nightwatch

Newsletter of the Pomona Valley Amateur Astronomers

Where the senses fail us, reason must step in. *Galileo Galilei*

President's Message

Between holiday travel, cold weather, clouds, and a seasonal cold, I haven't been out lately except for quick naked-eye views. Fortunately winter is the best time for naked-eye stargazing, with the splendors of Auriga, Gemini, Orion, and Canis Major soaring high overhead.

I write with a heavy heart this month. PVAA member Bill Vaskis passed away in late December. Please see the tribute page farther on in this issue for more about Bill – he will be missed.

If there is a silver lining here, it's that you all are such a great group of people. Like a darker sky making the stars shine brighter, the loss of someone from our club throws the character of those who remain into sharper relief. It's very easy to be president to people of such great enthusiasm, generosity, kindness, and good humor – qualities that Bill himself embodied. In short, I miss Bill, but I'm terribly lucky to have the rest of you.

Our speaker this month is the multi-talented Alex McConahay, who will speak to us about the total solar eclipse coming up this August. The general meeting will be at 7:30 PM, Friday, January 13, in Shanahan B460 at Harvey Mudd College. I hope to see you there.

Matt Wedel

Club Events Calendar

Jan 13, 2017 General Meeting

Jan 28, 2017 Star Party – Salton Sea, Mecca Beach

Feb 1, 2017 Board Meeting
Feb 10, 2017 General Meeting
Feb 25, 2017 Star Party

March 1, 2017 Board Meeting
March 10, 2017 General Meeting
March 25, 2017 Star Party

Mar 30, 2017 Board Meeting
Apr 7, 2017 General Meeting
Apr 22, 2017 Star Party

May 3, 2017 Board Meeting
May 12, 2017 General Meeting
May 25 - 29, Joint RTMC

May 31, 2017 Board Meeting
June 9, 2017 General Meeting
June 24, 2017 Star Party

My memories of Bill Vaskis

A couple of friends that I'm close to have a simple, almost brutal way of classifying everyone in their lives: those people who add to their lives, and those who only take away.

Bill added to my life. Every time I saw him, he was full of energy, curiosity, and happiness. He seemed to be on an unending quest to learn more, and to pass on what he had learned. I ran into him up on Cow Canyon Saddle years ago, before I was using it as a regular observing site, and he enthusiastically recommended it as a good place to kick back with binoculars and watch the stars go by. It seemed that at every meeting he had something to share – some amazing thing he'd learned about the world or the universe, or a provocative question, something to strike sparks off your mind and make you happy that the world contained such excellent human beings.

Bill's passing came a shock – I didn't even know he was ill. We just had a great conversation at the November meeting, and he was as sharp and lively as ever.

My only wish is a selfish one – that I could have had more time with Bill. If you totalled up all of our conversations over the years, they'd only run to a handful of hours at most. Now, on one hand, maybe it's arrogant or fatuous to eulogize someone based on such a slender thread. My experiences with Bill are just cupfuls from the river of a very full life. But I am convinced that any river that yields such refreshing cups must be a pretty great river, carrying energy and life wherever it goes.

I miss Bill already. His legacy is a lot of fond memories, and an implicit challenge to pay forward all of the happiness and fascination he brought to our lives. I think a fitting tribute to Bill would be to spend an evening up on Cow Canyon Saddle with a pair of binoculars, watching the stars go by – and encouraging anyone who happens by to look at the sky in wonder and humility. Farewell, my friend.

Matt Wedel

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Moon from Oakmont Elementary

Here are some pictures of the moon taken through my telescope at Oakmont Elementary.

Gary Thompson

taken with my little camera

taken using my phone

What's Up? - New Stars Are Born

New stars are born from cold clouds of dust and gas that slowly contract to collapse on themselves. This is caused by outside gravitational forces. Such as cosmic shock waves from supernova explosions or from other active newly formed stars.

Once this cloud's collapse is set off it will continue under its own gravitational forces. It will contract toward its potential star core at an intensifying rate. It's friction causes it to reach millions of degrees. An eventual nuclear fusion reaction will cause hydrogen atoms to change into helium atoms creating an energy center of heat and light. Now it has become a proto star.

Its nuclear fusion will cause this proto star to flare up into life. Stellar winds will sweep away excess material illuminating remaining nebulous material. Often jets of gas called Herbig-Hero jets are formed.

Herbig-Hero jets are ejections of nebulosity caused by collisions of new stars with nearby gas clouds. They last only a few thousand years. These unusual jet like ejections were first studied in detail by astronomers George Herbig and Guillermo Haro.

The proto star period lasts at least a million years as the very young star collects mass from a molecular cloud. Eventually the proto star's pull of collapsing gravity is balanced by an outward radiation of energy. This balance will allow it to blaze for billions of years. This hot blazing will blow away the remaining infall of gas and a bright new star will then be visible.

Starry births are common in a gaseous nebula area called a "star nursery" which could contain countless new stars. Such gaseous nebula born stars often form long lasting star clusters with nebulous material attached.

Very active nebulous star nurseries include the Eagle Nebula with its "Pillars of Creation" clouds (pictured) famously photographed by the Hubble Space Telescope.

The Eagle Nebula (M16) in the constellation of Serpens Cauda. This is the tail of the Serpent held by Ophiuchus (Serpent Bearer). There is also a Serpent's Head (Serpens Caput). This is a magical serpent since the Serpent Bearer is a kind of stellar doctor.

This cloud of hot dust in Serpens does have an eagle's shape (which explains the name). This new star activity in the Pillars of Creation area was caused by an ancient supernova shockwave. The continuing shockwave must have eventually destroyed the Pillars of Creation formation some 6,000 years ago. But since they are 7,000 light years away we can still see them today. How its new born stars were scattered won't be known for several thousand years. The appropriate name "Pillars of Creation" was drawn from a Christian text when the impressive Hubble picture become known.

Another very active star nursery is in the Orion Nebula (M42). Located in Orion (The Hunter) its in an area known as his "sword". It's 1500 light years away but is still one of the brightest nebulas. This Orion Nebula is just part of a vast molecular cloud more than 100 light years across in which many clusters of proto stars can be seen. As clusters of new stars are born whole formerly dark areas in Orion will light up.

Lee Collins

Pillars Of Creation

- NASA

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Big Science in Small Packages

About 250 miles overhead, a satellite the size of a loaf of bread flies in orbit. It's one of hundreds of so-called CubeSats—spacecraft that come in relatively inexpensive and compact packages—that have launched over the years. So far, most CubeSats have been commercial satellites, student projects, or technology demonstrations. But this one, dubbed MinXSS ("minks") is NASA's first CubeSat with a bona fide science mission.

Launched in December 2015, MinXSS has been observing the sun in X-rays with unprecedented detail. Its goal is to better understand the physics behind phenomena like solar flares – eruptions on the sun that produce dramatic bursts of energy and radiation.

Much of the newly-released radiation from solar flares is concentrated in X-rays, and, in particular, the lower energy range called soft X-rays. But other spacecraft don't have the capability to measure this part of the sun's spectrum at high resolution—which is where MinXSS, short for Miniature Solar X-ray Spectrometer, comes in.

Using MinXSS to monitor how the soft X-ray spectrum changes over time, scientists can track changes in the composition in the sun's corona, the hot outermost layer of the sun. While the sun's visible surface, the photosphere, is about 6000 Kelvin (10,000 degrees Fahrenheit), areas of the corona reach tens of millions of degrees during a solar flare. But even without a flare, the corona smolders at a million degrees—and no one knows why.

One possibility is that many small nanoflares constantly heat the corona. Or, the heat may come from certain kinds of waves that propagate through the solar plasma. By looking at how the corona's composition changes, researchers can determine which mechanism is more important, says Tom Woods, a solar scientist at the University of Colorado at Boulder and principal investigator of MinXSS: "It's helping address this very long-term problem that's been around for 50 years: how is the corona heated to be so hot."

The $1 million original mission has been gathering observations since June.

The satellite will likely burn up in Earth's atmosphere in March. But the researchers have built a second one slated for launch in 2017. MinXSS-2 will watch long-term solar activity—related to the sun's 11-year sunspot cycle—and how variability in the soft X-ray spectrum affects space weather, which can be a hazard for satellites. So the little-mission-that-could will continue—this time, flying at a higher, polar orbit for about five years.

Marcus Woo

If you'd like to teach kids about where the sun's energy comes from, please visit the NASA Space Place:
http://spaceplace.nasa.gov/sun-heat/

Astronaut Tim Peake on board the International Space Station captured this image of a CubeSat deployment on May 16, 2016. The bottom-most CubeSat is the NASA-funded MinXSS CubeSat, which observes soft X-rays from the sun—such X-rays can disturb the ionosphere and thereby hamper radio and GPS signals. (The second CubeSat is CADRE — short for CubeSat investigating Atmospheric Density Response to Extreme driving - built by the University of Michigan and funded by the National Science Foundation.) Credit: ESA/NASA


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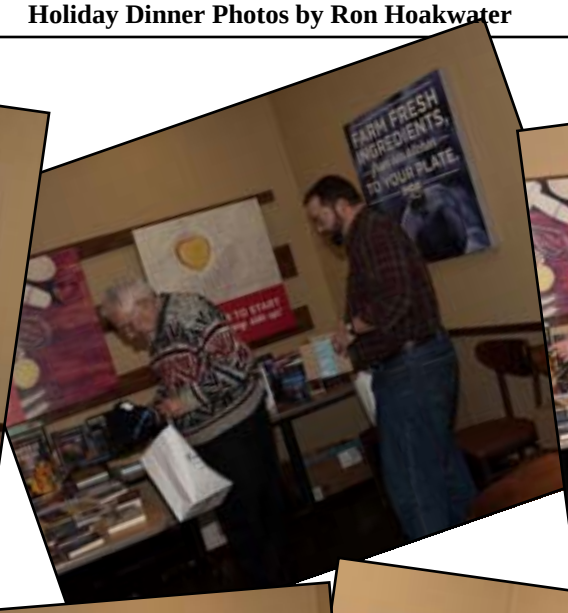
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