nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

The history of astronomy is a history of receding horizons. .
Edwin Powell Hubble

Volume 31 Number 11 ***nightwatch*** **November 2011**

President's Message

Last Sunday night, I spent a couple of hours stargazing on Mount Baldy, with a friend who had never been.

It's always an interesting experience, showing someone the night sky through a telescope for the first time. At first, I am always trying to balance what's up in the sky with the time available. What are the best and brightest things I could show off, to give my first-time observing companion the most illuminating and moving experience? So I am usually thinking of objects that would be on anyone's 'best of' list. I don't expect to be seeing new things myself.

But despite that expectation, I do usually end up seeing new things: an asterism I'd never noticed on a star-hop to a familiar galaxy, or a detached bit of nebulosity I hadn't noticed before near a favorite object, or just the pleasing arrangement of the starfield itself. And this is usually because I'm trying to figure out how to tell the person I'm with where to look. "You'll see three stars making a triangle, and the triangle points at the nebula," or something like that. I end up being a better observer myself, because I'm trying to show someone else the way.

At one time or another, we have all felt the compulsion to share what we see, and that act of sharing makes us see more clearly. I am starting to think that this is not an accident. In fact, I suspect that it is one of the most profound aspects of stargazing. The next time you have the opportunity to show someone something new in the night sky, pay attention to your own experience and see if it is not deepened as well .

Matt Wedel

Christmas Party reminder!

The Christmas Party is Friday December 9 from 7pm to 9pm.
Sizzlin Skillets, NE of the corner of Foothill and Euclid, Upland
No advance deposit, order from the menu.
Please RSVP to Bill Connelly 714-329-4080.

Club Events Calendar

November 4 - General Meeting -
"The Power of Stars" by Dr. Bryan Penprase
November 26 - Star Party - Landers with
Riverside Astronomical Society

December 9 - Holiday Party - 7pm at Sizzlin Skillets Upland

January 5 - Board Meeting, 6:15
January 13 - General Meeting
January 21- Star Party - Afton Canyon

February 2 - Board Meeting, 6:15
February 10 - General Meeting
February 18 - Star Party - To Be Announced

March 1 - Board Meeting, 6:15
March 9 - General Meeting - Robert Piccioni
March 24 - Star Party - To Be Announced

April 5 - Board Meeting, 6:15
April 13 - General Meeting
April 21 - Star Party - To Be Announced

May 3 - Board Meeting, 6:15
May 11 - General Meeting
May 19 - Star Party - To Be Announced
May 31 - Board Meeting, 6:15

June 8 - General Meeting
June 16 - Star Party - To Be Announced

July 5 - Board Meeting, 6:15
July 13 - General Meeting

October General Meeting

PVAA President Matt Wedel opened the October meeting and Laura Jaoui immediately let everyone know that in the subscription issue, (not the newsstand issue), of National Geographic; there is an article on Matt Wedel. This is for his work on classifying a new dinosaur. (Actually the dinosaur is very very old and long dead, it's just new to us.)

The treasurer Gary Thompson urged all the holdouts to pay their dues. He will be giving the Astronomical League the PVAA membership roster so that they can continue to receive their magazine "The Reflector".

Lee was back this month and looked at anything that had a spooky nature to have a Halloween theme. Everything from "The Eye of God" to the moons of Uranus. Lee is always informative and entertaining.

Matt then presented the idea of a "Library Telescope" for the Claremont main library. This would be a 4.5 inch Orion "Star Blaster" Dobsonian. It was well received by the membership. This would be pretty much an exact duplicate of what the New Hampshire Astronomical Society is doing. For more information please go to this website: http://nhastro.com/ltp.php

Gary Gonnella, a member of PVAA, was our featured speaker. In the past he has come to the meetings and past around the photos he has taken. They have been true works of art. They are observatory quality, which he will modestly deny. Check out: http://astrogab.ning.com/profile/GaryGonnella

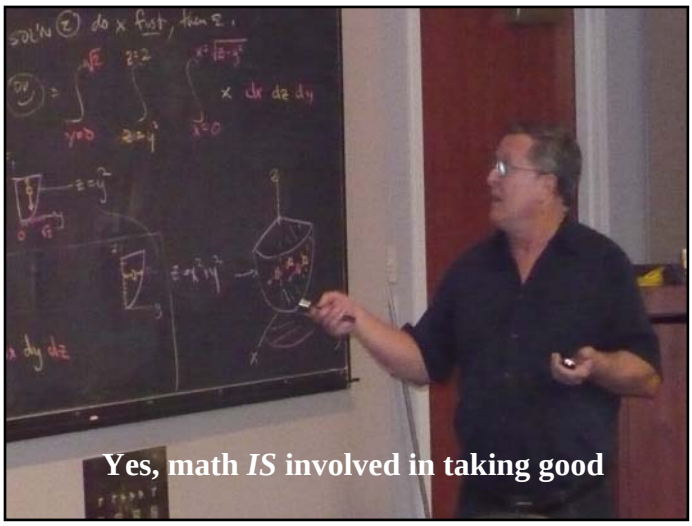
Gary started with a 4 inch reflector, and in 2002 bought an 8" Celestron. Later he got a deal on a Canon Rebel. This is when he started learning about the meaning of Field-Of-View, Pixel Size – (like .28 arc seconds per pixel versus 1.55 arc seconds per pixel.) He talked about narrow band filters. (He likes Astrodon filters. http://www.astrodon.com/)

If you want to get serious about astrophotography, there is going to be some math involved. He learned about noise – both "standard" and "random" that can affect your picture. He took several pictures at different exposure times and ambient temperatures with the camera lens *on* the camera to "see" the standard noise of the camera. He found that the colder the camera, the less noise it has. But once you know which pixels are "bad", you can adjust for it. He found that generally several 2 to 10 minute exposures are better than one long one because if a satellite or aircraft goes through the frame during the exposure, you haven't lost the whole night, just 2 – 10 minutes.

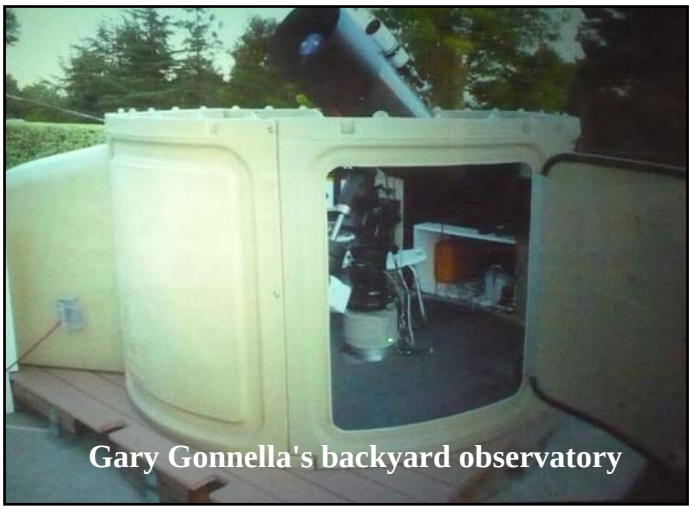
Currently Gary has a Celestron 14 inch FASTAR with an Orion 80mm guide scope. He spends a lot of time using the program "Nebulosity" by Stark Labs to stack and stretch his photos. See: http://www.stark-labs.com/nebulosity.html

Gary had so much information, that we just plain ran out of time. We will see if we can get a few workshops set up latter, or maybe a few before & after results - "If you do this, then you get that." - Anyway, it was a very good and informative talk .

Gary Thompson



Yes, math *IS* involved in taking good



Gary Gonnella's backyard observatory

Useful Links for Astrophotography

Last month club member Gary Gonnella gave us a wonderful presentation on the things he's learned as an astrophotographer. His talk included these links, which he has kindly passed on so that we can all benefit from them. Well done, Gary—hopefully we can wrestle you back to the podium before long to tell us more about your outstanding work!

Matt

www.stark-labs.com --- Nebulosity help file is very informative.
www.pixinsight .com --They have an incredible processing tool.
I am just learning to use it.
www.astrogab.ning.com --- A lot of good people willing to help.
http://www.corius.net ---------- Good source of information.
http://www.astrophoto.net ---------- Another good source.
http://apod.nasa.gov/apod/ - Often features amateur astrophotos.

How Does It Work?

Superman went faster than a speeding bullet. Now are neutrinos going faster than light?

In September Dr. Antonio Ereditato reported that his team had 16,000 measurements of bunches of neutrinos traveling 732 km through the earth from Cern Switzerland to Gran Sasso, Italy. They appear to have arrived 60 nanoseconds faster than if they had traveled at the speed of light.

The team searched for systematic errors, but couldn't explain their results. Dr. Ereditato is quoted as saying, "When you don't find anything, then you say 'well, now I'm forced to go out and ask the community to scrutinize this'."

It would take light 2.4 milliseconds to travel this far. One millisecond is a million nanoseconds. If there is an error, it is only a little bit larger than 60 nanoseconds. Many studies have been done to measure the speed of neutrinos and none have seen this so far.

Let's look at potential sources of error. First, when did the collision take place that generated the bunch of neutrinos? A clock must be the final reference, but first the collision must be detected. Then a signal must be generated to tell the clock when it happened. The problem goes away if the clock is off by 60 nanoseconds.

Light travels one foot in one nanosecond but the particles that trigger the detectors go a bit slower. Then the detector must generate a pulse which is sent to the clock. Based on photographs of the Cern interior, the distance traveled by the detector pulse is not trivial. I'm sure it's been measured many times, but could the pulse take 60 nanoseconds longer than the team thinks it does?

At Gran Sasso a similar detection of neutrino arrival must generate a pulse and stop a clock. How long does this take? How are the two clocks synchronized? How well do we know the 732 km distance between Cern and Gran Sasso? Does the sum of errors add to 60 nanoseconds?

I'm sure Dr. Ereditato and his team has asked these same questions and not found an error. But even he believes there is probably one or more that they have missed.

Within two weeks of publishing the results, 30 papers were submitted to various journals which tried to explain the data. None were immediately accepted by the Cern/Gran Sasso team.

But what if the measurements hold? How would that affect our thinking about faster than the speed of light? First, to my knowledge, Einstein never said nothing could go faster than the speed of light. He assumed the speed of light was a constant in any inertial system. The equations followed and were then interpreted.

It takes an infinite amount of energy to accelerate a mass to the speed of light. The term – square root [1-(v/c)^2], where c is the speed of light and v is the velocity of the mass – appears in the denominator. That means that if v exceeds c, the term becomes "imaginary" but is no longer infinite.

"Imaginary" simply means the term is multiplied by the square root of minus one. We don't have an interpretation of this in relativity. In electronics it is indicating a phase shift.

Sci-Fi fans and the press have jumped on the story. This is what "warp drive" is all about. It grabs the imagination. It's fun to think about.

The speed of neutrinos is important. Every mass has a wavelength - the smaller the mass, the larger the wavelength. Neutrinos have the smallest mass we know about. Photons have wavelength and the shortest ones ever measured are in the ballpark of the neutrino. Does something special happen here? Mass generates gravity and goes slower than the speed of light.

The fact that something has never been observed before doesn't mean it doesn't exist. But it is cause to be skeptical. Even the best teams make mistakes. It's easy to add 3 plus 2 repeatedly even though you were asked to multiply them.

Dr. Ereditato is also quoted as saying the results are "crazy." (The quotes are from Jason Palmer, BBC News.)

Ken Crowder

Library Telescope Program Follow-up

On Nov. 1, I was invited to speak about the proposed library telescope program to the Friends of the Claremont Library, which is the community support group for the Claremont Public Library. The Friends of the Library are very enthusiastic about the proposed program. They had lots of questions, mainly about the logistics of taking care of the telescope, which will be our job, and the rules regarding checking out the scope, which will be for the Friends and the library to decide. In order to start making these plans more concrete and sorting through those very necessary details, they would like to come up with a memo of understanding between the Friends of the Library, the library itself, and the PVAA. The people responsible for drafting that memo will be Friends chairperson Laura Bollinger, Claremont library director Don Slaven, and myself. We also talked about a possible timeline, and agreed that a launch in the mid-spring 2012 would be nice but possibly ambitious, and if it ends up being closer to summer, that's okay. We'd rather do this right than do it quickly. I will keep the PVAA board and you, the members, fully informed as we move forward, and of course I am always open to your questions and suggestions. Thank you for your own support; I think this will be a great thing for both the club and the community.

Matt

PVAA Officers and Board

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What's Up - Angelic Galaxies & A Deer Lick

The holiday movie "It's A Wonderful Life" starts out with five talking angelic galaxies who are conspiring to send a novice angel down to earth to save Jimmy Steward's soul in time for Christmas. This conspiratorial galactic group is Stephan's Quintet (pictured) in Pegasus. It was discovered by Edouard Stephan in 1877, making it the first known galaxy group. It's odd that they should act as angels because they are quite disturbed. Their gravitational interaction has left three of them twisted out of any ideal galactic shape. Of the five galaxies, the best shaped one (NGC 7320) doesn't interact with the other four because it's 40 million light years away while the other four are 290 million light years away. Two of these (NGC 7318A and 7318B) contort together in an embracing collision. Close by, NGC 7391 has its arms pulled out in violent starburst activity. Standing off from the group is seemingly unaffected elliptical NGC 7317.

Beautifully shaped galaxies photographed in visible light are often exploited to show an angelic view of "the heavens." In infared or X ray images they don't look so religiously reassuring.

Not far from Stephan's Quintet is a closer, brighter NGC 7331. This classic galactic spiral was discovered by Herschel in 1784. A large telescope will show a square asterism next to it nicknamed "the deer lick." The shapely NGC 7331 must be a deer licking this salty deep space cube made up of several galaxies even farther away than Stephan's Quintet. In spite of its rustic name all this is often called the Deer Lick Galaxy Group.

But there closer angelic galaxies to the south, on the other side of the "Great Square" asterism. They are the two companion galaxies to our Milky Way. The Andromeda Galaxy (M31) and the Triangulum Galaxy (M33) each in their namesake constellations. Along with our own galaxy (and some 30 dwarf galaxies) the three form what Edwin Hubble termed the "Local Group." Neighborly M31 and M33 are the most distant objects visible to our unaided eyes.

The Andromeda Galaxy is the closer of the two at 2.5 million light years. It is estimated to contain one trillion stars, while our Milky Way has a mere 400 billion. Although M31 is six times as wide as the full Moon, it's mostly the glowing 3.4 magnitude center that is seen in amateur telescopes.

The Triangulum Galaxy is the farthest of the three at 3 million light years, and home to only 40 million stars. It's also called "pinwheel" but since there are other pinwheels (M101) this can be confusing.

The observational history of Andromeda is one of larger and larger telescopes and appreciation. As early as 964 AD a Persian observer, Al Sufi, wrote of M31 as a "little cloud." With his small telescope Messier in 1764 listed it as bright nebula (fuzzy spot). In 1785, with a large telescope, Herschel termed it the Great Andromeda Nebula. By 1850 Lord Rosse's telescope (The Leviathan) reveals its spiral shape. In 1864, William Huggins took a spectrum and found it was not like gaseous nebulas but more starry in nature. This was confirmed in 1885 when a nova is observed in Great Andromeda. It was actually a supernova, but was downgraded to nova because everyone believed it was inside the Milky Way. Isaac Roberts first takes its photograph in 1887. He thinks it and other spiral nebulae are solar systems in the process of being born. In 1912, Lowell Observatory's Vesto Slipher discovers it to have the largest known velocity and moving in our direction. Heber Curtis in 1917 studies more nova and wonders why they're ten times fainter than normal nova. He forms a group that believes it to be outside our Milky Way. Along with other spiral nebula they call them "Island Universes." Conservative Harlow Shapley sticks to the position that our Milky Way is the entire universe and everything is within it.

In 1925, Edwin Hubble at Mt Wilson settles this debate by finding Cepheid variable stars. These are "standard candles" which determine that Andromeda Galaxy is at a distance outside the Milky Way.

Soon, Cepheids make Triangulum millions of light years away too. Gaseous nebula, globular clusters, and black holes have now been discovered and studied in both galaxies. The claim of an extra solar planet discovered in M31 is still under study.

Just south of Triangulum in Pisces (Fish) is a truly angelic galaxy, M74. Its strong spiral is popular on posters and as a background to music performances. Unfortunately, as a face on spiral at 32 million light years it's one of the faintest Messier objects for amateur astronomers.

Another object in this area that ranks as a faint Messier is M76, the Little Dumbbell planetary nebula in Perseus. But it's brighter than planetary nebula NGC7662, the Blue Snowball in Andromeda.

So there are many angelic galaxies and nebulae in our Universe. But some of them are the devil to try and see in an amateur telescope .

Lee Collins