

Vandenberg Amateur Astronomical Society  
presents  
**The Sidereal Times**



Messier 17 (see page 5)

**Meeting News:**

At the June meeting we talked about the Solar eclipse event in August and where totality will be best viewed. Solar viewing Glasses were handed out and Jana explained how they should safely be used.

**Reminder:** VAAS club meeting Manzanita School Teachers Lounge September 8<sup>th</sup> 7:00 Pm.



**Lunar Calendar:**

New Moon Sept 20th

Full Moon Sept 6th

Aug 21<sup>st</sup> Eclipse event sky at observatory



**Presidents Message**

**President's Comments:**

What a thing to have been in Madras, Oregon, to experience Totality! My thanks to our VP Jana Hunking for making me aware of a tent spot among 300 Airstream units on Lake Simstusus, along the Deschutes River. Though we traveled separately, we shared most of the meals and activities; I wish you could have experienced her amazing Oregon geology talk before sixty attendees AND seen her in full teacher mode as Totality closed in! DO NOT miss our September meeting! I herein defer to Jana's excellent coverage of the event and her thanks to all of you who made the morning at our Observatory a total success. She speaks for us both. But first I will share the reaction to Totality that I recorded as soon as sunlight returned:

Totality was gorgeous! The sky was a deep blue, the corona a gossamer, spoked, white shimmer, a spiked leaf. And at the center of it all, this alien, absolutely impenetrable, obsidian disk hanging there, our Moon as we never see it. Incredible. Incredible. Incredible."

Ever Skyward,

*Tom*

**Vice Presidents Comments**

Both the President and the V-P, and Secretary/ Treasurer of VAAS drove up the Oregon to observe the Totality of the Solar Eclipse on Aug. 21. Tom, Jana and her sister both ended up in a private eclipse party in a PGE campground at Pelton Dam on Lake Simtustus, about 8 miles NW of Madras, Oregon ( north of Bend.) Vince, I heard was staying at John Day Fossil State Park which was SE of where we were in Oregon. They said about ½ million people were to be coming to that area to watch the eclipse. My sister and I left at 1pm only to drive to Bend, 51 miles away, but it took 7 Hours.....with so many others with the same idea! The Totality WAS Amazing- for each of us a different experience- For me (Jana,) it was so totally unusual to see, and beautiful. Tom will have to tell you in person. I did get photos of the people watching it, projections through binoculars, and a colander, and one really good photo from my Nikon camera with a 40 zoom of the Corona- which seemed so large...stretching out into space! I will bring these photos to the next meeting on **September 8. Don't Miss Out on this Meeting!** I am so glad we had a large turnout at the Observatory, even though the fog was hanging around so long, and I know some missed it in Lompoc for that reason. **A Big Thank You to Vahan** for opening and operating the Observatory, to **Andy and Lisha** for helping set up signs, advertising, operating their telescope, and having extra Airmen available to help direct the public to the dome, and answer questions. Thanks also to **Dave McNally** for helping in the observatory and **Louise Gray** for helping with observatory crowd control.

*Jana.*

## Events

**Sept 5<sup>th</sup>** Neptune at opposition. The blue planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. This is the best time to view and photograph the planet. Due to its extreme distance from Earth it will appear as a small blue dot in all but the largest telescopes.

**Sept 12<sup>th</sup>** Mercury will be at its greatest Western elongation of 17.9 degrees from the Sun. It will be at its highest point above the horizon in the morning sky just before sunrise. Look low in the East.

**Sept 16<sup>th</sup>** *Star party at the Observatory.*



**Sept 22<sup>nd</sup>** September equinox. The equinox occurs at 20:02 UTC. The Sun will shine directly on the equator and there will be nearly equal amounts of day and night throughout the world. First day of Fall (Autumnal equinox) in the Northern hemisphere and first day of Spring (Vernal equinox) in the Southern hemisphere.

**Sept 23<sup>rd</sup>** *Star party at Figueroa Mt. Site 1.5.*



**Sept 30<sup>th</sup>** *Star Party at the observatory.*



Aug 21<sup>st</sup> Eclipse event at observatory



## Star party's and Events

**June** Several star parties and events cancelled due to weather.



**July 22<sup>nd</sup>** Star Party Figueroa Mountain. Last night was Beautiful. 70° & 3 mph winds. No bugs after sundown. Vince and I with members to be Mike and Joel. We all did a lot of visual work. We saw Comet 2015 Johnson, ISS (International Space Station), a huge handful of Clusters, Swan, Trifid, M81-M82, Blue Snowball, Ring, Dumbbell, Neptune, Uranus, meteors and much, much more. We were there until after 2:00 AM. Good night under the stars.



**July 29<sup>th</sup>** Star party at the observatory. Cancelled due to weather.



**Aug 12<sup>th</sup>** Star party at the observatory. Cancelled due to weather.



**Aug 21<sup>st</sup>** Eclipse event at the observatory. Vahan, Dave McNally, Andy Wallace and his wife Lisha and Louise Gray on site. Sky was heavy overcast with the Marine layer. Set up the observatory for solar mode. We had over 100 visitors, over half were USAF Officers and Enlisted personnel in uniform and the rest were families with children and lots of old and young singles. Distributed handouts that Jana made up to the attendees and the solar viewing glasses. Andy Wallace set up his 11 inch scope with solar filter. Andy's wife Lisha had refreshments available for the attendees. About 10:30 Am the sun peeked out from behind the clouds for a brief viewing then went back behind the clouds. This went on for the remainder of the morning. Everyone had a chance to see part of the eclipse, some in Andy's scope and some in the observatory scope. There were many questions and answers going on in between viewing. In general all were well pleased with the event, considering the weather, and some were interested in VAAS. Secured and departed at 11:45 Am. It was a successful event for VAAS.



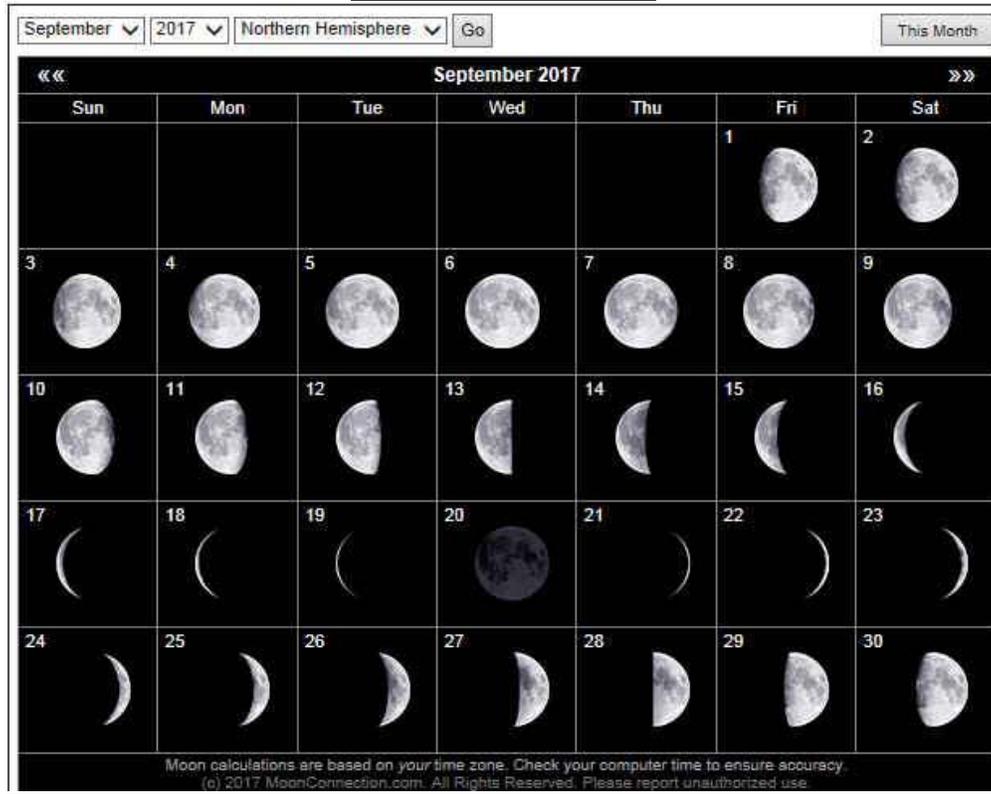
**Aug 26<sup>th</sup>** Star Party at the observatory. Cancelled due to weather.



Aug 21<sup>st</sup> Eclipse Madras Oregon



## September 2017 Moon



Full 6th, New 20th, Last Quarter 13th, First Quarter 28<sup>th</sup>.

### Moon Facts

The Moon orbits the Earth once every 27.322 days. It also takes approximately 27 days for the Moon to rotate once on its axis. As a result the Moon does not seem to be spinning but appears to observers from Earth to be keeping almost perfectly still. Scientists call this synchronous rotation.

The orbit and the rotation aren't perfectly matched. The Moon travels around the Earth in an elliptical orbit. When the Moon is closest to the Earth its rotation is slower than its journey through space allowing observers to see an additional 8 degrees on the Eastern side. When the Moon is farthest the rotation is faster so an additional 8 degrees is visible on the Western side.

Aug 21<sup>st</sup> Eclipse event @ observatory



Totality Madras Oregon





**Photo Courtesy Craig Fair**



**The Omega Nebula** Messier 17 NGC 6618 also called the Swan, the Horseshoe, and the Lobster nebula is a region of star formation and shines by excited emission caused by the high energy radiation of young stars. Unlike in many other emission nebulae these stars are not obvious in optical images but hidden in the nebula. Star formation is either still active in this nebula or created very recently. A small cluster of about 35 bright but obscured stars seems to be imbedded in the nebulosity. The Omega nebula is about 5000 to 6000 light years from Earth and it spans some 15 light years in diameter. The cloud of interstellar matter of which the nebula is part of is roughly 40 light years in diameter and has a mass of 30,000 solar masses. The total mass is estimated to be 800 solar masses. It is considered to be one of the brightest and most massive star-forming regions in our galaxy. Its local geometry is similar to the Orion nebula except that it is viewed edge-on rather than face-on.

The open cluster NGC 6618 lies imbedded in the nebulosity and causes the gases to shine due to radiation. The actual number of stars in the nebula is up to 800, 100 of spectral type earlier than B9 and 9 of spectral type O plus a thousand stars in formation in its outer regions. It is also one of the youngest clusters know with an age of just 1 million years. The luminous blue variable HD 168607, located in the South East part of the Omega nebula is generally assumed to be associated with it; its close neighbor, the blue hyper giant HD 168625, may be too. The Swan portion of M17, the Omega nebula, in the Sagittarius nebulosity is said to resemble a barber pole. As for diffuse nebula the overall brightness is difficult to estimate and is given discordantly in the sources. Older estimates are given at 7.0 magnitude and were performed in Northern observatories. Modern compilations list it as brighter, about 5.0 to 6.0 magnitude.

Image Capture, Site 1.5 Figueroa Mt, QHY10 camera, Celestron 9.25 inch SCT, CGEM mount. 300 sec exp 20 lights, darks and bias files. Processed in Lightroom and Topaz DeNoise programs. Stacked in Deep Sky Stacker.

## **For What Its Worth**

### **A changing Orbit**

The rotational period of the moon wasn't always equal to its orbit around the Earth. Just like the gravity of the moon affects ocean tides on the Earth, gravity from Earth affects the moon. But because the moon lacks an ocean Earth pulls on its crust creating a tidal bulge at the line that points toward Earth. Gravity from Earth pulls on the closest tidal bulge trying to keep it aligned. This creates tidal friction that slows the moon's rotation. Over time the rotation was slowed enough that the moon's orbit and rotation matched and the same face became tidally locked forever pointed toward Earth. Just as the Earth exerts friction on the spin of the moon the moon also exerts friction on the rotation of the Earth. As such the length of day increases a few milliseconds every century.

### **Here's how it works.**

The moon causes tides in the ocean. The moon's gravity pulls on the Earth and it pulls more strongly on the face of the Earth that is facing the moon. The land on the Earth does not particularly care about this extra tug but the oceans do. Water is lifted towards the moon and flows to make a bulge that faces the moon. (There is a bulge in back of the Earth too pointing away that is related). As the Earth turns this bulge flows through the oceans always approximately facing the moon, we see it as tides moving up and down. The Earth does the same thing to the moon – tidal forces from Earth are about 80 times stronger than the moon's tidal forces on Earth, because Earth's mass is greater, however there are no oceans on the moon so no liquid sloshes around like it does on Earth. The Earth's tidal force deforms the moon itself though ever so slightly. Back when the moon used to rotate relative to us there was a little land bulge on the moon's surface that wants to face Earth. When the moon used to rotate the rotation would carry the bulge with it. This set up a tug of war, the moon's rotation pulls the bulge away and the Earth pulls back on the bulge against the rotation. This then basically acted like a bicycle brake. The Earth's tidal forces constantly acted to pull against the rotation slowing the rotation down until it stopped. So now the bulge points directly at Earth, it is not very big but it is still there.

A way to visualize why we see only one side of the moon is to walk in a circle while always facing the middle of the circle. While it may not feel like it, you are actually rotating your body while revolving around the circle. When you have walked halfway around the circle you face the exact opposite direction compared to when you started. You complete 1/2 revolution in 1/2 rotation, meaning the same rate of revolution and rotation.

### **RECAP**

You are probably wondering why it takes the same amount of time for the moon to complete one revolution around the Earth as it does to complete one rotation around its axis. This is a phenomenon known as Tidal Locking. The force of Earth's gravity pulling on the moon causes it to bulge slightly in the direction of the Earth. Imagine that the rotation of the moon about its axis were faster or slower than its orbit around the Earth. Because the force of gravity is inversely proportional to the square of the distance between the two bodies ( $F = GMm/r^2$ , where **M** and **m** are the masses of the 2 objects, **G** is the gravitational constant, and **r** is the distance between the 2 objects). The force on the bulge closer to the Earth is greater than the force on the bulge farther from the Earth. Thus the force of Earth's gravity pulling on the bulge would produce a torque (force that causes rotation) on the moon causing the moon's rotation to slow down until the period (amount of time to complete one cycle) of rotation of the moon about its axis and the orbit of the moon around the Earth are the same.

### **Moon Statistics**

**Distance from Earth** – 238,857 miles (Average), 384,400 Km (Average)

**Size** – 2,260 miles in diameter, about 27% of Earth (3,475 Km).

**Gravity** – 17% Earth Gravity.

**Orbital Period** – 29.5 days

**Length of Day** – 708 hours.

**Travel time** - By Apollo 11 = 3 days. If you could drive it by car 135 days at 70 mph (113 Km/hr).

## *Club Officers*



**President  
Tom Gerald**



**Vice President  
Jana Hunking**



**Treasurer  
Vince Tobin**



**News Letter Editor  
Vahan Yeterian**

*“Astronomy compels the soul to look upward,  
and leads us from this world to another”.*  
*(Plato)*



## Club Meeting

**Reminder** Club meeting Sept 8th at 7:00Pm  
Manzanita School.

**Star Parties (as always weather permitting)**

## Other Astronomy Club Meetings

**Central Coast Astronomical Society**

Link to web site...

<http://www.centralcoastastronomy.org/>

**Santa Barbara Astronomical Unit**

Link to web site...

[http:// www.sbau.org/#AU\\_EVENTS\\_Calendar](http://www.sbau.org/#AU_EVENTS_Calendar)

**Night Time Bright Objects** (no scope required)

Link to “Heavens Above” web site

[http:// www.heavens-above.com/](http://www.heavens-above.com/)

(Iridium Satellite)

(ISS Visible Pass)

Be sure to set the nearest location from their  
pull-down menu.

The web site link below will take you to some

Great Milky Way interactive images and how

It was developed. (Type it in the search box.)

<http://skysurvey.org/>

VAAS.

Dave McNally is the VAAS Web Site Serf/Minion

Dave

