

# Bays Mountain Astronomy Club

☞ *Next Meeting: Dec. 6* ☞

## REFLECTIONS

Greetings fellow Star Watchers, Another month is upon us. Our November meeting was a very busy one. We started the meeting with the Welcome. November's constellation was Lepus, the hare, presented by Terry Alford. Terry shared information about this little constellation that many people dismiss when they are doing their observing.

After Terry's presentation, we moved right into our keynote speaker for the night. Dr. Donald Luttermoser's presentation was "The Death of the Earth" which focused on the life of our star, the sun. I want to thank Dr. Luttermoser for coming out and sharing this interesting subject with the members present.

Following the keynote presentation, we had our business meeting. We are starting plans for the annual dinner meeting which will be in January. Three additional places were offered as consideration for the dinner, they were Jack's City Grille in Johnson City, TN, Food City banquet center, Kingsport, TN & "Athens Steak House" in Bristol, TN. Which brings the total to 7

BY WILLIAM TROXEL

places to choose from. Our goal is to have this list narrowed down to two and then we'll vote for the one we want at the December meeting. Anyone wanting to help gather details on the three locations I just listed, please let me know before the meeting.



Adam showed some 2014 astronomy calendars from "The Year In Space" that are available for purchase. If you would like to get a copy, let me know so that we can order as a group. The cost for the wall and desk calendars are \$12.95 each, but lower in cost with quantity, down to \$9.95 each.

Connect with me if you would like more information or would like to order via e-mail or call me.

Updates on the track of ISON was given to members present. Because of the early morning timing and no view to the east, the club will not be offering any public viewing of this comet. I reminded everyone of the importance of coming out and supporting the Park staff during the StarWatches during November.

I have started gathering pictures and video to put together for the movie that I've discussed in the past on the web site. Over the next few weeks, I hope to have enough to get

## Calendar

### Special Events

Jan. 11 (snow date 18); 6:30 p.m. Annual Dinner. Dr. Richard Ignace will speak. Topic and Place TBA.

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BMACers are always welcome to help with this nighttime viewing program for the public. Please show up about 30 min. prior to help set up.

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Feb. 7 Topic and speaker TBA.

a good representative picture of our club's events.

I contacted the Boy Scouts about becoming a location for the scouts to come to get their astronomy merit badge requirements completed. They seemed very interested in working with us. I will keep you posted as the details are worked out.

Our December meeting will be featuring the constellation Aries the Ram presented by BMAC'er Nathaniel Wentzel. Following his presentation, our keynote speaker will be Brad Dunn talking about "The Magnetic Shift of the Sun." I hope to see you at the December 6th the meeting!

Until next time, clear skies.

## STAR STUFF

BY TERRY ALFORD

December and the holiday season is upon us. But don't forget to spend some time observing stars and planets and comets in the night sky. It gets dark early this month and it is colder than November on average. Just dress very warmly and enjoy the Solar System parade.

First, the Sun is at the solstice at 12:11 p.m. EST on the 21st. And thus, Winter officially starts. Brrr! To me it is still odd that the coldest part of Winter is still weeks away. I know about the "lag" effect of Earth's warming and cooling with the seasons but.... Anyway, be thankful that the days will be getting longer after the 21st. Colder, but longer days... oh well.

The Moon is new on December 2nd. On December 5th, a thin crescent Moon will appear to the upper right of a crescent shaped (through a telescope) Venus. This will be a good opportunity to view the similarity of the visual appearances of these two orbs and their relative positions in the skies. Of course there is a difference in millions of miles of distance but the similarity in shapes make me remember Galileo and his observations and conclusions more than 400 years ago. The Moon is full on December 17th.

Mercury is in the morning sky, below and to the left of Saturn. It brightens to -0.8 magnitude early in the month but soon races towards the Sun and is gone from view for a while.

Venus shines very brightly at almost -5 magnitude this month. If you are lucky enough to be able to view from a dark site on a moonless evening try to see the shadow cast by Venus. The planet is racing around

the Sun to "catch up" with the Earth and its crescent shape grows taller and thinner in a dramatic way. Towards the end of the month it will be easy to see the thin crescent even with a small scope or binoculars that are held or mounted steadily. If you have young eyes that "see" very small objects you may be able to see Venus' crescent without optical aid. It is possible.

Mars is rising a little after midnight during December and brightens 0.3 mag to +0.9 mag by the end of the month. It is still small, though. If you happen to go out before dawn to view some of the comets visible now be sure to take a long look at the small ruddy disk. You might catch a peek of a polar ice cap. Mars will be a much more interesting telescopic object in the next few months as it nears opposition on April 8.

Jupiter will be putting on a grand show this month. It rises pretty early and is high in the sky well before midnight. Jupiter will really be "king" of the eastern evening sky. At a magnitude of -2.7 and a large diameter of 47" it is a prime telescope target. Small scopes and even binoculars can show the four bright Galilean moons of Io, Europa, Ganymede and Callisto. Try to use as big a scope that you have access to and as much magnification as the seeing conditions will allow. The Jovian atmosphere can show a wealth of detail.

Saturn rises a couple of hours before dawn this month and is kinda low in the southeast. Still, the rings are opening up rather nicely to a maximum of 21°. Saturn is at opposition May 10.

Uranus is visible in Pisces and Neptune in Aquarius, both in the southwest during the early evenings this month.

The Geminid meteor shower will peak on the morning of December 14th, right after midnight. Unfortunately, the Moon will be nearly full. But, this very reliable meteor shower should feature some bright and relatively slow streaks of lights for several days before the peak. Also, these meteors show up earlier in the evening than most other showers such as the Perseids. Another odd thing about the Geminids is that they are not associated with a comet but rather with a small asteroid, 3200 Phaethon.

During mid November, Comet ISON (C/2012 S1) underwent an outburst of some sort. It brightened by two magnitudes. It is still too early to know what will happen with this comet as perihelion approaches November 28th. [Ed.: As of Nov. 20th, the comet is around 4.5-5 mag and viewable in binoculars. The comet has been brightening each day.] We will see. By the way, there are several other morning comets visible now (mid November). Check out <http://cometchasing.skyhound.com> for finder charts and other good to know stuff. Of course there are many other internet sources for info on how to find and view these comets. Why are all these icy visitors morning objects? Dang, it is about time to have a bright evening comet. Ahh, the days of Comet Hale-Bopp.

*HAPPY BIRTHDAY PROJECT MERCURY*

BY ROBIN BYRNE

This month we celebrate the official start to America's manned space exploration. The story, however, begins much earlier. As early as 1956, the United States Air Force was beginning to explore the idea of sending men into space and had solicited proposals for spacecraft designs. Ultimately, the design proposed by Max Faget was agreed upon. This design was shaped like a cone, with the blunt end covered with a heat shield used during reentry.

The launch of Sputnik 1 by the Soviet Union on October 4, 1957 caught the United States by surprise. It took four months for the U.S. to successfully launch a satellite into orbit. Meanwhile, the Soviets had already launched a second satellite with a dog, Laika, on board. The U.S. was looking bad. We had to act fast to catch up. The next logical step would be to send a man into space. In October of 1958, Project Astronaut was approved by Congress, but President Eisenhower didn't like the name, because it gave too much importance to the person in the capsule. On December 17, 1958 Project Mercury was officially announced.

Named for the fleet-footed Roman god, the Mercury program was meant to get a man into space as quickly as possible. But first, we would need men qualified to take the ride. Eisenhower wanted the astronauts to be chosen from the ranks of military test pilots. They had to be between the ages of 25 and 40, no taller than 5 ft 11 in, and have a college degree in engineering.

Starting with a group of 508 candidates, 110 were chosen to be interviewed, and from those, it was narrowed down to 32 men to be put through a variety of tests. Basic physical health was evaluated. Their ability to withstand noise, vibrations, g-forces, isolation and heat was tested. They were given an array of psychological tests to evaluate their mental stability. Ultimately, seven men were chosen: Malcolm S.



Carpenter, Leroy Gordon Cooper, John H. Glenn, Virgil I. "Gus" Grissom, Walter M. Schirra, Alan B. Shepard, and Donald "Deke" Slayton.

Before we sent anyone into space, the spacecraft needed to be developed and tested. From 1958 to 1961, the Mercury capsule underwent design, construction and testing. The first tests were unmanned, which is good, since many of the flights were unsuccessful. The next step was to test the vehicle with an

animal on board. While the Soviet Union preferred using dogs for their tests, the United States used monkeys and chimpanzees. On January 31, 1961, a chimp named Ham was launched on a suborbital flight, going straight up and down. Despite going higher than planned, the mission was the needed success to send a man into space on the next mission.

Once again, the Soviet Union beat the U.S. to the punch. On April 12, 1961, Yuri Gagarin completed one orbit of the Earth and successfully returned. One month later, Alan Shepard became the first American in space on May 5, completing a 15 minute suborbital flight. Gus Grissom followed-up with a second suborbital flight, but we had yet to achieve orbit. Finally, on February 20, 1962, John Glenn became the first American in orbit, completing three orbits before returning home. Each subsequent Mercury flight pushed the spacecraft to longer and longer missions, culminating with Gordon Cooper's 36 hour flight in May of 1963. The only Mercury astronaut to not fly during this time was Deke Slayton, due to an irregular heartbeat. He was reassigned to the Astronaut Office and chose the crews for each mission. Slayton ultimately did get to fly in space in 1975 as part of the Apollo-Soyuz Test Flight mission, America's first joint mission with the Soviets.

*(Continued on page 5)*

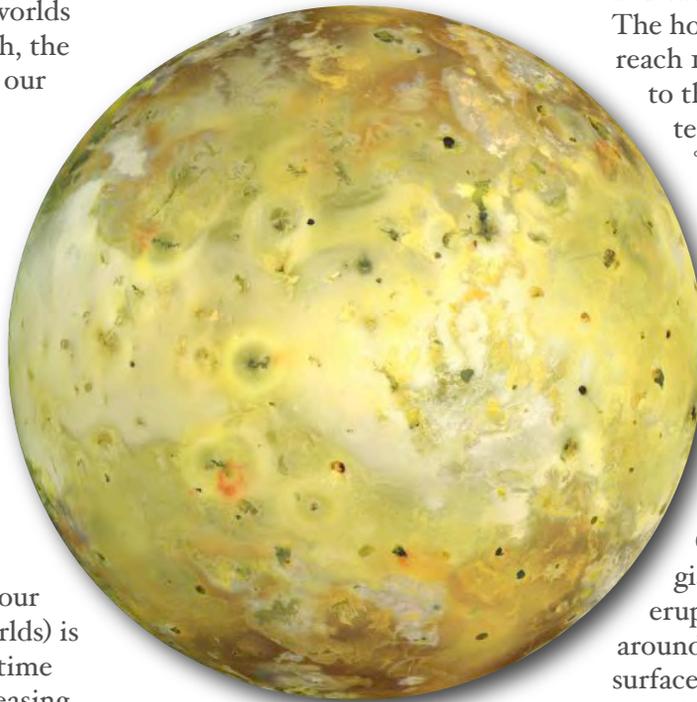
## NASA SPACE PLACE

**The Most Volcanically Active Place Is Out-Of-This-World!****By Dr. Ethan Siegel**

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large. Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior. This is caused by a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!

Yet, volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth and despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes. 4.5 billion years is more than enough time for it to have cooled and become stable. Yet, Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view

it up close. When the Voyager 1 spacecraft visited, it found no impact craters on Io, but instead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometers high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.



*Io. Image credit: NASA / JPL-Caltech, via the Galileo spacecraft.*

Where does the energy for all this activity come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average. Far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause

the world itself to stretch and bend by an astonishing 100 meters at a time! This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface opens up, that internal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface

temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions too (like Enceladus around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's innermost moon, Io!

Learn more about Galileo's mission to Jupiter: <http://solarsystem.nasa.gov/galileo/>.

Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: <http://spaceplace.nasa.gov/volcanoes>.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

*MISCELLANEOUS***Happy Birthday  
by Robin Byrne***(continued from page 3)*

Throughout the Mercury Program, the United States was playing catch-up with the Soviets, and we didn't surpass them until the Gemini missions in the mid-1960's. Despite our shaky start, it was only a couple weeks after Alan Shepard's flight that President Kennedy announced that we would go to the Moon before the decade was out. That bold initiative gave everyone involved the push needed to make great strides in the next eight years. Had it not been for the first tentative steps of Mercury, we would never have taken one giant leap for mankind.

## References:

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Project Mercury

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**Regular Contributors***WILLIAM TROXEL*

William is the current chair of the club. He serves as activities coordinator for a local retirement living community.

*TERRY ALFORD*

Terry is also a founding member since 1980 and has been chair many times, as well. He has worked as an astronomy lab instructor at ETSU since 2001.

*ROBIN BYRNE*

Robin has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

*ADAM THANZ*

Adam has been the Editor for almost all of the years since 1992. He is the Planetarium Director at Bays Mountain Park as well as an astronomy adjunct for NSCC.

# The Bays Mountain Astronomy Club



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## Dues:

The Bays Mountain Astronomy Club requires annual dues for membership. It covers 12 months and is renewable at any time.

## Rates:

\$16 /person/year

\$6 /additional family member

If you are a Park Association member, a 50% reduction in fees is applied.

Find out more at our website:

<http://www.baysmountain.com/astronomy/astronomy-club/>

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