



Newsletter of the Pomona Valley Amateur Astronomers

Volume 30 Number 4

nightwatch

April 2010

President's Address

In less than two months PVAA returns to Mt. Wilson for another night of observing with the 60-inch telescope. That's right, on June 12, 2010 PVAA has the 60-inch telescope reserved. This date was selected because it gives us the best chance of having excellent observing conditions. And Mt. Wilson at its best is one of the very best observing sites in the world.

Personally, this will be my 11th observing session with the 60-inch and I am still as eager and excited as I was before my first session. During each visit I see things that I would never have expected to get see when I was younger. Every visit has been a thrilling adventure. With the 60-inch I have seen the moons of Mars. I was afforded views of the planets Jupiter and Saturn that rivaled images from the Hubble space telescope. Revealing 17th magnitude stars with ease and intricate detail, invisible in a lesser instrument, planetary nebulae such as the Ring and the Cat's Eye were nothing short of spectacular. This year I am hoping we will see the "Einstein Cross," a gravitationally lensed quasar about 9 billion light-years away. It isn't often that our eyes register 9 billion year old photons.

A night with what was once the largest telescope in the world is a unique and unforgettable adventure for any amateur astronomer. Unfortunately the rental fee for the 60-inch has risen in the last few years. The club must charge \$100 per person. A maximum of 25 are allowed to attend so get your name in soon. You won't want to miss out.

To amateur astronomers May means one thing, the Riverside Telescope Makers Conference Astronomy Expo. The 42nd annual RTMC Astronomy Expo will be held Wednesday through Sunday (May 12-16). The date has been changed from the traditional Memorial Day weekend in order to take advantage of the new moon. RTMC is one of the highlights of the astronomical year. This will be my 18th year to attend the conference, which every year keeps getting better.

RTMC is a great place to try out and buy astronomical equipment. I bought my 22-inch Starsplitter telescope there. I have also purchased binoculars, several eyepieces, and filters at RTMC. The prices are generally better than what they are elsewhere. If you have all the equipment you need (that's hard to imagine) there are books, back issues of magazines, tee shirts, meteorites, fossils, astro-photos, paintings, jewelry, chess sets, and anything might turn up at the swap meet on Saturday morning.

Every year RTMC has legions of interesting speakers and presentations to hear and see and this year (I'm sure) will be no exception. The keynote speaker for 2010 is Dr. Fritz Benedict. Dr. Benedict is a Senior Research Scientist with the University of Texas' McDonald Observatory.

But, what we all love to do is look at the sky and RTMC is one giant star party. And this year with the new moon it will be even better than usual. If RTMC isn't the biggest in the world it must be very close. There are hundreds of telescopes and binoculars out on Friday and Saturday nights. Several years ago I spent a night looking at Messier objects through a pair of 20 x 120 binoculars someone was selling. What a thrill! During the day there are solar telescopes set up, often with H-Alpha filters. The last few years I have seen a few solar spectroscopes as well.

Another great thing about RTMC is getting to visit during the day and observe the heavens at night with old and new friends. Each of the last several years up to Camp Oakes I have met up and camped with Joe Hillberg, Bob Akers, Jim Bridgewater, John Stover, and Ludd Trozpek. It will be a chance to catch up with some people I haven't seen for a year and some that I have seen more recently.

I would strongly encourage anyone with any interest in astronomy to attend the Riverside Telescope Makers Conference, May 12-16. It truly is a wonderful experience!

Ron Hoekwater

Book Report by Bill

Recently I bit the bullet and bought a book on Astronomy, "The Amateur Astronomer's Essential Reference" Third Edition, 2008. It is nearly coffee table in size, 368 pages, and the cost (\$49 at retail) takes it out of the category of an impulse buy. It helped that Ellie had a 40% off coupon at Borders. The book shows two isbn #'s, ISBN-13:978-1-55407-344-3 and ISBN-10:55407-344-8. I recommend the Third Edition as it has very fresh reviews of the latest hardware and software.

I wish I had run across this book a couple of years ago as it would have saved me a great deal of frustration and also money. It is encyclopedic in its coverage from beginner to serious intermediate. It has details for dealing with maintenance issues of scopes and optics, has procedures for collimating optics using different tools, and realistic guidance for choosing hardware beginning at binoculars, and ending at intermediate astrophotography.

I have learned quite a bit in the last couple of weeks, and it is helping me to decide where I will go next with this hobby. I can bring it to an upcoming meeting but I suggest you check it out yourself at a library or book store.

William (Bill) Connelly

Club Events Calendar

April 23, General Meeting - Matt Wedel
member and author of *10 Minute Astronomer*

May 6, Board Meeting

May 12 - 16, RTMC

May 21, General Meeting - Dr. Eric Grosfils,
Pomona College Geology Professor

June 5, 2010, Saturday – Star Party – Mt. Baldy

June 12, Saturday – Mt. Wilson 60" viewing

June 17, Board Meeting

June 25, 2010, General Meeting

July 10, Star Party – White Mountain

July 20, Star Party – Ontario Library, Main Branch 7–9 PM

July 23, General Meeting - Bob Eklund and Al DeCanzio
Dialogue on the Galilean Imagination

August 7, Star Party

August 19, Board Meeting

August 27, General Meeting - Dr. Rachael Akeson
on Finding Planets Through Transits

September 4, Star Party

September 16, Board Meeting

September 24, General Meeting

March General Meeting

We began the evening hearing about some of our past observing sessions at Mt Wilson's 60-inch telescope. Jeff Felton shared his stories of seeing detailed and colorful planetary nebula, Phobos and Deimos - the moons of Mars, and details of Jupiter and Mars usually seen only in Hubble photos. You have your own chance to try for some of these sights on the night of Saturday, June 12th as the Club again rents the 60-inch telescope for the night. The cost is \$100 per person. Call or email a member of the board or get your name on the list at our next meeting to reserve your spot.

Gary Gonnella shared more excellent photos from his Alta Loma backyard. It's amazing what he's been able to produce from his suburban backyard using a digital camera and photo processing software.

Our main speaker was Dr. Sara Martin of 15-year old Helio Research in La Crescenta. Using a 10-inch home built solar telescope along with several grants from the National Science foundation, she studies our sun. In addition to the more well-known filament and prominence features, much of her work delves into the properties of channels. A channel is an area along a polarity reversal boundary where a filament can form.

What are commonly called prominences can actually be several different things. They can be filaments seen on the limb of the sun – dark areas which form above the sun's surface between areas of opposite polarity. They can also be flares and surges. Flares are explosions of gas in the sun's atmosphere while surges occur when a large amount of plasma travels upward from an active region of the sun. They can travel at speeds as high as several hundred miles per second.

While our Club does many more nighttime than daytime solar observing events, solar features are also generally less well known to both the public and to ourselves. Thanks to Dr. Martin for expanding our knowledge with a very interesting lecture

Claire Stover

References:

Helio Research:

<http://helioresearch.org/>

Solar Surges:

<http://www.springerlink.com/content/k45w165p10m43ku4/>

Events cont.

October 9, Star Party

October 12, Star Party – Ontario Library, Main 7–9 PM

October 14, Board Meeting

October 22, General Meeting

November 6, Star Party

November 11, Board Meeting

November 19, General Meeting - Gene Serabyn of JPL

How Does It Work?

On a clear night, the ability to see the faint fuzzies or even a star will depend on how much contrast there is between the object and its background. Even in a dark sky location the background is limited by light scattered from the atmospheric aerosols.

In 1968 RCA published an "Electro-Optics Handbook" which has some very interesting data. This will be my primary source. The units "lumens per square meter" (l/m²) relate to the amount of visible light illuminating a surface. Ten l/m² is about the same as one foot candle, if you are more familiar with those units.

On a dark clear night the light from stars only, at sea level, is about 5x10 exp(-4) l/m². By comparison, a full moon at midnight will illuminate with about 0.3 l/m². That tells us that the full moon provides 600 times more illumination. On a dark night with clear sky, dry and free of dust, this allows us to see about a magnitude 6 star with our naked eye. As the light is scattered from the atmospheric aerosols, it makes the background appear lighter and thus reduces the contrast between our target faint fuzzy and the background.

A telescope limits the light from outside the field of view. That means the effect from scattered light is greatly reduced. A FOV of 1/2 degree will reduce the background by about 400 times. This is equivalent to about 6.5 magnitudes. (A magnitude 6 is about 2.5 times as bright as a magnitude 7.) We are now able to see a magnitude 12 to 13 star. As we change FOV, the contrast is improved as the square of the ratio. More magnification doesn't make the star bigger, but it does reduce the FOV and thereby improves contrast.

The term "air glow" is used to describe what is happening as a result of natural scattered light. Even at a dark site the scattering is a bit more complex than indicated above. Secondary scattering occurs and can be significant when the air is very humid, for example. A factor of 4 (1.5 magnitudes) deterioration is not uncommon.

Another source of sky glow is from cars and city lights. In the Los Angeles suburbs it seldom gets better than allowing a magnitude 3 star to be visible with the naked eye. Here the light from the surface is being reflected back off the aerosols. Where you are relative to the sources of light will affect the limitation you experience.

Various filters are available which may help by blocking light scattered from the city. Light from sodium vapor street lights can be blocked fairly well. Other filters which can be used are the "deep sky," Ha, and even the deep red. Each has an advantage which depends on the source of scattered light and the type of aerosol.

When searching for that comet, asteroid, double star, faint fuzzy, or whatever, we often have an idea of its magnitude. What is visible to the naked eye is the starting point. If you use the information here, it might let you know what your chances are if you use a narrower field of view and a filter.

Ken Crowder

Star Party - Cottonwood Springs

The forecast was for "average" seeing. LA basin weather looked lousy. I had invited a friend (Jeff Wright) along who had some interest in astronomy, but many frustrations with equipment. Do we go???? Since we had some other interests that day (hiking etc) we decided to go and see what developed.

As the afternoon progressed, the weather seemed to be worse than forecast. There were several thin "standing lenticular clouds" which obscured a significant percentage of the sky. We thought, in for a pence, in for a pound. Some of the clouds dispersed as the sun set and things cooled off, but a large one overhead obscured Polaris to Ken Crowder's frustration. Mercury, Mars, Venus, and Saturn were visible and provided interesting targets as twilight grew dimmer and dimmer. Once twilight ended and we began to probe the sky, it became apparent that where the clouds were not, the visibility was VERY GOOD. M81 and M82 were large, and BRIGHT in my Lightbridge. Ken Crowder was able to capture the loop of illuminated star-stuff which extended from one galaxy to another! Star clusters were pinpoint and bright in the sky.

Cottonwood had many campers, but we were able to find sites together. We were able to jaw-bone a couple of campers to shield their Coleman Lanterns. A father and son from La Canada-Flintridge were very cooperative and said that the son would be joining the Astronomy Club when he started Freshman year in high school this fall. They were the first visitors to our small group, but were soon followed by about a dozen others. Lots of good questions were asked, and Jim, Ken, Jeff, and I were busy providing answers for most of an hour.

William (Bill) Connelly

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What's Up? Shooting Stars Or The Sky Is Falling ?

It's hard to believe, but our recognition that meteorites (or "shooting stars") fall from outer space is only about 200 years old. As recently at the 1950's, advances allowed astronomers to calculate the orbits of bright meteors. These showed orbits into the asteroid belt between Mars and Jupiter. These asteroid fragments were from the formation of the solar system. However a few rare ones were from more recent molten planetary events. These unusual rocks came from our Moon, Venus, or Mars. One meteorite contained tiny gas bubbles similar to the known Martian atmosphere. Another, found in the ice of Antarctica, is thought to contain Martian microfossils. Could an Earth explosion have sent microbes to Mars?

But any meteorites are hard to find, especially after years of burial or erosion. The ice-covered whiteness of Antarctica has proven an excellent place to spot meteorites. Most are picked up after a witnessed fall by those who have seen a flaming "falling star" impact. Many know that meteorites can be as much as fifty times as valuable as gold.

The first meteorite I ever saw was the Goose Lake at Griffith Planetarium. This 2,573 pound iron meteorite has the familiar appearance of a giant raisin coated with a shiny fusion crust. However others, especially the ones that come from Mars, look like stones. The basic division is iron, stone, and stony-iron. In addition, meteors in the yearly Perseid meteor shower are icy and never hit the ground to become meteorites. The Perseids are predictable because the Earth sweeps through the dust filled orbit of Comet Swift-Tuttle every August 12-13. I witnessed a great greenish fall of meteors with our club several years ago. In 1833, a big meteor shower caused sinners to confess their sins. I confessed my awe and wonder.

Some large meteors can explode before they hit the ground. The most famous of these was 1908's Tunguska "event" in Siberia. This explosive space visitor was seen to blow up but never left a crater, just 1,000 square miles of fallen trees. However many large meteors leave huge impact craters, in various states of erosion, to be examined for valuable meteorites.

The world's best preserved large impact crater is Arizona's Meteor Crater near the interstate just east of Flagstaff. About 50,000 years ago, thousands of tons of iron meteor vaporized or melted upon impact. Its crater is 4,100 feet across and 570 feet deep. It was created by a meteor about 150 feet in diameter traveling at some 40,000 mph. Meteor Crater is an impressive site and has a first class meteor-impact museum located on its rim. Here, a world map shows hundreds of meteor impact sites all over the world. Many are ancient, but have been spotted by orbiting space satellites.

The history of Meteor Crater is like others around the earth. It was commonly believed to be caused by a volcanic explosion, since it was felt that earth was protected from impacts by its atmosphere. Some felt the Moon's impact craters were volcanic.

In 1909, this opinion was changed by mining engineer, Daniel Barringer, who laid claim to the Arizona crater in the belief that he could extract valuable minerals from its buried treasure. Unfortunately, because of the pulverizing explosion of impact Barringer went broke in his search. However the family still holds title and the official name is Barringer Crater.

Even today, meteor falls remain an ongoing threat to

earthlings. The 1992 Peekskill (N.Y.) meteor was more photographed in its flight than any other in history. One final fragment punched through the trunk of a parked Chevrolet Malibu as it struck. It was collected by the police as evidence and used briefly as a doorstop. Eventually it was returned to the young lady who was its newly wealthy owner. In 2003, a meteoric fireball exploded over Chicago raining stony meteorites down on the suburb of Park Forest. Six houses and three cars were damaged, as baseball sized fragments crashed through ceilings to terrify inhabitants. One roof-piercing piece hit a computer printer just as its operator was about to hit print. In 2009 a big bolide-sized meteor streaked over western states, finally breaking up over Utah.

Consequently there has been an increasing interest in large meteors being a serious hazard. It's now recognized that 65 million years ago the sudden demise of the dinosaurs was caused by the impact of a six mile wide object (now called Chicxulub) that struck the Yucatan Peninsula. This seems to have been just one of several previous impact extinctions events in earth's history. But such a disaster could be avoided by a cooperative human effort.

The search for earth-crossing asteroids began in 1973 and increased with the formation of NASA's Spaceguard Survey in 1998. As a result thousands of larger suspicious objects have been catalogued, although smaller meteor-sized fragments are still unobservable. This has resulted in an increase of "killer asteroid" reports only to have the object veer safely aside as it nears earth.

What to do if we find a really dangerous near-earth-asteroid headed toward us? Well the plan would be to try and hit it with a spacecraft changing its course to miss Earth. Or maybe to grab it and tow it into a safe orbit. It would certainly be a world-wide effort.

In the meantime keep looking up for falling meteors and their hissing tell-tale ionization trails. If one lands in your neighbor's yard it instantly becomes a meteorite. Grab it and claim it fell on your property. He that owns a piece of outer space owns a valuable collectable

Lee Collins

The City of Montclair is putting on a trip to Griffith Observatory on Thursday, May 13th. Departure time is 8:30am with return at 3:30 pm. You are on your own for lunch at Phillippe's or on Olvera Street and the cost is \$25.

Contact the city at (909) 625-9479 for more details. Reservation deadline is May 7th.

Braille Institute Star Party

Frank’s tire went flat 34 miles after meeting me at Grove & the 60 freeway. Fortunately it was the rear passenger side tire, so the car was easy to control. Another good thing was that it happened just before an off ramp. Triple-A came to the rescue, and even stored the tire in their garage overnight so we could pick it up on the way back.

We arrived at 2pm, which was only an hour later than planned. We had plenty of time to set up before the group’s arrival at 5:30pm. My Dob was set up in a jiffy, and Frank set his up in stages, giving his knees a little rest between trips to the car. Jim Bridgewater was already there when Frank & I arrived, and he had started setting up his equipment. By the time Frank was half done, Jim had put a solar filter on his refractor, and was checking out the sun. In his scope you could easily see a couple of sunspots. Cool. His drive tracked the sun very well. A little later Joe Hillberg showed up with his new refractor. If you haven’t seen it, it’s a beauty.

The Braille group arrived in two Institute vans, and 3 cars for a total of 24 people. At first Frank was worried that less than 10 would show up. With the arrival of the group the Park Ranger – Leslie- introduced herself. She took them on a walk of about half a mile round trip, explaining the plants and local wildlife. We stopped at an amphitheatre where she gave a talk, and passed around items such as a turtle shell and mountain goat’s horn. (It was heavy!)

When we arrived back at the picnic location we found that dinner was ready to be served. The Park Ranger wished us well, and took off to other duties. During the dinner I gave a little talk of what we were going to look at tonight. The moon, Venus, Mars, Saturn and the Orion Nebula were our targets for the night. The talk was a lively one, with lots of questions.

Frank’s monitor was focused exclusively on the moon. He could adjust the brightness and contrast to help them see better and do it for each person if need be. Frank had brought and set

up several tactile displays of the moon, planets and stars. They were a big hit.

Jim and Joe had their clock drives in gear as they looked at the planets. Venus went down below the horizon early, so it was only for about 15 minutes or so that we looked at that. Just as it went out of view Saturn popped up over the roofs that supplied shade to the picnic tables. Everyone was busily going from scope to scope. Some even brought their own binoculars and pointed out Pleiades, and the constellations Orion, the Big Dipper and Cassiopeia to me.

I settled in and stayed with the Orion Nebula. I took a brief detour to M41 (an open cluster), but most wanted to see the great nebula in Orion. All night long you could hear “Wow!” and “Thank you!” coming from all the scopes. When it was time for them to leave they again gave us many thanks, and departed with all smiles. This was definitely “worth it.”

Then we were left with the scopes for ourselves. I looked through Jim and Joe’s scopes & was impressed with their quality. I liked Jim’s zoom eyepiece. Joe brought over a couple of his eyepieces to my Dob, and they definitely improved the seeing. I’m not saying that my eyepieces are not high quality, well, yeah I am saying that Joe’s are not just a step above, but maybe 3 or 4 steps above. (Someday Joe.... It’s on my wish list....)

Frank removed his digital camera that he used to view the moon, and put on his video camera. He then had to align his telescope again, as his quick alignment for the moon was ok, but not for finding small faint objects.

We all stayed up until midnight and each of us retired and slept in our own vehicles. At daybreak we talked a while and then headed back to civilization.

Thanks Frank! –It was fun!

Gary Thompson.





An Article in the Universe Today

The article was written by Nancy Atkinson on the orbiting brown dwarf as seen through the Hubble Space Telescope. The dwarf's number is 2M J044144. It has a companion object that is estimated to be 5-10 times the mass of Jupiter. His observation is that they have noticed a unusual object orbiting the brown dwarf, and it brings into question as to what constitutes a planet. This particular Brown Dwarf is found in the Taurus star-forming region, with an orbit approximately 2.25 billion miles. Astronomers say it is the right size for a planet, yet they believe the object formed less than a million years and that it is a short time for a planet to form, according to conventional theories.

It has been observed that there are 32 young brown dwarfs in the Taurus region as stated by Kamen Todorov of Penn State University and his team. It is said that the Brown Dwarf is 5-10 times the mass of Jupiter and is too small to sustain nuclear fusion to shine as a star.

There has been a lot of discussions as to whether Pluto is a planet and how small an object can be and still be a planet, the new observation brings into question at the other end of the spectrum, how small does a object have to be to be called a brown dwarf rather than a planet. Astronomers are not sure if this new mass is a planet or a companion at this point. The answer is strongly connect to the mechanism by which the companion most likely formed.

The Hubble news release offers a possible scenario for how the object could have formed.

By dust in a circumstellar disk slowly agglomerates to form a rocky planet ten times larger than Earth. Then it accumulates a large gaseous envelope in a disk and quickly collapses to form an object or a star or brown dwarf.

It is stated by Kevin Luhman that the mechanisms of binary stars extends all the way to planetary masses, and appears to make planetary mass companions through two different mechanisms. If the mystery companion formed through cloud collapse and fragmentation, as stellar binary systems do, then it is not a planet by definition, because planets build up the inside disk. It is suggested by Luhman that all four objects may have formed in the same cloud collapse actuality making this a quadruple system.

John Bratton Sr.

Source:

<http://www.universetoday.com/2010/04/06/mystery-object-found-orbiting-brown-dwarf/>

<http://hubblesite.org/newscenter/archive/releases/2010/03/>