



If the stars should appear but one night every thousand years  
how man would marvel and stare.

*Ralph Waldo Emerson*

**Newsletter of the Pomona Valley Amateur Astronomers**

**Volume 37 Number 08**

*nightwatch*

**August 2017**

### President's Message

The eclipse is almost upon us! Just a couple of weeks now until showtime, which will be on the morning of Monday, August 21. Here in the Inland Empire the partial eclipse will run from 9:06 to 11:46 AM, with max eclipse at 10:22. It is curious to look up at the waxing moon, as I have been doing every evening this week, and think that the next time the moon is new, it will be passing directly between us and the sun.

I know a lot of you have plans for the eclipse. My own eclipse plan is to be in western Nebraska, near where my mom grew up, to hopefully catch the total eclipse. There are lots of local eclipse events, too - the Claremont Public Library is holding an eclipse party from 10:00 to 11:00 on August 21, and I know that Griffith Observatory in LA is doing something similar. If you have safe solar gear, volunteering to help out at the Claremont library event is a great way to share the eclipse with others. I have a list of ways to safely observe the sun on my astronomy blog, here:

<https://10minuteastronomy.wordpress.com/safely-observe-the-sun/>.

If you are traveling to see the eclipse, or just want to see what it will be like from other places, there are good state maps here:

[http://www.eclipse2017.org/2017/path\\_through\\_the\\_US.htm](http://www.eclipse2017.org/2017/path_through_the_US.htm)

<https://www.greatamericaneclipse.com/>

and a very thorough interactive map here:

[http://xjubier.free.fr/en/site\\_pages/solar\\_eclipses/TSE\\_2017\\_GoogleMapFull.html](http://xjubier.free.fr/en/site_pages/solar_eclipses/TSE_2017_GoogleMapFull.html)

Our speaker this month is Vatche Sahakain, Physics professor from Harvey Mudd College. His talk is titled "Emergence of spacetime from quantum entanglement". We're back in Shanahan B460, and we'll be meeting there for the foreseeable future. I'll miss this meeting, unfortunately - I have a museum exhibit opening to attend. But I'll look forward to seeing you next month and hopefully trading stories and pictures from the eclipse. Clear skies!

*Matt Wedel*

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## PVAA General Meeting 6/9/17

After Mathew Wedel opened the meeting with announcements of upcoming events, Ludd Trozpek gave a presentation about a 36" (34" usable) mirror being donated to the club. The mirror is 549 pounds, and was in Azusa. We now have the mirror, it is in storage in a PVAA member's shed. It has a 15 foot (4752mm) focal length for an F/5.3. [15 feet = 180 inches,  $180/5.3 = 34$ -inch mirror.] This is truly a great gift. Now



that we have it, the Club needs to come up with a workable telescope design to put it in. Club members may wish to contribute the materials needed to make this become a working telescope or to donate funds toward their purchase. I'm sure your ideas and expertise can be shared during future meetings about this exciting Club project.

PVAA's own president Mathew Wedel was the main speaker for the night. Mathew writes the monthly 'Binocular Highlight' column in the Sky & Telescope magazine. Tonight's topic was right up his alley: "Exploring the Cosmos with Binoculars". While Mathew grew up in Oklahoma with dark skies; he used binoculars to look at the night sky for the first time when he lived in Merced.

So why Stargaze with binoculars?

It's easy!

It's inexpensive.

It's intuitive – you look in the same direction as the object as the instrument, with no mental flipping or rotation required.

You may see things at a smaller image scale (less magnification), but you will also see more sky (larger field of view).

Binocular stargazing isn't inferior to using a telescope; any more than biking is inferior to driving. It's a different experience.

He then went over the 'Bino Basics: Magnification x Aperture'. While the 'average binoculars' are 7x50, [7 power, 50mm diameter lens], other common configurations are 7x35,

10x50, 15x70, 8x42, & 10x42. He also talked about the two main types of binoculars: Porro Prism vs Roof Prism, and the exit pupil diameter of the image to your eye.

One great thing about binoculars is their Field-Of-View (FOV). Many 10x binoculars give a 6 or 7 degree FOV, which is enough to take in Orion's Belt and Sword at the same time. Larger 15x binoculars only show about 4.5 degrees at a time. – Enough for the Belt or the Sword, but not both at once.

When it comes to lens coatings: Red or 'Ruby' means STOP! – Don't buy those. Green or Blue – Go!. Then the question comes to whether to mount or not to mount or image-stabilized binos. Mat says that there are advantages to mounting, but he likes to keep it simple. So, which should you choose, and why?

DON'T

No Zooms

No Ruby lenses

Nothing so heavy or with so much magnification you can't hold it steady

DOs

Porros tend to be cheaper and less finicky than roofs of equivalent quality

Aperture between 35mm and 50mm, for starters

Magnification between 7x and 10x

If you can, try before you buy, or buy from a vendor with a generous return policy

How much should you spend? Currently the Celestron UpClose 10x50 can be found for \$30.49, and the Celestron SkyMaster 15x70 is \$63.05.

As for books on binoculars, Mat suggests:

Sky & Telescope's Pocket Sky Atlas,

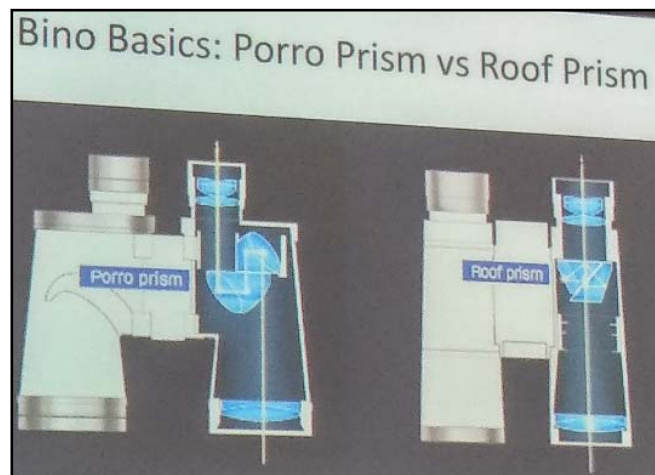
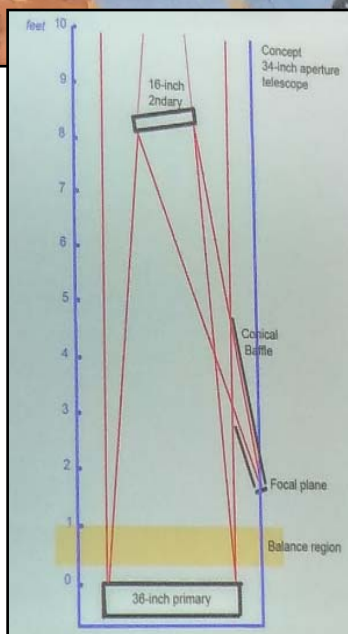
Sky Atlas for Small Telescopes and Binoculars, Binocular Highlights,

Touring the Universe through Binoculars, and the Astronomical League's website where you can earn awards.

Take the challenge!

<https://www.astroleague.org/>

<http://skymaps.com/>



Gary Thompson



### 34-Inch Mirror

Four of us, Joe Hilberg, Ron Hoekwater, Bob Akers, and I, gathered at the Stover garage Thursday night following the arrival of the 34-inch mirror. Lucy Stover had been around when we arrived, but somehow she managed to tear herself away to go to Home Depot with a friend.

Our purpose was to inspect the goods and also to attempt a quick evaluation. Joe brought a home-made Foucault tester, but it needed batteries and so we didn't use it. Ludd brought a home-made Ronchi grating, done on Photoshop and his laser printer at 75 lines per inch). Joe also had a light source fixture to which we adapted a small LED flashlight and put atop an enclosure John Stover had nearby. We adjusted its position to near the center of curvature of the mirror, stacked sideways on a brick; realizing things were kind of wobbly.

Ludd and Bob both were able to observe the Ronchi pattern both outside and inside focus, and to our untrained eyes it looked consistently like a good parabola. Remember, nothing was fixed: this was not an optical bench. And we were just holding the sheet of transparency film printed with the Ronchi pattern in our hands and it was waving and bending around. Still, for a rough and ready test, it was quite encouraging.

The plan ahead is to get the Foucault tester running and take a more stable table to the mirror, adjusting the mirror instead of stacking things on bricks to get the light at the center of curvature. To do anything quantitative, which may or may not be necessary, we know we will have to bear down on the stability issues.

Two images accompany this note. In one, Bob is trying to find the return beam using our Ronchi lash-up. I told people to close their eyes because I had the flash on, and I guess Joe thought I'd be setting off a nuclear explosion. In the other image, Joe, Bob, and Ron pose with the 34-inch mirror (it's a 36 inch disc, but only 34 inches clear aperture; focal length is 180 inches) Ludd's shapely legs are reflected in the mirror.

As described at the July club meeting, the plan is to put this mirror, all 600 lbs of it, in some sort of telescope which we will design and build. Comments, assistance, and contributions of any sort are welcome.

Ludd Trozpek



### Club Events Calendar

**August 4 General Meeting-Vatche Sahakian**

**August 5 – Nature at Night Star Party, Cabrillo Beach Youth Center**

**August 12 Star Party - Cow Canyon Saddle, Mount Baldy**

**August 30 Board Meeting**

**September 8 General Meeting**

**September 23 Star Party - Palomar Mountain and Observatory tour 10 AM**

**September 27 Board Meeting**

**October 6 General Meeting**

**October 21 Star Party - Nightfall, Anza Borrego**

**October 25 Board Meeting**

**November 3 General Meeting**

**November 18 Star Party - Landers GMARS**

**November 29 Board Meeting**

**December 9 Holiday Party**



## What's Up? - Solar Eclipse Myths

Ancient peoples strove to imagine why the Sun, their life-giving god, was suddenly swallowed by blackness. Dusk fell across the land and birds stopped singing. This was certainly a bad omen and caused primal fear. Many people would make loud noises and bang pots and pans. After a few minutes that seemed to scare the demon of darkness away. Legends involved mythical figures eating, swallowing or stealing the Sun. In ancient China a celestial dragon was hungry enough to eat the Sun. The Chinese word for eclipse means to eat. The Vietnamese imagined a big mouthed giant frog. Norse cultures favored hungry wolves. Koreans pictured wild dogs stealing the Sun to take back to their den. American Indians visualized the Sun fighting with a black bear biting it away piece by piece. Then the bear went on to take a bite out of the Moon. This explained the close intervals between Solar and Lunar eclipses.

Hungry mythic animals and often angry demons fought with the Sun making him go dark and enter the underworld, but not for long. Theft, hunger and fights of various kinds among the gods were primitive explanations for those frightening ecliptic moments. The word eclipse comes from the Greek word for abandonment. The Sun was abandoning the Earth. Loud shouts and noises would frighten away the hungry monsters to make the Sun return. In India a group religiously immersed themselves up to the neck in water. This would keep disaster away.

More modern fears involved possible miscarriages for pregnant women. They should stay indoors during an eclipse. Food cooked during an eclipse could be poisonous. However one Italian myth believed that flowers planted during a solar eclipse would be bigger and brighter being blessed by the Sun's ability to throw off its dark demon. Observers today must very realistically beware of damage to their eyes.

*Lee Collins*



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## Nature at Night

The Club has been providing telescopes and sharing their dark sky observing expertise for a couple of decades to the Girl Scout summer camp Nature at Night. It has been held at various locations throughout the years, most recently at Skyland Ranch in the San Jacinto Mountains. Due to renovation work taking place at that camp this year, it is being held at the Cabrillo Beach Youth Center near Long Beach.

Members Kay and Gary have committed to helping out but we could really use more volunteers as the Camp is expecting about 100 campers and they would all like to see a variety of objects and to have a turn at the telescope. I know it's a bit of a

drive but I hope a couple more of you can attend. I assisted with the event for many years myself – it's a wonderful group of girls who really enjoy learning from us. Even if you don't have a scope to bring, a laser pointer along with a tour of the constellations or a few pairs of binoculars can teach a lot to these eager girls.

Dinner is provided – and is always delicious – and tent camping is allowed if you'd like to spend the night. Please help out if you can, it will be a fun event!

*Claire Stover*

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## Twenty Years Ago on Mars...

On July 4, 1997, NASA's Mars Pathfinder landed on the surface of Mars. It landed in an ancient flood plain that is now dry and covered with rocks. Pathfinder's mission was to study the Martian climate, atmosphere and geology. At the same time, the mission was also testing lots of new technologies.

For example, the Pathfinder mission tried a brand-new way of landing on Mars. After speeding into the Martian atmosphere, Pathfinder used a parachute to slow down and drift toward the surface of the Red Planet. Before landing, Pathfinder inflated huge airbags around itself. The spacecraft released its parachute and dropped to the ground, bouncing on its airbags about 15 times. After Pathfinder came to a stop, the airbags deflated.

Before Pathfinder, spacecraft had to use lots of fuel to slow down for a safe landing on another planet. Pathfinder's airbags allowed engineers to use and store less fuel for the landing. This made the mission less expensive. After seeing the successful Pathfinder landing, future missions used this airbag technique, too!

Pathfinder had two parts: a lander that stayed in one place, and a wheeled rover that could move around. The Pathfinder lander had special instruments to study Martian weather. These instruments measured air temperature, pressure and winds. The measurements helped us better understand the climate of Mars.

The lander also had a camera for taking images of the Martian landscape. The lander sent back more than 16,000 pictures of Mars. Its last signal was sent to Earth on Sept. 27, 1997. The Pathfinder lander was renamed the Carl Sagan Memorial Station. Carl Sagan was a well-known astronomer and science educator.

Pathfinder also carried the very first rover to Mars. This remotely-controlled rover was about the size of a microwave oven and was called Sojourner. It was named to honor Sojourner Truth, who fought for African-American and women's rights. Two days after Pathfinder landed, Sojourner rolled onto the surface of Mars. Sojourner gathered data on Martian rocks and soil. The rover also carried cameras. In the three months that Sojourner operated on Mars, the rover took more than 550 photos!

Pathfinder helped us learn how to better design missions to Mars. It gave us valuable new information on the Martian climate and surface. Together, these things helped lay the groundwork for future missions to Mars.

*Linda Hermans-Killiam*



*Caption: The Mars Pathfinder lander took this photo of its small rover, called Sojourner. Here, Sojourner is investigating a rock on Mars. Image credit: NASA/JPL-Caltech*

Learn more about the Sojourner rover at the NASA Space Place:  
<https://spaceplace.nasa.gov/mars-sojourner>