



"This sight...is by far the noblest astronomy affords..."
-Edmond Halley

Newsletter of the Pomona Valley Amateur Astronomers

Volume 30 Number 7

nightwatch

July 2010

President's Address

It is July and elections are almost upon us. At the July meeting we will continue to accept nominations for club offices. As I announced at the June meeting I will not be candidate for reelection as president. Being president for 8 years has been a great experience but I think it is time for me to step aside and give someone else a chance. There are many people in our club who would make fine presidents. I hope one of you will step forward. I am willing to continue to find speakers for the meetings or serve in some other way.

September 18 - 19 the third annual Pacific Astronomy and Telescope Show will be held in Pasadena Convention Center. PVAA will again be offering discounted tickets. PATS will have a great lineup of speakers including Alex Filippenko, UC Berkley astronomy professor and key note speaker at RTMC a few years ago. PATS is brought to you by the same that put on RTMC every year and they do a terrific job as they do with everything. If you want to see what is new in astronomy, are looking to save money on equipment, or just want to hear all the

interesting speakers, be sure to be there. PATS is looking for people to support the public outreach program at Paseo Colorado again this year. I will give more details when I have them.

We will have our August star party at Skyland Ranch in San Jacinto Mountains. This is a change as it was originally scheduled to be at Angelus Oakes. The Skyland Ranch is a Girl Scout facility and the first part of the evening we will be spent showing the sky to scouts. This is the umteenth year that we have assisted with the Girl Scouts' "Nature at Night" program and everyone involved has really enjoyed it. The location is 19750 Hwy 243, Banning, CA. The scouts will provide dinner if you get there in time. They will also try to provide sleeping accommodations. Try to arrive about 5:30 if you want dinner. Please let me know if you plan to attend so I can tell the them how many to expect.

Happy Stargazing!

Ron Hoekwater

Club Events Calendar

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

August 7, Girl Scout Star Party - Skyland Ranch

August 19, Board Meeting

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

September 4, Star Party—GMARS in Landers

September 16, Board Meeting

September 24, General Meeting

October 9, Star Party

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

October 14, Board Meeting

October 22, General Meeting - Robert Piccioni -
"Einstein for Everyone"

November 6, Star Party

November 11, Board Meeting

November 13, Townsend Junior High School in Chino Hills

November 19, General Meeting - Gene Serabyn of JPL

December 4, - Star Party

January 11, 2011 - Main Branch, Ontario Library, 7 - 9 PM

January 21, 2011, - General Meeting

February 18, 2011, - General Meeting

March 18, 2011, - General Meeting

April 15, 2011, - General Meeting

June General Meeting

June saw the return of speaker Tim Thompson, retired JPL physicist. We first heard an inspiring tale of an amateur astronomer who has hit the big time – twice! Anthony Wesley of Australia discovered a small blemish on the surface of Jupiter in July of last year. While not of the magnitude of Shoemaker Levy 9 in 1994, Anthony followed up his modest asteroid impact find with evidence of another hit just weeks before our meeting, on June 3rd of this year. One would wonder if Anthony was perpetrating a hoax to get the publicity if it weren't so hard to fake an explosion on a planet hundreds of millions of miles away from the dark skies down under.

William Herschel, who lived from 1738 to 1822, had many claims to fame himself – among them the discovery of Uranus and Infrared radiation. How appropriate then, that that an infrared telescope launched in May of last year, the Herschel Space Observatory, should be named for him. A partner craft, Planck, was launched by the same rocket and is studying the cosmic microwave background radiation.

The third new observing instrument appears to be the most novel. Sofia is an acronym for the Stratospheric Observatory for Infrared Astronomy. The rather high falutin title masks a 2.5 meter reflector squirreled away inside a Boeing 747 aircraft. By flying at altitudes of over 40,000 feet it will observe infrared wavelengths which are blocked by water vapor lower in Earth's atmosphere. One merely opens a gaping window in the side of the aircraft at altitude to allow the scope to look into space to observe at those wavelengths it is unable to see from the ground.



http://en.wikipedia.org/wiki/File:413139main_ED09-0352-03_430.jpg

We'd like to thank Tim for shedding some light on these exciting new instruments, which will no doubt contribute to interesting discoveries in the future.

Claire Stover

References:

<http://www.planetary.org/blog/article/00002521/>
http://en.wikipedia.org/wiki/Herschel_Space_Observatory
[http://en.wikipedia.org/wiki/Planck_\(spacecraft\)](http://en.wikipedia.org/wiki/Planck_(spacecraft))

How Does It Work?

Visitors have asked, "Why do meteor showers always peak after mid-night?" Well, the answer is that they don't - except for our viewing pleasure. The best time to see them is often after midnight, but not always, except in a city where the lights are beginning to dim after midnight.

Every day hundreds of meteors impact our atmosphere. The well known meteor showers are clouds of dust and debris which are crossing our orbit around the sun. The largest dust particles can produce a hundred visible "shooting stars" in an hour.

They most likely come from an ancient comet and are actually on its orbit. That explains why they are in the same place each year. The clouds can't just sit there, they would be pulled into the Sun. And they can't be on our orbital path or they would move.

The Leonid showers, for example, appear to come from the constellation Leo. This happens in November each year because as the Earth revolves in its orbit, it encounters the cloud when Leo appears to be behind the cloud. The showers begin when the Earth's atmosphere enters the cloud and ends when the front half of the atmosphere exits the cloud. (The back side passes through the hole without an intercept.) The peak for viewing normally lasts at least 36 hours.

The direction of origin is from the east. That is the direction the earth is moving and is also the darkest part of the sky. Early evening viewing is limited by the sun's air glow. After a nice warm day the humidity at ground level will increase after the sun goes down. Scattering of the sun light will make it harder to see a "shooting star." We call that period "dusk." By midnight the air is cooled to a point that at altitude the dew point has caused precipitation and the humidity at ground level has nearly maximized. That will give the best viewing of the night. Of course, the viewing is also dependant on where the moon is.

After explaining why they come from the east, you can also point out that cities don't start turning off lights until after midnight. And, of course, that occurs first in the east. The sky glow from city lights prevents seeing any but the brightest events. This gives you a chance to lobby for reduced city lights all night long.

Ken Crowder

42 inches and Dark, Dark Skies

Our July star party was held at Grandview Campground in the White Mountains, east of Bishop. Grandview is a terrific site but it is too bad that we have to drive so far to find truly dark skies.

I arrived at Grandview late Tuesday afternoon. My favorite campsite was already occupied. Fortunately it was occupied by someone with a 42-inch telescope. Even more fortunately Perry Hacking, professor of astronomy at El Camino College and one of those responsible for building the huge telescope, agreed to let me share the site. This was indeed my lucky day. Although I set up my little 22-inch Starsplitter, from Tuesday until Friday night I spent almost all of my observing time at the 42-inch scope.

The 42-inch scope is by far largest telescope that I have ever observed with from a dark sky site. One of my personal favorite objects was the "Veil Nebula." Although my scope, with its wider field-of-view shows bigger chunks of the nebula, with the 42-inch the fainter parts of the "Veil" were more plainly visible and I could see more detailed structure than I have ever seen before. In fact when later I looked again through my scope, I found the view almost disappointing.

Another favorite was NGC 7974 in Pegasus. I don't remember having seen this object before but I think that it will become one that I go back to regularly. NGC 7974 is a spiral galaxy with a very prominent bar. Also the spiral arms are visible even though it is about 100 million light years away.

The galaxy cluster in Hercules, Abell 2151, has been a favorite of mine for some time. In the 42-inch it was spectacular. The best that I have ever seen it.

A galaxy cluster in Corona Borealis, Abell 2065, that I struggled to see last month was clearly visible in the 42-inch. These galaxies are a billion or more light-years away. They are the most distant galaxies that I have seen.

Stephan's quintet was great in the 42-inch. The individual galaxies were much easier to pick out. than in my scope. I really enjoyed seeing this object with such a large aperture.

Finally I spent more than an hour looking for and then at PGC 69457, the galaxy in which the "Einstein Cross" appears. The Gravitationally lensed quasar nicknamed the "Einstein Cross" is not actually in PGC 69457 (also known as Huchra's Lens), it is vastly more distant. This is an object which I have spent many hours over the last several years attempting to see. PGC 69457 showed up clearly in the 42-inch scope, but it shows

up in my 22-inch. The quasar was more difficult. I believe that I glimpsed some components off and on. I was surprised at how difficult this object is even in a 42-inch scope. I think at least part of the problem is that it requires excellent seeing conditions and the steadiness of the seeing that night was not good enough..

I spent several more hours over the next several nights looking at PGC 69457 and the surrounding star field in my scope. I tried to determine what were the faintest stars that I could detect. In the end my results were inconclusive. I believe that I occasionally did see components of the Einstein Cross in my 22-inch scope, but I am less than 100% positive of that.

After reviewing the observations of others on the internet, I am in even more doubt. In some cases the observations of others differ so much from mine that I do not believe they saw the object. In fact I not sure they were even looking in the right place. But other observations were, I think valid. When they differed from mine, I believe, it was because of differing conditions and equipment. Anyway, successful or not, I had a very

enjoyable time in my quest to see this elusive object.

Besides Perry Hacking, I was fortunate to meet two others from the team that built the 42-inch. Joe Haberman, who is co-founder of PlaneWave Instruments and spent hours with me trying to see the "Einstein Cross" and Don Quok who I understand was important in bringing the 42-inch project to completion.

On Friday Owen Robbins arrived at the campground. We visited during the evening, but as we camped a little distance away from each other, didn't get to observe together. I didn't see any other PVAA members, but it is possible I missed someone.

Saturday the team packed up the 42-inch. This was quite something to see. The mirror weighs 275 pounds and the whole telescope is somewhere in 600 pound range. The scope is loaded into the beds of two pickup trucks, the heavier parts of the scope requiring ramps and a wench.

The last four nights I was by myself. As I said I spent a lot of time on the "Einstein Cross." I also spent some time comparing views of objects that I had observed in the 42-inch. This was one of the most enjoyable star parties that I have attended. I am only sorry that more PVAA members couldn't have been there.

Ron Hoekwater



What's Up? In The Swan's Arm

The star rich area long known as the Cygnus (Swan) Arm of the Milky Way Galaxy is now combined with the Norma (Draftsman's Square) Arm to be the Outer Arm. It's all part of a new form for the Milky Way Galaxy as a barred spiral with consolidated arms. But whatever the ultimate form of the Galaxy, the Swan's Arm still holds an amazing variety of sights.

Here's the Summer Triangle of three first magnitude stars with birdy names. In Lyra the Lyre lies Vega (vulture, 0 mag., 25 ly.), it's about the size of our sun but burns brighter. In the second corner in Aquila the Eagle shines Altair (flyer, 0.7 mag, 17 ly) it rotates at a high speed squashing it into a football shape. Last but not least, in the tail of Cygnus the Swan is the most distant of all first magnitude stars. This is enormous Deneb (tail, 1.2 mag, 3,000 ly), it's football field sized next to Altair's spinning football.

In Cygnus we also find pitch black clouds outlining emission clouds to form shapes like the North America Nebula (NGC 7000). This continent shaped form was first observed by William Herschel in 1786 but not named until 1890. It's 16 times the full moon and has an even fainter neighbor, the Pelican Nebula. Just below the North America Nebula is a "hole" (the Northern Coalsack) where star obscuring clouds start the Great Rift.

The Great Rift was originally seen as an "empty" breach in the Milky Way's bright flow. Now it's known to be blotting out stars with its molecular dust. It stretches all the way down through Aquila to cover the Galactic Center. Dark obscuring clouds can also be seen in other galaxies like the Sombrero (M104).

Three very dim but remarkable objects in the Swan are Cygnus A, Cygnus X-1, and Piazzi's Flying Star. Cygnus A is a distant galaxy colliding with another galaxy and creating a powerful radio source. Cygnus X-1 is a high mass X-ray binary system in which a blue super giant is orbited by what could be a black hole. Black holes are hard spot but this one steals mass from the super giant creating an accretion disk and a powerful X-ray source. A safe 6,000 light years away, Cygnus X-1 has caused physicists Steven Hawking and Kip Thorne to make an "is it or isn't it" black hole bet. Piazzi's Flying Star (61 Cygni) is a close pair (11 light years, 6 mag.) of red dwarf binary stars revolving around each other. They move at a high proper motion across the sky, living up to their flying star name. They were discovered by Sicilian priest astronomer Giuseppe Piazzi in 1804. Piazzi discovered dwarf planet Ceres on January 1, 1801 (1-1-01).

More visible with an amateur telescope (plus filter) is the Veil Nebula (NGC6992) near the swan's arm. Appearing in four pieces (one called the Witch's Broom) it's all called the Cygnus Loop. It's the expanding remnant of a 6,000 year old supernova that covers 36 times the area of the full moon. First noticed in 1784 by William Herschel, it has four NGC numbers.

An even fainter veil in Cygnus is the Crescent Nebula (NGC 6826). It's the ghostly illuminated shell of a dying Wolf-Rayet star. Wolf-Rayet stars were discovered in 1867 by French astronomers Charles Wolf and Georges Rayet. A Wolf-Rayet is a massive super-hot star with a burning gaseous atmosphere so thick that it's continually being ejected into space. They can look like planetary nebula and are all expected to end up as

supernovae.

The brightest planetary nebula in Cygnus is the Blinking Nebula (NGC 6826). It has a central star which can overwhelm the eye when viewed directly, and that makes the surrounding nebula seem to blink in and out in peripheral vision.

Nearby is another planetary nebula, the Dumbbell Nebula (M27) in Vulpecula (little fox). It's the first planetary to be catalogued by Messier in 1764. Its butterfly shape is the expelled outer layer of a collapsing red-giant star. Off the other arm of Cygnus is the Ring Nebula (M57) in Lyra with its cosmic cheerio shape. It was discovered by Messier in 1779 and described as "like a fading planet." One theory explains the butterfly or ring shapes as a side or front view of the illuminated shell as it's formed by the magnetic field of the collapsing star. A central star can be seen, a white dwarf illuminating the spooky expanding shell.

Vulpecula is one of several faint smaller constellations surrounding Cygnus. It was originally called the fox and the goose, but the goose got cooked. The name Anser (goose) is the name of its brightest (4 mag) star. It also contains Brocchi's Cluster which looks like a coat hanger hanging in the dark closet of space. Nearby is the brighter Sagitta (arrow) which contains a modest globular cluster, M71. Below that is Delphinus (dolphin) with its boxy body nicknamed "Job's Coffin." Next is faint Equuleus (little horse) which is near two large globular clusters M15, and M2.

The best double star in Cygnus is the head of the swan, Alberio. A popular blue and gold, it's easy to separate in an amateur telescope. Another favorite is Epsilon Lyrae, the hamburger tasty double-double.

So the Swan, seen as the Northern Cross by the faithful and as a flying chicken by Arabs, has arms which embrace many fascinating deep sky objects.

Lee Collins

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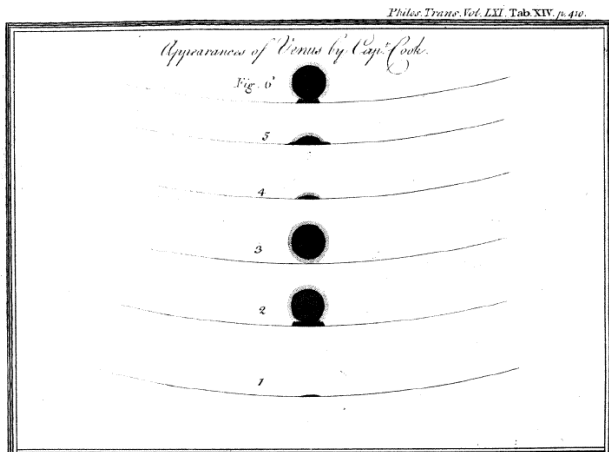
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You may have noticed the quotations sometimes placed at the top of your Nightwatch. I collected them on-line, but do not always know the circumstances surrounding their origin. "This sight...is by far the noblest astronomy affords." by Edmond Halley was such a case. I could not help but wonder what sight he was referring to.

Armed with my ancient lap-top and an internet connection, I began my adventure. All things are revealed to he who can google ... almost (I'm still looking for the historical price of propane). I quickly ascertained that Halley was referring to the transit of Venus in 1761. He died in 1742 and never saw this transit or his namesake comet. The first recorded transit of Venus was observed by Jeremiah Horrocks in 1639. Subsequent observations were recorded in 1761, 1769, 1874, 1882, and 2004. The pattern repeats at 8, 105 1/2, 8, 121 1/2 years.(1) Jeremiah Horrocks noticed a discrepancy in the astronomical tables of the day and recalculated the transit in 1639 less than a month before he projected an image of the sun onto a 6-inch piece of paper.(2)

All the excitement was caused by Halley's idea of using the transit of Venus to calculate the distance from Earth to the sun, also known as an "astronomical unit". Mercury was too close to the sun to be useful. By measuring the timing of the transit of Venus from far flung locations on Earth and using parallax, the au could be calculated. Many expeditions were dispatched including James Cooks "First Voyage of Discovery". First stop ... Tahiti! He observed the transit from a point on the north shore named Venus Point; probably not a coincidence. The only problem was an optical phenomenon known as the "black drop" effect. When the disk of Venus first contacts the edge of the sun, the disk of Venus stretches out toward the edge of the sun and reduces the accuracy of the timing.

The transit of 1874 was uneventful because it was not visible from Europe. The transit of 1882 was a different story. It was visible from the United States and Europe. Telescopes were everywhere. Novels were written about it; Sousa marches were performed; millions of people viewed the transit.(3)



The complete quote:



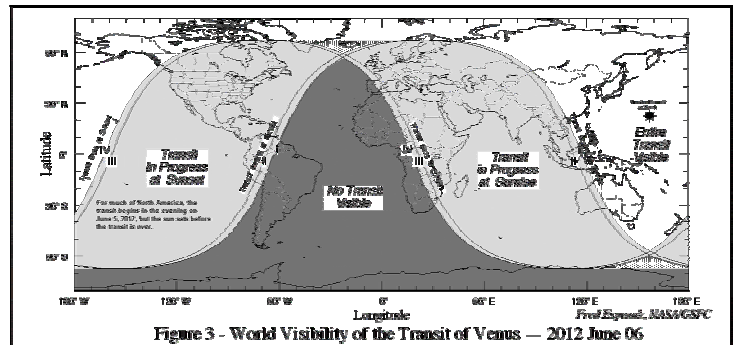
"This sight, which is by far the noblest astronomy affords, like the secular games, is denied to mortals for a whole century, by the strict laws of motion. It will be afterwards shown, that by this observation alone, the distance of the sun, from the earth, might be determined with the greatest certainty, which, on account of the parallax otherwise quite insensible, has not hitherto been precisely defined."(4)

So join with me on June 5–June 6 in 2012 for "a chance to stand beside Edmond Halley and James Cook and take a dip into the magic waters of astronomical history."(5)

John Stover

- (1) <http://www.transitofvenus.org/>
- (2) <http://365daysofastronomy.org/>
- (3) The Economist May 27th 2004, Josh Winn, Harvard-Smithsonian Center for Astrophysics
- (4) Edmond Halley. "De Visibili Conjunctione Inferiorum Planetarum cum Sole, Dissertatio Astronomica." Philosophical Transactions of the Royal Society 17 (1691): 519. English translation taken from C.Hutton, G. Shaw and R. Pearson. The Philosophical Transactions of the Royal Society of London, from their Commencement, in 1665, to the Year 1800; abridged, with Notes and Biographic Illustrations 3, 454. London: C. and R. Baldwin, 1809.
- (5) David Levy, Sky & Telescope

2012 Transit of Venus



Claremont, CA

Longitude -117.7197785 Latitude 34.0966764 Height 361 Time zone -8 daylight saving time

contact	date	time
1. ingress, exterior	2012 June 5	15.06.22
2. ingress, interior	2012 June 5	15.23.58
minimum separation	2012 June 5	18.25.31
3. egress, interior	2012 June 5	21.29.30*
4. egress, exterior	2012 June 5	21.47.33*

sun's setting and rising on June 5 and 6 19.55 05.44 horizon

mean cloud amount in June 53%



Grandview
Campground
July 2010

Photos by Ron Hoekwater

