Yeah we all shine on, like the moon, and the stars, and the sun.
John Lennon

Newsletter of the Pomona Valley Amateur Astronomers

Volume 32 Number 07 ***nightwatch*** **July 2012**

President's Message

Has this ever happened to you? It's a fine summer evening, the sun has gone down and twilight is fading. It's a weeknight, so no time to drive a scope to a dark site. You'd really like to observe, though, so with visions of star clusters dancing in your head you look up and see...smog. An evil salmon-colored haze that blocks all but the brightest stars and turns what should be a spectacular summer sky into a postapocalyptic sci-fi nightmare. You grumble, inwardly at least, and go inside to crack a book or see what's on the tube.

I regret to say that the above scenario has played out all too often for me. I do try to observe from home, but it's a heck of a lot easier in the winter, when the frequent rains scrub the sky of haze and smog and leave things surprisingly clear and dark. In January and February I have tracked down most of the Messier objects from my driveway with 15x70 binoculars--even M1, right at the zenith, one particularly clear night when my eyes were fully dark-adapted.

Still, summer is here, and I can't just not observe. So I fight the summer doldrums in various ways. Even if I'm too busy to go farther afield, I run up Mount Baldy for a few hours to get a taste of clearer, darker skies. I observe solar system objects and double stars, which punch through the summer haze just fine. And, I'll admit it--some nights I stay inside and read a book or surf the Cloudy Nights forums.

But I can't shake the feeling that maybe I'm running away from a problem I should tackle head-on. My friend Terry is a truly dedicated observer--he lives in LA and doesn't have a car, so he takes a scope via public transportation to local parks for his deep-sky observing. It's a triple challenge--hunting down galaxies using a small scope under light-polluted skies. He uses the regular arsenal of tricks--light baffles on his scopes, an observing hood of dark cloth to preserve his dark adaptation, using averted vision to pick up faint targets, and--mostly--sheer tenacity and patience.

It's rather humbling, actually. When confronted with crappy skies and limited to small aperture, Terry just gets out and observes anyway. And he observes what he wants to observe (galaxies, mostly), not what he thinks will show up best under less-than-perfect conditions. And he does it with a four-inch scope. So what do I have to complain about? I should just get out there and do it.

How do you survive the summer doldrums? Feel free to write to me at mathew.wedel@gmail.com and tell me your tips and tricks.

Our speaker this month is...you! Bring your photos from May's annular eclipse and June's transit of Venus, and we'll take turns sharing our experiences.

Matt Wedel

Summer is Election Season for PVAA

At our July 13th 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 10th general meeting. Please try to attend both meetings if you can.

Northern Branch of the PVAA

We enjoyed some interesting viewing experiences this year. The annular solar eclipse found Lucy, John, and I driving an hour and a half north to the town of Willows. We were just inside the zone where the moon was fully within the sun's disc. It would have taken another couple of hours to get to Redding, which was very close to the center line but we all had work or school the next day. In Willows we set up in a small park where two other groups of people soon joined us – oddly enough both from Davis. A Willows local with a scope in his yard wandered over to keep us company for awhile.

Family Eclipse Photo

Lucy at Maximum Eclipse

Crescents on the Street in Willows.

Two weeks later we scanned the events taking place in Davis for the Venus Transit – observing on the UC Davis campus and by the local observing club at the Explorit Science Museum. I decided to help at a third event – one Club member was braving a public park next to an elementary school all by himself. Sure enough, he was manning two scopes, a couple pairs of binoculars, and a 40-person line - all by himself. My 8-inch Dob was a welcome addition. Look closely at the pictures on the club's Facebook page and you'll recognize a few familiar faces. White board graphics are Lucy's, telescope photography of the transit are by the Davis Astronomy Club member.

http://www.facebook.com/media/set/?set=a.370239606374096.88069.306727559391968&type=1

Claire Stover

June 5, 2012 transit of Venus

About 15 minutes into the event, used Canon XTi,,300 mm lens, at f 5.6, shutter 1/4000 second. Solar filter. From Claremont

About 40 minutes into the event, used Canon XTi,,600 mm lens, at f 6.3, shutter 1/4000 second. Solar filter. From Claremont

Ray Magdziarz

This image is me and my l2" lightbridge. Since I now have a go-to, the dob is not used as much as before. I will be happy to loan it to members on a short term basis. It is not for sale. Specs: 1500mm focal length. Shroud, telrad finder, 2" 24mm eyepiece. optical tube, 48 lb, base 34lb, secondary 6lb. Optical tube will fit in base for transport in the back seat of a sedan or in the back of an suv with sufficient vertical clearance. I can be contacted by phone (714-329-4080) or e-mail beconn2006@yahoo.com

William (Bill) Connelly

How Does It Work?

In the previous articles we looked at scattering from air borne particles that affect astronomy. Now let's look at some of the visual effects that we have seen. A rainbow is the first one that comes to mind.

My mother had a saying, "A rainbow at night is a sailor's delight. A rainbow in the morning is a sailor's warning." Since she was raised on a farm in Missouri, I could never figure out where this saying came from. There aren't many sailors on the Missouri farms. Then I learned that rainbows only are seen opposite to the sun. A rainbow in the morning meant there was rain in the west and that is where the storms come from.

Rainbows have been enjoyed and have raised questions by everyone who has seen them. Myths and legends have attempted to explain them. In the 11th century Chinese philosophers began to get it right. In the 13th century Persian philosophers independently began to get the right idea. They were the first to say it was caused by reflection in rain drops. It wasn't until Gustav Mie published his work in 1908 that modern explanations could provide a detailed explanation.

When light enters a sphere the rest of its path is determined by the shape and index of refraction. In a water droplet the light which enters the top half of the droplet will reflect off the back side of the droplet twice and exit back out the front and down at 42 degrees from where it entered. That is independent of the size of the droplet. Inside the droplet the various colors are separated by refraction and take slightly different paths. They are separated more as they exit.

We only see a rainbow when the sun is directly behind us. The rays from the sun pass around us and enter the water droplets. Imagine a line from the sun through your head and imagine a 42 degree cone around it. The rainbow will appear in the distance around that cone. A person standing 20 feet away to your left or right will see a rainbow too. But it will be displaced in their direction by 20 feet.

Red is always at the top and violet at the bottom. This is determined by refraction as the light first enters the droplet.

When light enters the bottom half of the droplet it follows a similar but inverted path. It will exit back out the front and down at 51 degrees. These rays are much weaker and seldom seen. When they are visible they lie around a cone of 51 degrees and the colors are inverted. Red is at the bottom and violet at the top. The dark band in between is called Alexander's Band after Alexander Aphrodisias who first described it.

Next time you see a rainbow, look for its double. It will be very faint if you can see it at all..

If you have a topic you would like me to discuss, please let me know at lcrowder@roadrunner.com.

Ken Crowder

Pay club dues at the General Meeting or by mail. $30 individual / $40 family.

Club Events Calendar

July 13 - General Meeting
July 21 – Star Party – Cottonwood Springs
July 24 - Ontario Library Main Branch - Dark to 9pm
July 25 – Star Party – Orange County Braille Institute, Anaheim

August 2 - Board Meeting, 6:15
August 10 - General Meeting
August 18 - Star Party - Mojave River Forks Regional Park
August 30 - Board Meeting, 6:15

September 7 - General Meeting
September 15 - Star Party - To Be Announced
September 20-21 - PATS Astro Imaging Workshop
September 22-23 - PATS
September 27 - Board Meeting, 6:15

October 5 - General Meeting
October 13-Star Party–Nightfall/Anza-Borrego Desert State Park
October 23 – Ontario Library Main Branch 7 – 9pm
October 25 - Board Meeting, 6:15

November 2 - General Meeting
November 10 - Star Party - To Be Announced
November 30 - Board Meeting, 6:15

December 7 – PVAA Holiday Party
December 27 – Board Meeting, 6:15

PVAA Officers and Board

Officers

President .....Mathew Wedel ….....909-767-9851
Vice President ..Joe Hillberg.....909/949-3650
Secretary .....Bill Connelly.....714/329-4080
Treasurer .....Gary Thompson…….909/935-5509
VP Facilities .....Jeff Felton.....

Board

Bill Vaskis (2013).....
Lee Collins (2012).....626/852-9442
Ray Magdziarz (2012).....909/626-8303
Karl Rijkse (2013).....

Directors

Nightwatch .....John Stover….....909/988-9747
Membership ...Ludd Trozpek.....909/624-3679
Programs .....Ron Hoekwater.....909/391-1943
Publicity ....Laura Jaoui.....

What's Up? - Starry Clouds, Cloudy Stars

Around Sagittarius (Archer) near the Milky Way's center lie a wealth of starry clouds and cloudy stars. Excellent star clusters emerge from giant emission clouds. Let's consider the stellar ones.

Bright M7, was recorded by Ptolemy in 130AD. He described as "a glowing nebula following Scorpius' stinger." The stinger is marked by two stars, The Cat's Eyes. Here also is M6, The Butterfly Cluster. Both were spotted in 1654 by priest-astronomer Giovanni Hodierna.

Moving north along the Milky Way we pass our Galactic Center. It's hidden by dark clouds and 30,000 light years away but gives off strong radio signals as Sagittarius A.

Next we reach M8, The Lagoon Nebula. This interstellar gas cloud is 50 ly across and visible to the unaided eye in dark skies. It's the first of four enormous emission nebulas along the Milky Way. They are all the hotbed birthplaces of new stars with their collapsing clouds of proto-stellar material called Bok globules. A star cluster hovers in front of its bright center marked by a sinuous dark "lagoon." Over 4,000 light years away it was first recorded by Hodierna in 1654.

Just above M8 is another mammoth emission nebula glowing with ionized light, M20 The Trifid Nebula (pictured). Further away at 5,000 light years its three flowery lobes were noted by William Herschel in 1786. The dividing "lines" are dark absorption nebulas. Clusters of hot new stars emerge from its complex flower shape.

Near by, above the "teapot" asterism of Sagittarius, is one of the sky's largest globulars, M22. There largest number of observable globular clusters are found in this area around the Galactic Center.

Also there are five sparkling Messier open star clusters, M18, M21, M23, M25, and the strange M24 (the Sagittarius Star Cloud). M24 is not to be confused with the luminous center of the galaxy star cloud that seems to rise from the "spout" of the "teapot" like bright steam. The smaller M24 is also called Delle Caustiche meaning a thin caustic glow. It's made up of what appear to be over a thousand tiny stars. M24 is actually a window in obscuring clouds that opens onto a far away portion of the Sagittarius Galactic Arm. The stars in this window seem small because they're 10,000 to 16,000 light years away. It's the greatest concentration of separate stars visible in a single telescopic field. Messier is first cataloged it in 1764.

Still moving north we find the nebula with the most names, M17 The Omega, Swan, Horseshoe, Checkmark, and Lobster Nebula. Its a horseshoe omega connected to a checkmark which looks like a swan, a "rubber ducky" or maybe a clawed lobster. About 6,000 light years away it was discovered by a wealthy Swiss amateur astronomer, Philippe De Cheseaux in 1745. They were mostly all amateur astronomers in those days. De Cheseaux also made observations of the six-tailed comet of 1743, but sadly died at age 33.

Moving further north along the Milky Way into Serpens Cauda (Serpent's Tail) we find the last of four super starry clouds, M16 The Eagle Nebula. It forms a flying eagle shape in a smaller telescope. It was also discovered by De Cheseaux. Hubble Space Telescopes photographs from 1995 enlarged a portion of elongated clouds as the "Pillars of Creation" These "columns" clearly show Bok globules gathering to create new stars. From a timely point of view the Eagle is over 7,000 light years away and the "pillars" probably no longer exist as such.

Near the starry window of M24 is our dogged dwarf planet Pluto (god of Hell). It was discovered by astronomical assistant Clyde Tombaugh at Lowell Observatory in 1930. It made the modest Tombaugh instantly famous as the first American to discover a planet. At that time it was considered to be Earth sized, but has since shrunk to a dwarf size of 1,450 miles in diameter. This is smaller than many of our larger moons. Its eccentric 248 Earth year orbit brings it closer to the Sun than Neptune. When closer to the sun its frozen atmosphere goes temporarily gaseous. The largest of four moons, Charon (boatman of Hell's river Styx), was discovered in 1978. Charon's diameter of 750 miles makes it half the size of Pluto. This Pluto-Charon system revolves around a common center. It's our only double planet system. Charon orbits Pluto every 6.4 days in a synchronous orbit (the pair show the same faces to each other). To an observer on Pluto, Charon would appear to be stationary in the sky. The New Horizon spacecraft is due to reach Pluto in 2015.

Well, this is only a faction of what's up near the dense Galactic Center.

Lee Collins