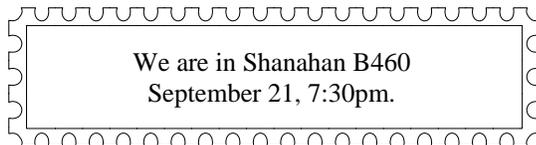




Newsletter of the Pomona Valley Amateur Astronomers

Without ambition one starts nothing.
Without work one finishes nothing.

Ralph Waldo Emerson



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nightwatch

September 2018

President's Message

Although it may not feel like it, temperature-wise, astronomically speaking the year is three-quarters behind us: the fall equinox is this Saturday evening. The days are getting noticeably shorter, and the nights a little cooler, as we head into autumn.

We have a lot coming up between now and our October general meeting. Our next star party will be Saturday, September 29, at the Cottonwood Springs campground at Joshua Tree. Please coordinate with other members via the club Facebook page to see who's going.

The following Saturday, October 6, is our Mt. Wilson trip. We'll spend all night observing with the 60-inch telescope. The cost is \$125 per person, and we still have a few spots left. Please let Ron Hoekwater or me know if you are interested but haven't signed up yet.

Tuesday, October 9, the Biane Library at Victoria Gardens is having an astronomy outreach. Our own Cori Charles will be on a panel at 6:00 PM discussing the NASA/JPL Solar System Ambassador program, and there will be telescopic observing afterwards. If you are available to help out, please let Cori know.

This Friday at our general meeting is meteorite show-and-tell. In lieu of an outside speaker, PVAA members will show off their impactites: meteorites, tektites, shattercones, space dust--whatever you have, we're interested. It doesn't have to be a rare meteorite or a fancy presentation. Just bring what ya got and let us know about it. The meeting starts at 7:30 PM in Shanahan B460 on the Harvey Mudd campus. I hope to see you there.

Matt Wedel



Sikhote-Alin 186g shrapnel in hand



Middlesborough Campo

1cm cube

and Sikhote-Alin meteorites

PVAA Gen Meeting 08/24/18

The meeting was started, a little late, by our club president Matt Wedel. He started by asking if anyone was attending the meeting for the first time. 3 people were first time visitors. One was brought by a friend, one saw us in the newspaper & one on the internet. He also announced that we are renting out the 60" Mount Wilson telescope for the whole night, Saturday October 6th until the skies are too bright early Sunday October 7th. If you have never gone, you should seriously consider going. The view through the 60" telescope is truly amazing. It is \$125 per person with a 25 person limit. You can also sponsor a student for \$100. Your donation is tax deductible. Because our monthly star party was originally scheduled for that night, the star party has been moved to 9/29.

The speaker for the night was Denise Kaisler PH. D. of Citrus College. She is one of two professors that make up the astronomy department for Citrus College. The topic for tonight was: "Who Will Be First? The Future of Space Tourism."

For space tourism, first we need to define space. We generally think of space as the lack of atmosphere and zero-gee. The zero-gee part is not accurate. If you have acceleration or deceleration, then you will have a g-force in the opposite direction equal to the acceleration/deceleration. When you are in orbit around the Earth, you are in 'free fall'. You are falling towards the Earth, but moving so fast that you constantly miss it. If you were moving slower at that altitude you would spiral in and eventually hit it. If you were going faster you would go to a higher orbit, or even leave Earth's gravity. 'Zero-gee' or micro-gravity – as in the International Space Station (ISS), is actually the unique balance of continuously falling towards Earth, and continuously missing it, remaining in orbit. Internationally 'Space' is recognized as being 100 kilometers (62+ miles) above sea level. Originally the US Air Force declared that you were in space at 50 miles above the sea level and gave astronaut wings to the X-15 pilots that went above that line. As most of the world uses the metric system, 100km is the standard definition. A good video on 'free-fall' is OK Go's "Upside Down & Inside Out" YouTube video:

<https://www.youtube.com/watch?v=LWGJA9i18Co>

This was done on a plane doing parabolic arcs, creating the 'zero-gee' shown in the video. In fact, the company that does this is called 'Zero G': <https://www.gozerog.com/> - Check out some of their videos.

Dr. Kaisler came up with 6 companies to watch to see who will be first to make a business out of space tourism. She noted that there already have been tourists aboard the Mir and ISS, but no one is currently doing this in an ongoing profitable fashion.



#6 **Orion Span** (<https://www.orionspan.com/>) which is developing the **Aurora Station**, dubbed as the world's 'First Luxury Space Hotel in orbit'. They are shooting for at 2021 launch date with guests arriving in 2022. They do have several former NASA employees on staff.

#5 **Axiom Space** (<https://axiomspace.com/>) plans to have "The World's First Commercial Space Station" President and CEO of Axiom is Michael Suffredini – who before retiring from NASA was the ISS Manager. Several other big-name NASA employees are also now working for the company. In 2022 they plan to attach 2 modules to the ISS. When the ISS retires, they will disconnect their modules to create their own space station.

#4 **SpaceX** (<https://www.spacex.com/>) While not in the tourism business, they are currently building a human-rated spacecraft to take astronauts to and from space. They recently announced that they are sending a tourist around the moon using their BFR (Big Falcon Rocket) launch vehicle.

#3 **Space Adventures** (<http://www.spaceadventures.com/>) and The **Roscosmos State Corporation for Space Activities**, (known as **Roscosmos**) (<http://en.roskosmos.ru/>) **Space Adventures** sent the original 7 space tourists into space 2001 – 2009. They have been the go-to company to get people into space using other's hardware (Sort of the **Expedia** of space travel) **Roscosmos** is the state corporation responsible for the space flight and cosmonautics program for the Russian Federation. Currently only Russia has a human rated spacecraft in operation. **Space Adventures** has worked with **Roscosmos** to send people into orbit and have devised a concept (no real hardware yet) to send people around the moon.

#2 **Blue Origin** (<https://www.blueorigin.com/>) is specifically looking to send humans into space. While they are now making their final tweaks on their sub-orbital New Sheppard rocket and spacecraft, they are also now in the final development stage of their orbital New Glenn rocket. The New Sheppard will start sending people into space by 2019. Blue Origin is owned by the richest man on Earth – the founder of Amazon – Jeff Bezos.

#1 **Virgin Galactic** (<https://www.virgingalactic.com/>) already has over 700 deposits for sub-orbital flights. Their spacecraft, SpaceShipTwo, can take 6 passengers and 2 pilots above the 100km 'Karman Line' for 3 – 4 minutes of weightlessness before gravity dictates they return to their seats. SpaceShipTwo is a spaceplane taken up to 50,000 ft (15,000 meters) by a 'mother plane' and released. SpaceShipTwo then ignites its engine and goes up to 106 – 110 kilometers above the Earth. It returns and lands on a runway like a glider.

So, who will be first? Who will be most successful? Many are dependent on others – Axiom Space and Orion Span will depend on SpaceX and Boeing to develop their human rated vehicles for their ventures to go forward. We will just have to wait, not to long we hope, and see.

Gary Thompson

Observing Report: Star Party at Culp Valley

Our most recent club star party was Saturday, September 8, at Culp Valley campground in Anza-Borrego Desert State Park. I drove down with Terry Nakazono, a friend from LA who has been a frequent visitor and sometime speaker at PVAA meetings. We found a campsite on the west side of the campground and started setting up. It was just our luck to have landed in the PVAA zone: Mike and Sharol Carter were in the site to the north, and Ron Hoekwater was set up to the northwest. Pam Reber rolled in a little later, and parked near Ron.

I knew that I'd want to have a look at the planets early in the evening, and then do some low-power, wide field scanning of the Milky Way later on. I took my C80ED refractor, which is good in both departments. Terry was rolling with his Meade Polaris 114 reflector. He has now observed and sketched more than 2100 deep sky objects with telescopes of 4.5 inches aperture or smaller, including almost the entire Herschel 400. I believe Mike and Sharol had an 8-inch SCT, Ron had his 25-inch Obsession, and Pam had binoculars. Several of us had binoculars, in fact, and later on I spent a lot of time just sweeping the Milky Way at 7x.

One constant annoyance over the course of the night was a steady breeze from the southwest, probably never less than 5-7 mph and gusting to about twice that. Drinking cups, napkins, atlas pages, and observing notebooks all got tumbled at one point or another. The seeing wasn't great, although I did catch a glimpse of Saturn's Cassini Division in a rare moment of steadiness.

Mike, Sharol, Ron, and Pam all visited Terry's and my camp early in the evening, and I visited the others later on. I only used my scope for about the first hour. After that I spent quite a bit of time scanning the skies with binoculars, and even more time just staring up with naked eyes. I spent my first few years as an amateur astronomer chasing ever-fainter targets with ever-larger telescopes. These days, my interest has shifted to trying to understand the large-scale structure of the galaxy and for that, binoculars are good and eyes are even better, under sufficiently dark skies. Fortunately the skies at Anza-Borrego are pretty good.

All told, it was a fun evening, both the parts I spent looking up by myself, and especially the parts I got to share with club members and friends.

Matt Wedel



Club Events Calendar

- Sept 21** [General Meeting - Meteorites](#)
Sept 29 [Star Party – Cottonwood, Joshua Tree National Park](#)
- Oct 6** [Mt Wilson 60” telescope observing](#)
Oct 9 [Biane Library at Victoria Gardens](#)
Oct 17 [Board Meeting](#)
Oct 26 [General Meeting– Apollo 7](#)
- Nov 10** [Star Party – Mecca Beach, Salton Sea](#)
Nov 14 [Board Meeting](#)
Nov 30 [Genral Meeting Apollo 8/Jules Verne–Ken Elchert](#)
Dec 8 [PVAA Holiday Party](#)
- Jan 5** [Star Party – Afton Canyon Campground](#)
Jan 9 [Board Meeting](#)
Jan 18 [General Meeting](#)
- Feb 2** [Star Party – Anza-Borrego Desert State Park](#)
Feb 13 [Board Meeting](#)
Feb 22 [General Meeting](#)
- Mar 2** [Star Party – TBD](#)
Mar 13 [Board Meeting](#)
Mar 22 [General Meeting Apollo 9 – TBD](#)
- Apr 6** [Star Party – TBD](#)
Apr 10 [Board Meeting](#)
Apr 19 [General Meeting](#)
- May 4** [Star Party – TBD](#)
May 8 [Board Meeting](#)
May 17 [General Meeting Apollo 10 – TBD](#)
- Jun 1** [Star Party – TBD](#)
Jun 5 [Board Meeting](#)
Jun 14 [General Meeting](#)
- Jul 10** [Board Meeting](#)
Jul 19 [General Meeting Apollo 11 – TBD](#)
Jul 27 [Star Party – TBD](#)
- Aug 7** [Board Meeting](#)
Aug 16 [General Meeting](#)
Aug 31 [Star Party – TBD](#)
- Sept 4** [Board Meeting](#)
Sept 13 [General Meeting](#)
Sept 28 [Star Party – TBD](#)
- Oct 2** [Board Meeting](#)
Oct 11 [General Meeting](#)
Oct 26 [Star Party – TBD](#)

The Harv Pennington Scope

In August I borrowed the 10-inch telescope owned by the PVAA to take up to Lake Tahoe. It's a 10-inch f/6 Dobsonian reflector with truss tubes. It was designed and built in the late eighties by then-club member Harv Pennington. Harv has long since passed on, and the telescope came to the club around then.

It is fundamentally quite strong and robust, built with furniture-grade plywood in the mirror box and ground board/trunnion. It has aluminum truss tubes very sturdily and repeatably attachable, and an upper tube assembly (cage) carrying a telrad, right-angle 50 mm Meade finder, and an early-model AstroSystems 2-inch Crayford-type focuser. The metalwork on the truss tubes and various brackets is top-notch, as is the woodwork. I've used it sporadically since the early 1990s and it's gotten its share of nicks and dings over that time. It looked quite sad (scuffs, delaminations, much dirt) a couple of years ago and I cleaned it then but not especially thoroughly...mostly the operational parts such as the azimuth bearings and the trunnion. It went back into storage before I tracked it down again in August.

This time, I noticed that both mirrors were quite dirty and the wood really needed a light sanding and refinishing.

Before I left I took the mirror out, did a little more dismantling, and did some minor repairs and sprucing up (I sanded and refinished the wood which was beginning to look threadbare and cheesy). I also cleaned both the mirror and secondary with distilled water, cotton, etc., and they came through great. I changed the screws on the secondary to Allen head socket screws which makes adjustment there much easier. There are still improvements that could be made in that area, but it's good enough and much better than it was. An Allen driver is required to adjust the primary mirror tilt, so I ran one of those down and put it in the kit. I also tightened up screws and bolts that had become loose over the years.

We had a big crowd at Tahoe--fifteen people at one point, and most nights I cycled through Jupiter, Saturn, and Mars. Venus was visible but it set relatively early and was a bit boring. For those who had the patience, some of the objects in Sagittarius were interesting. The last few days of the week the Moon was up and people were amazed. 460x, which the seeing



over the lake was supporting, put them right down in the craters on the terminator. We especially liked craters Fracastorius, Catharina, Cyrillus, and Theophilus and were able to get an image of those through the eyepiece. On two nights, the Great Red Spot was obvious on Jupiter when we were observing. On the best night, even the newbies could catch glimpses of the south polar cap on Mars.

After collimation, the telescope holds its alignment well. I only had to make a couple of minor adjustments after taking it to pieces to put in the baggage compartment of the airplane for the trip up. Harv Pennington did a nice job on keeping the mechanical tolerances low so it goes together essentially as it was when taken apart. At this point, it operates great and looks great. It comes with four or five serviceable eyepieces and a 1.25 inch adapter, though I used my own oculars.

I started to get a little dissatisfied with the focuser, which is an unusual Crayford-type. I could never get happy with the fine control knob, which is engaged by an O-ring belt drive, and in an awkward place. It also uses a vinyl sleeve for friction with the drawtube, which makes it feel mushy. I have a spare Crayford--I think it's JMI--which would fit and operate more smoothly and be more conventionally mounted.

I had binoculars along as well, and the Milky Way was fabulous, especially from a hammock on the lawn since it was essentially straight overhead and down to the south. We also had a little 90mm short tube refractor which didn't do badly on the Moon. I really need a better tripod for it though.

Most of the people in our group of several extended families hadn't much experience in astronomy, so the planets and moon

were perfect targets and quite accessible to inexperienced observers. It made a perfect after-dinner activity in the gathering twilight and early part of the night.

Ludd Trozpek





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A Trip Through the Milky Way

Feeling like you missed out on planning a last vacation of summer? Don't worry—you can still take a late summertime road trip along the Milky Way!

The waning days of summer are upon us, and that means the Sun is setting earlier now. These earlier sunsets reveal a starry sky bisected by the Milky Way. Want to see this view of our home galaxy? Head out to your favorite dark sky getaway or to the darkest city park or urban open space you can find.

While you're out there waiting for a peek at the Milky Way, you'll also have a great view of the planets in our solar system. Keep an eye out right after sunset and you can catch a look at Venus. If you have binoculars or a telescope, you'll see Venus's phase change dramatically during September—from nearly half phase to a larger, thinner crescent.

Jupiter, Saturn and reddish Mars are next in the sky, as they continue their brilliant appearances this month. To see them, look southwest after sunset. If you're in a dark sky and you look above and below Saturn, you can't miss the summer Milky Way spanning the sky from southwest to northeast.

You can also use the summer constellations to help you trace a path across the Milky Way. For example, there's Sagittarius, where stars and some brighter clumps appear as steam from a teapot. Then there is Aquila, where the Eagle's bright Star Altair combined with Cygnus's Deneb and Lyra's Vega mark what's called the "summer triangle." The familiar W-shaped constellation Cassiopeia completes the constellation trail through the summer Milky Way. Binoculars will reveal double stars, clusters and nebulae all along the Milky Way.

Between Sept. 12 and 20, watch the Moon pass from near Venus, above Jupiter, to the left of Saturn and finally above Mars!

This month, both Neptune and brighter Uranus can also be spotted with some help from a telescope. To see them, look in the southeastern sky at 1 a.m. or later. If you stay awake, you can also find Mercury just above Earth's eastern horizon shortly before sunrise. Use the Moon as a guide on Sept. 7 and 8.

Although there are no major meteor showers in September, cometary dust appears in another late summer sight, the morning zodiacal light. Zodiacal light looks like a cone of soft light in the night sky. It is produced when sunlight is scattered by dust in our solar system. Try looking for it in the east right before sunrise on the moonless mornings of Sept. 8 through Sept 23.

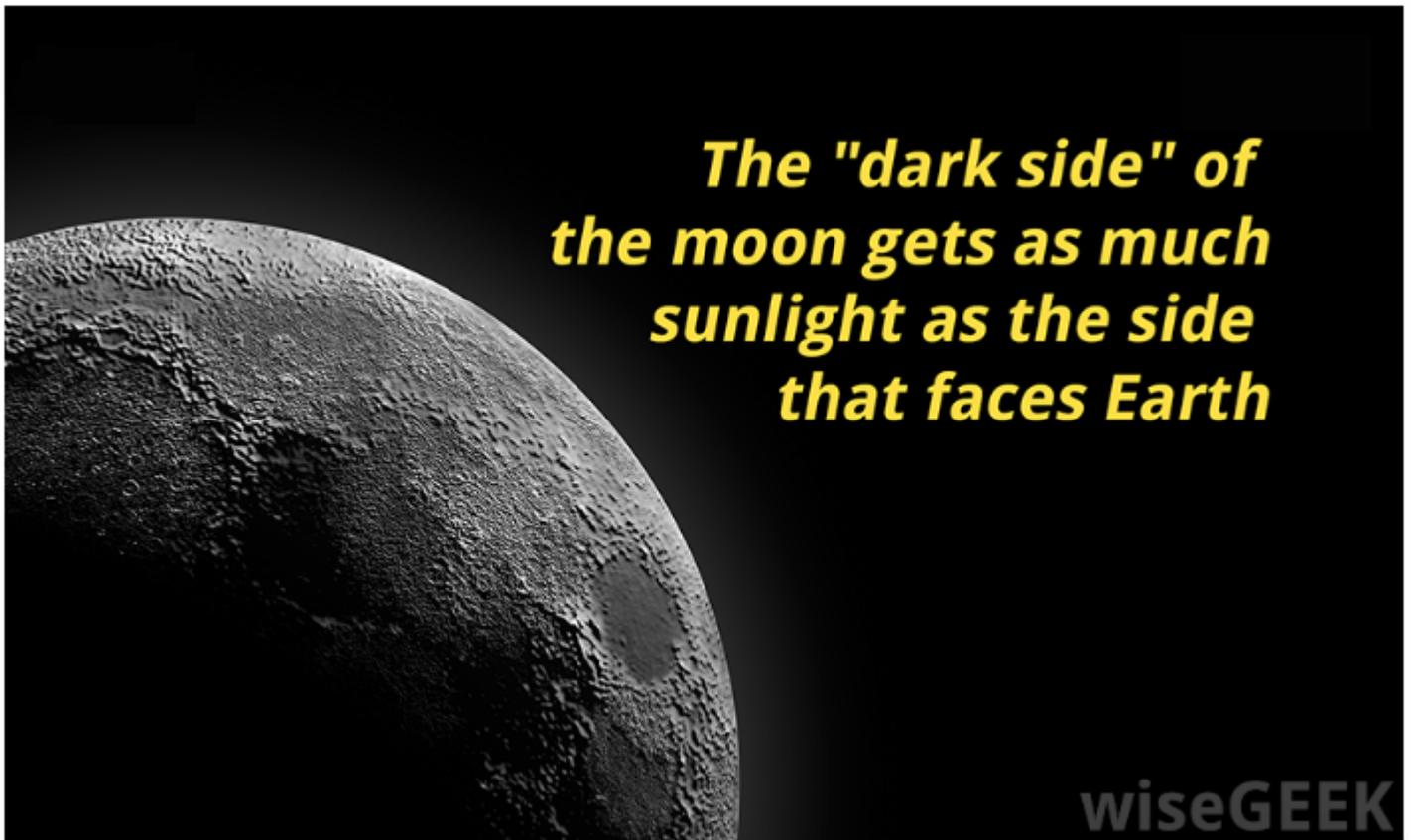
You can catch up on all of NASA's current—and future—missions at www.nasa.gov

By Jane Houston Jones and Jessica Stoller-Conrad



Caption: This illustration shows how the summer constellations trace a path across the Milky Way. To get the best views, head out to the darkest sky you can find. Credit: NASA/JPL-Caltech

Amazing Facts



The dark side of the moon would be better known as the far side of the moon. It always faces away from Earth, but it still regularly faces the Sun. This is because of a phenomenon known as "tidal locking" which causes the moon to rotate slowly as it orbits the Earth. Each lunar day and night lasts the equivalent of 14 Earth days and nights. When the moon appears full, the near side is experiencing "midday", while the far side is in darkness.

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