientists say yes. It should be observable with a 10 to 12 inch aperture scope. If it happens in late August the moon will be up from the West Coast to as far east as western Texas.

For more info, check out the LCROSS project website at <http://www.lcross.arc.nasa.gov/observation.htm>.

*Jim Bridgewater*

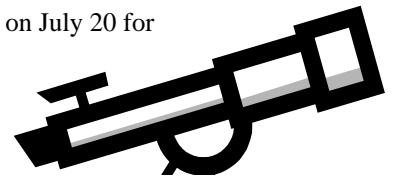
### Club Events Calendar

- July 10, General Meeting - Speaker Phillip Choi, Professor, Pomona College Dept of Physics & Astronomy, on Adaptive Optics.
- July 11, Tour of Mt Palomar 2 PM.
- July 18, Star Party - Mojave River Forks Regional Park
- July 20, Project Bright Sky, Junior Blind of America, Malibu
- July 25, Public Star Party at Griffith Observatory 2 – 9 PM
- July 30, Board Meeting
- July 31, Moonlight Fishing Star Party – Santa Fe Dam Rec Area in Irwindale 8 – 11 PM
  
- August 7, General Meeting - Speaker Greg Lyzenga, Geophysics Professor, Harvey Mudd College on Asteroid Occultations
- August 15, Girl Scout Nature at Night - Skyland Ranch
- August 18, Cub Scout Star Party - Mountain View Park 7:30 pm
- August 19 Rescheduled Mt. Wilson trip
- August 22, Star Party - Helipad at Camp Angeles
- August 26, Ontario Library Main Branch, 7 – 9 PM
- August 27, Board Meeting
  
- September 4, General Meeting - Michael Janssen of JPL on the Juno Mission to Jupiter
- September 19, Star Party – Landers
- September 24, Board Meeting
- September 26 - 27, Second Annual PATS, Pasadena
  
- October 2, General Meeting
- October 17, Star Party Cottonwood Springs
- October 22, Board Meeting
- October 24, Solar Star Party - Village Venture in Claremont 9 -5
- October 24, Star GATE at Townsend Jr. High School in Chino
- October 27, Ontario Library Main Branch, 7 – 9 PM
  
- November 6, General Meeting
- November 11 – 15, Nightfall - [www.nightfall2009.com](http://www.nightfall2009.com)
- November 14, Star Party – Mecca Beach at Salton Sea
- November 19, Board Meeting
  
- December 12, Star Party – Claremont Hills Wilderness Park
- December 17, Board Meeting
  
- January 9, Star Party – Mecca Beach
- January 19, Main Branch, Ontario Library, 7 – 9 PM
- January 21, Board Meeting
- January 29, General Meeting

### Summer is Election Season for PVAA

At our July 10<sup>th</sup> general meeting nominations for PVAA board positions and club offices will be accepted. Be thinking of who you might want to nominate. All of our current board members have consented to run again. Of course, you can nominate anyone who is a current member. The elections will be held at our August 7<sup>th</sup> general meeting. Please try to attend both meetings if you can.

The astronomer in the yellow shorts in last months Nightwatch was our very own Frank Busutil! He'll be hosting a Summer Sky Party in Malibu on July 20 for the Junior Blind of America. Contact Frank for details if you can come and help.



### Found on the Web

While cruising the web, I ran across an amazing display of the Mt. Wilson 60 inch telescope . Check it out at : <http://www.journeytopalomar.org/panoramas/wilsonpano.htm>

### PVAA Officers and Board

**Officers**

- President .....Ron Hoekwater.....909/391-1943
- Vice President ..Joe Hillberg.....909/949-3650
- Secretary .....Claire Stover.....909/988-9747
- Treasurer .....Ludd Trozpek.....909/624-3679
- VP Facilities .....Bob Akers.....909/946-0228

**Board**

- Lee Collins .....626/852-9442
- Ray Magdziarz .....909/626-8303
- Jim Bridgewater .....909/624-4893
- John Stover .....909/988-9747

**Directors**

- Nightwatch .....John Stover.....909/988-9747
- Membership ...Ludd Trozpek.....909/624-3679
- Publicity .....Dorene Hopkins.....909/983-5584

## June General Meeting

Ron began our June meeting with a book report. He just finished reading *Decoding the Heavens* by Jo Marchant which tells of the discovery over 100 years ago of what is being called the Antikythera mechanism. The object was found within the remains of a Greek shipwreck dating from around 70 BC. Scientific investigation methods have advanced since 1900 when sponge divers first found the device, and recent scans have revealed an amazing precision and complexity in what appears to be an early geared computer for tracking astronomical events. If you are looking for an interesting read, this hardcover book can be found on line for under \$20. Alternatively, since Ron is now done with the book and promised to get it right back to the library, you can check it out next yourself – absolutely free.

### Featured Speaker

Physicist Tim Thompson was our speaker for the evening. In addition to over 20 years of experience with JPL, Tim is on the Board of Directors of the LA Astronomical Society, president of the Mount Wilson Observatory Association, and Secretary for the Pasadena Chess Club. As you can see, this man never just attends a meeting to hear the lecture or sits down to play a game of chess but helps make sure events are planned for and enjoyed by everyone!

The topic for the evening was String Theory. We began our history of physics with the Classical Mechanics of Newton and Maxwell's breakthrough that electric and magnetic forces were one and the same – now imaginatively called electromagnetism. The inconsistencies revealed between these two theories were resolved by Albert Einstein and his General and Special Theories of Relativity in the early 1900s. Einstein's contribution to physics added time to the three spatial dimensions we were familiar with – the X, Y, and Z axes we learned in high school geometry class. In another brilliant flash of word play, Einstein's new reality was described as spacetime.

Some earlier research in the 1800s, like the discovery of the photoelectric effect, showed that classical mechanics did not completely explain what was being experimentally observed. As we were able to look deeper into the world of small objects like molecules and atoms and closer into the properties of light, quantum mechanics came into its own. It involved the ideas that matter and radiation have both wave and particle-like properties and that such small particles are governed by probabilities instead the certainties of location and behavior they would have had using a classical model.

Starting in the mid 1960s, the relatively simple model of an atom consisting of protons, neutrons, and electrons became passé as scientists discovered an alphabet soup of subparticles, the building blocks which make up these larger particles. For example, protons and neutrons are made up of quarks – whose types are called flavors: up, down, top, bottom, charm, and strange. This lively language of quarks is tamed by the pedestrian gluon, the particle which holds together quarks in an atomic nucleus while photons and neutrinos are produced by stars.

Next, we learned about physicists and Nobel Prize winners dating from the mid-1970s who built on the theories of quantum mechanics and the new elemental particles and were beginning to propose ideas that were probably unheard of for most of us whose physics classes took place prior to that decade. There has been a strong drive in physics to unite more of the forces, as Maxwell did with electromagnetism and Einstein with spacetime. Ideas were proposed, including loop quantum gravity, supersymmetry, supergravity, M-theory, D-branes, and black p-branes. The popular overarching name for many of these recent ideas is string theory. Since much of the most current research in this field involves 11-dimensional space and numerous higher mathematical equations to describe it, I think most of us were glad that Tim didn't try to share the specifics with us.

What we did learn, however, was an overview of the history of these ideas and the knowledge of some of the reasons people are continuing to pursue it. Tim gave us four reasons - Einstein's General Relativity can be produced out of the current String Theory model, it requires a handedness just like that found in nature and in physics, M-Theory neatly wraps up several other earlier models, and the symmetries of particle theory are also found in String Theory.

Despite the difficulty of understanding the complexities of these new ideas, there are some ways to verify them experimentally. If a particle exists, string theory says it should have a partner whose characteristics can be predicted. It is hoped that the recently completed Large Hadron Collider in Switzerland will play a role in the discovery of some of the currently "missing" particles. It is expected to resume operation later this year, after repairs are completed from a faulty electrical connection which vented 6 tons of liquid helium into the collider late last year. Some of the effects predicted by the extra 7 dimensions of the newest theories should show up experimentally as we are able to observe smaller and smaller objects, forces, and distances.

Thank you so much for an interesting and mind bending talk, Tim. While I think we hoped that String Theory could be quickly drawn out on the blackboard and was as "easy" to grasp as Einstein's theories of relativity, we left the meeting with at least a greater appreciation of the work that has happened so far and of the challenges ahead as the scientific process moves slowly forward.

*Claire Stover*

References:

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

<http://www.laas.org/>

<http://en.wikipedia.org/wiki/Spacetime>

[http://en.wikipedia.org/wiki/Quantum\\_mechanic](http://en.wikipedia.org/wiki/Quantum_mechanic)

<http://en.wikipedia.org/wiki/Quarks>

<http://en.wikipedia.org/wiki/LHC>

## What's Up - A Flying Triangle & God's Eyes

A flying triangle is of course the bird filled Summer Triangle of three magnitude stars, Vega (swooping vulture or eagle), Altair (flying one, in Aquila the eagle), and Deneb (tail, of Cygnus the swan). This great triangle of stars is easily spotted even in a light polluted city.

The three stars appear the same brightness, but their distances tell a different story. Vega (0.0 magnitude, 25 light years) is about twice the size of our Sun. Altair (0.7 mag, 17ly) is more Sun sized but rotates at a super speed of once every 6 hours which would make it look flattened like a football from the side. Giant Deneb (1.2mg, 3000ly) is much further away and would be football field sized next to Altair's football shape. It's an impressive 3,000 times the size of Vega and Altair. Altair is also the background for the classic science fiction film Forbidden Planet which was the inspiration for T.V.'s Star Trek.

But let's return to Vega in Lyra (the lyre), the first star to have a photographic study of its spectrum. Recently, it's been found to have a rotating disk that's probably forming a new planetary system. It's also the first star to have a car named after it and where Jody Foster went in the movie Contact.

Next to Vega is the hamburger sounding "double-double" star system Epsilon Lyrae. At the other end of Lyra we find the brightest planetary nebula in our sky, the Ring Nebula (M57). Basically round in shape it's been called a cosmic cheerio.

Nearby, in the small constellation of Vulpecula (the fox) is the second most visible planetary nebula, the Dumbbell (M27). It's shaped like its name and there's a theory that the ring Nebula would look dumbbell shaped if you could look at it from its side rather than its front. Of course, someone would have to travel there to prove this theory. There's also a Little Dumbbell (M76) in Perseus. The shapes of planetary nebula are dictated by the magnetic fields of the stars that have blown off their luminous expanding shells.

Next to Vulpecula is Sagitta (the arrow), which really looks like an arrow. Here we also find a small globular (M71) and a tiny asterism called the Coathanger which hangs suspended in the dark closet of deep space.

Nearby is a third small constellation, Delphinus (the dolphin) which is recognized by its diamond shaped head sometimes called Job's Coffin.

Cygnus (the swan) contains a wealth of deep sky objects. It's flying form is also seen as the Northern Cross by religiously inspired viewers. Arabs, knowing few swans, saw a giant chicken. Flying across a brilliant area of the Milky Way, the swan contains many cloudy nebula. There are the black clouds that seem to tear open the Milky Way like a giant rip. They were traditionally called the Great Rift and viewed as a starless area. Also there's the North America Nebula and the filmy Veil Nebula. The Veil is the last remnant of an ancient and complex supernova explosion. At the swan's head is a much viewed double color star, the blue and gold Albireo. Then there's the Blinking Planetary Nebula. This name comes from the fact that if you look at its bright central star the surrounding ring seems to blink out.

This brings us to my title mention of planetary nebula called

god's eyes. Planetary nebulas have nothing to do with planets, although some do look like planetary globes in telescopes. There's the Ghost of Jupiter (NGC 3242) in Hydra and the Saturn Nebula (NGC 7009) in Aquarius. Many appear gem like and blue, there's the Blue Snowball (NGC 7662) in Andromeda, the Little Gem (NGC 6818) in Sagittarius, or the Blue Planetary (NGC 3918) in Centaurus. But the most photographed planetary nebula look like staring faces or eyes. There's the Eskimo Nebula (NGC 2392) with its furry face in Gemini. There's the Owl Nebula (M97) in Ursa Major with two glaring eyes that may mean that two stars expelled shells. The weird Cat's Eye Nebula (NGC 6543) in Draco probably had multiple expulsions.

It's definitely the eye shaped planetary nebula that are most likely to attract popular attention. The original god's eye was the relatively bright and close (700 ly) Helix Nebula (NGC 7293) in Aquarius. Computer colored photographs of this seem to show a friendly, compassionate god's eye. Then came a Hubble Telescope photograph of the remote Hourglass Nebula in Musca (the fly). It appeared on a 1997 cover of National Geographic and was described as "the eye of God staring back." This faint, distant (8,000ly) looked like the eye of an angry vengeful god. It quickly went on to appear on a Pearl Jam rock album and in a video game, Final Doom. It currently appears on a poster in the scary film Angels And Demons. Since it's in the constellation of Musca the fly, maybe it's the eye of Satan, lord of the flies. Really, it's only one of over 3,000 planetary nebula that have been found.

But planetary nebula are not planets, gems, faces, or eyes but emission nebulas made of glowing shells of gas and plasma formed by older stars when they die. At the end of the star's life, during its red giant phase, the outer layers are expelled. The remaining stellar core collapses into a hot, bright central star illuminating a cosmic lantern.

It's the human mind that needs to see meaningful images in the night sky. It projects triangles, flying birds, and the eyes of many gods looking back in diving judgement.

*Lee Collins*

### Mount Wilson 60-inch Update

Our observing session on the 60-inch is rescheduled to Wednesday, August 19th. We are unlikely to get perfect conditions in August, but on the plus side the night will be longer and it is unlikely that weather in August will force us to reschedule again. Another plus is that Jupiter will be just 5 days past opposition making this an excellent time to observe the "king of the planets." Uranus and Neptune will both be close to opposition as well. Mars will not be ideally positioned, but it will be observable. We will also be able to observe colorful stars, double stars, and bright planetary nebulae.

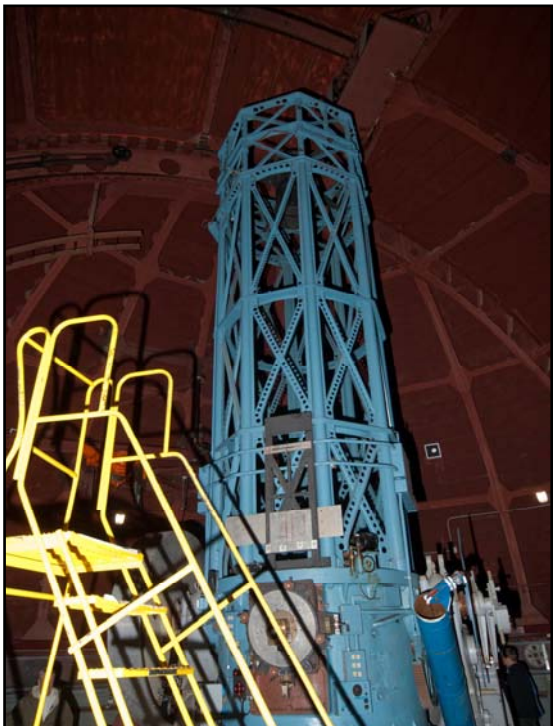
I have also reserved the telescope for next year on Saturday, June 12th 2010. Maybe next year we will get that perfect night that we just missed having this year.

I hope to see you up on Mount Wilson!

*Ron*



PVAA at  
Mt. Wilson Observatory  
June 20, 2009



Photos by Ron Hoekwater

