



Newsletter of the Pomona Valley Amateur Astronomers

Time is a storm in which we are all lost.  
 William Carlos Williams

Volume 37 Number 11

*nightwatch*

November 2017

### Speaker Announcement

Our speaker in November is Ken Elchert. He will speak on the Star of Bethlehem.

### Club Events Calendar

**November 3 General Meeting**

**November 18 Star Party - Landers GMARS**

**November 29 Board Meeting**

**December 9 Holiday Party**

**No December Board Meeting**

**January 5 General Meeting**

**January 13 Star Party**

**January 24 Board Meeting**

**February 2 General Meeting**

**February 10 Star Party**

**February 21 Board Meeting**

### An Invitation from a Neighboring Astronomy Club

This is Steve Caron, I am part of the astronomy club in Twentynine Palms called Sky's the Limit.

I am writing to see if some astronomers would like to join us for a large public outreach event called the Night Sky Festival. It is a two night star party we put on in collaboration with Joshua Tree National Park. It will be held November 10 and 11 at Sky's the Limit observatory.

If anyone from your group is interested, let me know. We are looking to fill Sky's the Limit (and possibly some other locations in the park) with telescopes and knowledgeable astronomers. There will most likely be over 500 guests on each night.

<http://skysthelimit29.org/>

<https://www.facebook.com/skysthelimit29/>

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### PVAA General Meeting 10/06/17

Terry Nakazono gave a quick presentation of trip to Australia last August 16<sup>th</sup> – 31<sup>st</sup>. It was his first time in the Southern Hemisphere. He saw the Sydney Observatory (founded in 1858) and the 1822 Parramatta Observatory. While he was there he spent 4 nights in the city, and 4 nights in the countryside. He observed 42 deep sky objects.



1874 photograph of Sydney Observatory



Transit Piers in Parramatta Park, facing Southeast & facing West.

### NIGHTFALL 2017

Star Party at Borrego Springs, Ca.  
Friday-Sunday, Oct. 20-22.

I booked my reservation about a week in advance, at a Resort less than five miles away from the Nightfall location: Palm Canyon Hotel & RV Resort. I attended the free lectures on Eyepieces, Road Tripping and Flying with your Astronomy Gear, The Laser Interferometer Gravitational Wave Observatory (LIGO), and A Solar Eclipse Show & Tell.

Some of the other fun activities included a Night Sky Tour at the outdoor Amphitheater by Dennis Mammanna, a magic show, and a night time Scorpion hunt with ultra violet flash lights, which makes them glow in the dark. I observed two of them. I also attended the evening Potluck Dinner, located at the picnic pavilion next to the Amphitheater. Woodland Hills Telescope sponsored an Ice Cream Social at the location's Bar & Grill Restaurant (with all the toppings).

There were numerous telescopes and binoculars throughout the site. I observed the Planet Uranus, the Owl Nebula, the Ring Nebula, the Pleiades, Globular Clusters, Andromeda, Cassiopeia, Vega, Moon, and Solar Observing. The sky was a bit cloudy and windy during the day on Friday, but by nightfall, very dark and beautiful. The evenings were mostly warm, no jacket needed.

*Cori Charles*



Tim Thompson was the main speaker of the night. He is retired from JPL, a Mt Wilson associate, and a member of the LA Astronomical Society. His talk was about the distances of the cosmos and the history of the universe as we know it. Just for a frame of reference he gave us some distances.

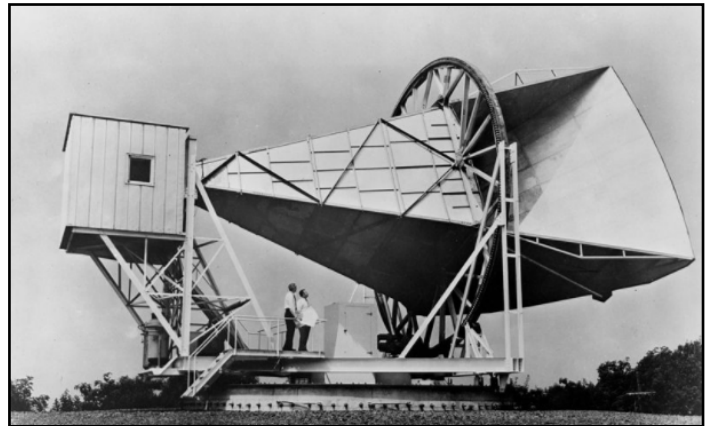
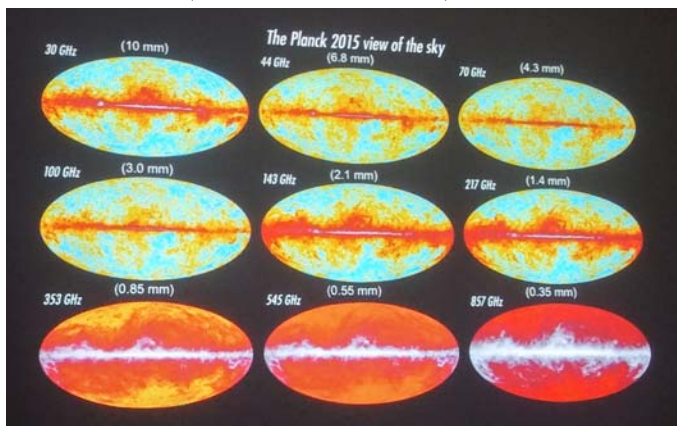


1 AU (Astronomical Unit) is 149,597,870,700 meters. 149.6 million kilometers is the mean distance from the center of the sun to the center of the earth. In 2015 a Parsec was defined as:  $648000\pi$  astronomical units, about 3.26 light-years. (A light-year is 9,460,730,472,580,800 meters, or the distance light will travel in a year.

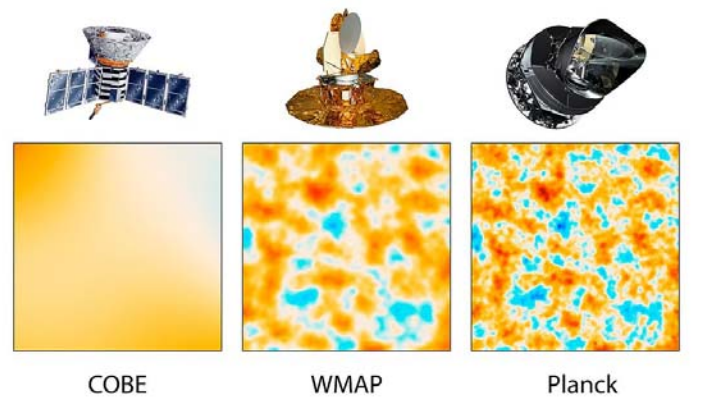
William Herschel, in his ‘**On the Constitution of The Heavens**’ put a Parsec at less than a fifth of what it is now. Harlow Shapley, using the Mt Wilson observatory ‘finds’ the Milky Way, and starts to map it out. Later Edwin Hubble proved that M31, the Andromeda Galaxy, was not part of our Milky Way galaxy, but much further away. His first calculations put it at 697,640 LY away. (Now it is measured at ~2.5 million LY distant.) At first Hubble did not believe that the universe is expanding. He performed several experiments that proved he was wrong. Now we have “Hubble’s Law”: The recessional velocity of a galaxy increases with its distance from the earth, which implies that the universe is expanding. An American astronomer Vesto Slipher provided the first evidence of strongly red-shifted nebulae a decade before. George Lemaitre came up with and published in 1927 the expanding universe theory. Two years before Hubble’s article was published.

Modern cosmology came into being with Albert Einstein and his General Relativity and Alexander Friedmann’s ‘Friedmann equations’. These expanded on Einstein’s theory and became known as the ‘Friedmann-Lemaitre-Robertson-Walker metric’.

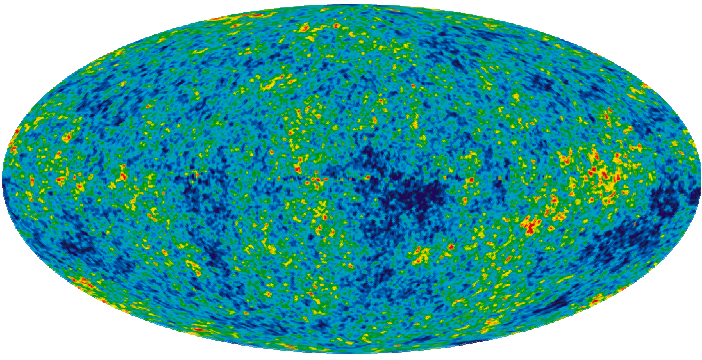
In 1964 Arno Penzias & Robert Wilson discovered Cosmic Microwave Background (CMB). Robert Dicke developed the Dicke radiometer, a microwave receiver. He used that to set a limit on the CMB to 20 Kelvins. The CMB finally killed the steady state universe theory. CMB has been measured at 2.72548 K +/- 0.00057 K. (zero K is absolute zero.)



The Holmdel Horn Antenna – used by Penzias and Wilson to discover cosmic microwave background.



By NASA/JPL-Caltech/ESA - <http://photojournal.jpl.nasa.gov/catalog/PIA16874> (direct link), Public Domain, <https://commons.wikimedia.org/w/index.php?curid=25226768>



Cosmic Microwave Background - 9-year WMAP image

The European spacecraft: PLANCK, which operated from 2009 to 2013, was the highest resolution of the CMB by spacecraft. Several studies are still coming out of the spacecraft’s data.

Gary Thompson

## What's Up? - Cygnus, Swan / Northern Cross

The largest late Summer into early Autumn constellation is Cygnus the Swan. In Classical mythology it wings flew down the Milky Way as one of Zeus' disguises to seduce queen Leda and give birth to Pollux one of his many starry bastard children. Later Christians saw it as a holy Northern Cross to accompany the smaller Southern Cross. Astronomers can see that it contains a great many remarkable cosmic objects.

Notable is blue white Deneb (meaning tail), a first magnitude (1.3) giant that is 2600 light years from Earth and 160,000 times brighter than our Sun. Along with Altair (in Aquila) and Vega (in Lyra) it forms one corner of the "Summer Triangle" of three very bright stars.

At the head end of the Swan is Alberio a beautiful double star. A 3.1 magnitude orange giant at 386 light years has a 5.1 mag blue green companion. A colorful double attractive in any telescope. Alberio is an Arab corruption of something like "the flyer" or the "flying chicken". Another fainter double is 61 Cygni with two orange dwarf stars at 5.2 and 6.1 mag. they orbit each other every 68 years. A close 10 light years distant they were the first stars to have their parallax and their distance from Earth measured in 1838. Because it is one of our closer stars it has been observed to move through the years and so has the nickname of Piazzi's Flying Star.



Cygnus also has many notable gaseous nebulas. The huge North American nebula (NGC 7000) is one of the largest visible emission clouds. A

dark dust cloud forms the "Gulf of Mexico" in this continent shaped object. Nearby is the fainter IC 5070 called the Pelican Nebula. In this area is a dark totally star blocking cloud named the Northern Coalsack (there's also a Southern Coalsack). But most photographed in Cygnus is the Veil Nebula broken up into NGC 6960, 6995 and 6992. It was all discovered by William Herschel in 1784. They are the expanding gaseous traces of a star that went supernova some 5000 years ago. The brightest most photographed part is NGC 6992. Smaller more telescopic nebulas in Cygnus include the Crescent Nebula (NGC 6888), the Cocoon Nebula (IC 5146) and the Egg Nebula (PK 80) which is a planetary exploded star remnant.

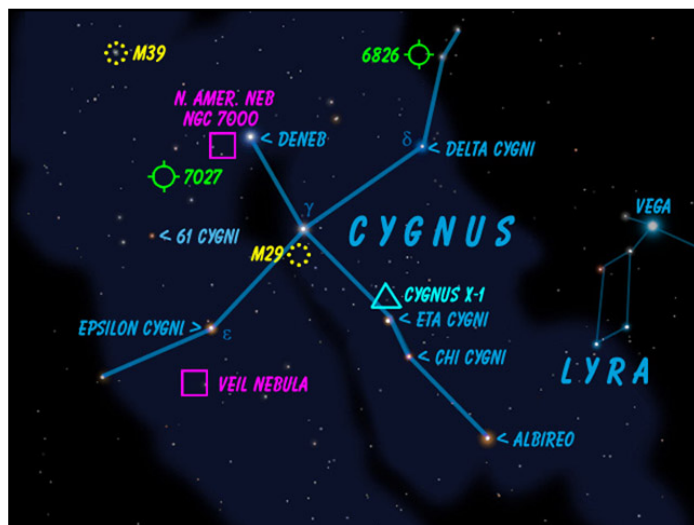
Another planetary nebula is the 8<sup>th</sup> magnitude Blinking Planetary (NGC 6826). Looking at the 10th magnitude star remnant at its center and then looking away is said to produce a "blinking effect".

Here is a powerful radio source is Cygnus A caused by two distant galaxies in violent collision.

Here is also the first known X-ray stellar source, now widely accepted to be a black hole (Cygnus X-1) was discovered in Cygnus in 1964 as the result of a high altitude rocket flight. It is still one of the strongest X-ray origins visible from Earth. Cygnus X-1 belongs to a high-mass X-ray binary system about 6,000 light years away. It includes a blue supergiant variable star. A stellar wind produces an accretion disk around the X-ray source. A pair of jets perpendicular are carrying energy of infalling material away into space and Earth.

A black hole is a still a mysterious cosmic phenomenon that is by definition invisible and so very difficult to study. But they do influence their surroundings in ways that can be detected. It's a region of space where gravitational forces have become so strongly collapsed that not even light can escape from powerful interior forces. The term "black hole" was first mentioned by physicists in reference to Cygnus X-1. It would come to mean a completely gravitationally collapsed star. Cygnus X-1 would be one of the first black holes to be recognized and studied.

In conclusion, Cygnus (Swan and Northern Cross) is a constellation flying along an area of the Milky Way extremely rich in a wealth of deep space phenomenon.



Lee Collins





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## Spooky in Space: NASA Images for Halloween

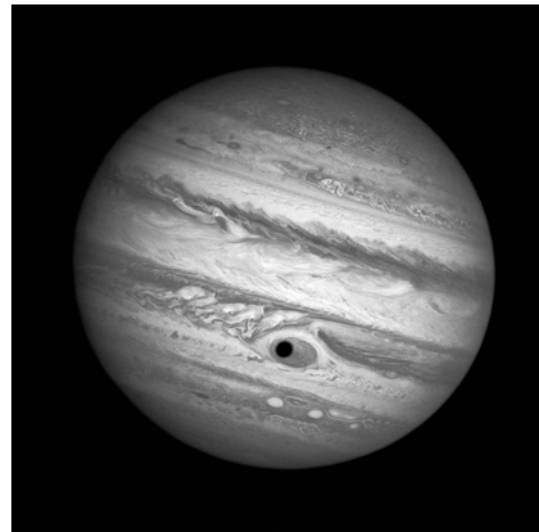
Have you ever seen a cloud that looks sort of like a rabbit? Or maybe a rock formation that looks a bit like an elephant? Although you know that a cloud isn't *really* a giant rabbit in the sky, it's still fun to look for patterns in images from nature. Can you spot some familiar spooky sites in the space images below?

This might look like the grinning face of a jack-o'-lantern, but it's actually a picture of our Sun! In this image, taken by NASA's Solar Dynamics Observatory, the glowing eyes, nose and mouth are some of the Sun's active regions. These regions give off lots of light and energy. This causes them to appear brighter against the rest of the Sun. Active regions are constantly changing locations on the Sun. On the day this image was captured, they just happened to look like a face!



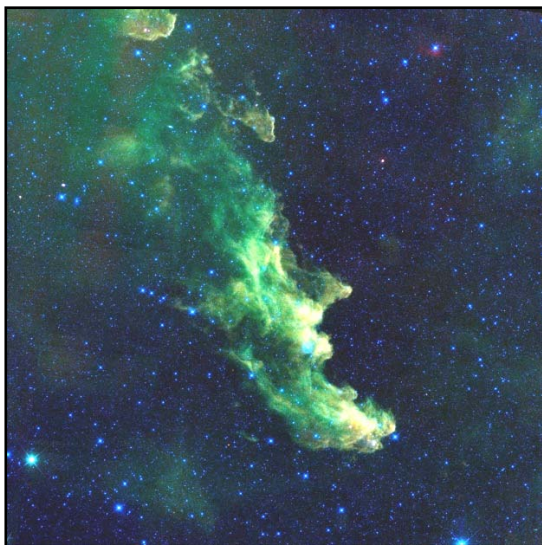
Credit: NASA/GSFC/SDO

This is a Hubble Space Telescope image of Jupiter. Do you notice something that looks like a big eye peeking back at you? That's actually the shadow of Jupiter's moon Ganymede as it passed in front of the planet's Great Red Spot. Jupiter's Great Red Spot is a gigantic, oval shaped storm that is larger than Earth and is shrinking. It has been on Jupiter for several hundred years, and its winds can swirl up to 400 miles per hour!



/Credit: NASA/ESA/A. Simon (Goddard Space Flight Center)

Credit: NASA/JPL-Caltech

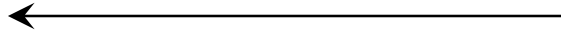


Can you see the profile of a witch in this image? This image, from NASA's Wide-Field Infrared Survey Explorer, shows the Witch Head nebula. The nebula is made up of clouds of dust heated by starlight. These dust clouds are where new stars are born. Here, the dust clouds happen to be in the shape of an open mouth, long nose and pointy chin.

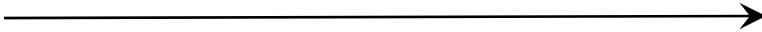
Credit: NASA/JPL-Caltech/Univ. of Wisc.



The Black Widow Nebula looks like a giant spider in space. It is a huge cloud of gas and dust containing massive young stars. Radiation and winds from these stars push the dust and gas around, creating a spider-like shape. This image is from NASA's Spitzer Space Telescope.



Did a skeleton lose one of its leg bones on Mars? Nope! It's just an image of a Martian rock. NASA's Curiosity rover captured this image. The rock was probably shaped to look this way over time by wind or water. If life ever existed on Mars, scientists expect that it would be small organisms called microbes. So, it isn't likely that we'll ever find a large fossil on Mars!



To learn some fun planet facts and make a planet mask, check out NASA Space Place:  
<https://spaceplace.nasa.gov/planet-masks>



Credit: NASA/JPL-CALTECH/MSSS

*Linda Hermans-Killiam*