

Bays Mountain Astronomy Club

☞ *Next Meeting: Apr. 4* ☞

REFLECTIONS

Greetings fellow amateur astronomers! April is here starting the second month of spring StarWatches at Bays Mountain. Hope you had a chance to get out and be a part of the fun. If you haven't, I hope you will choose to come out this month. I also want to encourage you to come out for SunWatch on clear Saturday and Sunday afternoons. During the last few solar sessions, visitors have been able to see a lot activity on the sun's surface.

The theme of March's meeting was to finish cleaning up the roll-off and domed observatories. We also checked out the telescopes. Once we finished those chores, we did some enjoyable observing. I want to thank everyone that helped.

I have started working on one of the many Astronomical League's Observing program. It's my hope that I can complete several of the projects and get the patches and certificates. Have you looked at the programs? They are designed to work with all levels of amateur astronomers. Our club's coordinator is Adam Thanz. Should you have any questions about the program, please

BY WILLIAM TROXEL

feel free to contact Adam or myself. Being new to the program and how it works, I will defer to Adam for most of the questions. However, I will be happy to help in any way I can.

After our February meeting when Ms. Denis shared her experience with the "Mars One" project, I started thinking about astronomy from the point of view of our neighbor Mars. Ms. Denis did not share any of her ideas or thoughts about astronomy from there, though it still started my mind going at full speed.

After a number of dead ends on the research of ideas about what the first celestial objects these new Martians would see if they looked into the night sky, I have decided that should they (the Martians) look into the night sky they would not have to drive to a remote area to get a dark sky. The IDA would be able to list the entire planet as a dark sky location. Wonder if they would be able to see the same field of view as we have or would it be wider? I feel sure the sun would look farther then it does to us. Maybe they would see the exact sky we see on a clear night here.

I wanted to remind everyone that we will have Astronomy Day on



Calendar

Special Events

May. 10 Astronomy Day.

SunWatch

Every Sat. & Sun., 3 - 3:30 p.m.,

Mar. - Oct., weather permitting.

BMACers are always welcome to help.

StarWatch

8 p.m.: Mar. 29

8:30 p.m.: Apr. 5, 12, 19, & 26

BMACers need to arrive 30 min. early to set up.

BMAC Meetings

7 p.m., Discovery Theater:

Apr. 4 Brandon Stroupe: "What You Can See with a DSLR Camera;" Constellation Quest: Terry Alford: Total Lunar Eclipses of 2014; Amateur Astronomer Corner: Adam Thanz: Planispheres.

May 2 Tom Rutherford "The NITARP AGN Project;" Constellation Quest & Amateur Astronomer Corner: TBA.

May 10th at Bays Mountain Park. We still need people to man the tables and help with the extended SunWatch.

More information will be forthcoming on times and numbers of volunteers needed. Please mark the date on your calendar.

May's meeting will feature a new segment called "Amateur Astronomer Corner," this program will focus on simple, easy to understand demonstrations and displays that anyone starting out or thinking about starting in our hobby can follow. Adam Thanz will be the first with short presentation on using a planisphere. Our goal is to offer this each month. Please share this new part of our program with anyone you know that is, or you think would be, interested in coming.

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STAR STUFF

BY TERRY ALFORD

If you like viewing the planets, then this month is for you. Though, Mercury is an exception. During the first couple of weeks of April, it can be glimpsed low on the eastern horizon right before dawn.

Venus will dominate the eastern sky during the month, brighter than -4 magnitude. It is in a half lit phase [Ed.: Called dichotomy] so it will look a lot like the first quarter Moon through your scope. Unfortunately, there is little detail to be seen.

Mars is at opposition on April 8, so it will be visible all night long. It rises about dusk and doesn't get high overhead until around midnight...

which is the best time to

observe it. This month it stays pretty close to magnitude -1.5 and a diameter of 15". This is the nearest Mars has been to us since 2007.

Two big asteroids are also in opposition this month. Vesta will be respectfully bright at mag 5.8 on April 13. Soon thereafter on the 15th (Tax Day!!), Ceres will be mag 7.0. Both can be seen with instruments as small as binoculars. It has been a long time since I have observed an asteroid. This will be a great opportunity for all of us to view these big chunks of rock.

Jupiter is still a showpiece almost directly overhead in Gemini as darkness falls. It stays around magnitude -2 all month and the disk shrinks slightly from 38" to 35". Now that the weather has warmed, spend some time viewing Jupiter at the highest power the atmosphere will allow.

Saturn is rushing towards opposition in early May so it will be a great target all of April. Bear in mind, though, Saturn is in Libra and thus is pretty far south. It is at it's brightest of the year at +0.1 magnitude. One reason it is so bright is that the rings are tilted nearly 22°.

Look for Saturn to rise about 10:30 p.m. at the start of

the month and 8:30 p.m. by month's end.

Our Moon will be the source of a couple of interesting, entertaining and educational events this month. On the night of April 14-15, there will be a Full Moon that will go into total

eclipse. It has been three long years since our last total lunar eclipse. Totality will start at 3:07 a.m. and end at 4:25 a.m. Still, the eclipse is in partial phase until 5:33 so get up as early as possible and catch as much of the eclipse as you

can before heading off to work... or back to bed. Earlier in the month on the 3rd, a crescent Moon slowly glides through the Hyades open star cluster and occult several stars along the way. Use binoculars or a scope at lower magnification to watch the stars "twink out" over the night. This will start soon after sunset and last until moonset. It has been about 13 years since we last witnessed this event. Wind up your Brownie camera and take some pics.

There is a named meteor shower this month, the Lyrids. The shower will peak on the morning of April 22 but there will be a last quarter Moon in the sky that will wipe out the fainter meteors. 20 meteors per hour is about average for the Lyrids.



TENNESSEE SPRING STAR PARTY 2014
May 2-4, 2014

This year marks the tenth annual "Tennessee Spring Star Party" (TSSP) held at Fall Creek Falls State Park (FCFSP).

TSSP is designed for those who are interested in astronomy and has assembled a group of mostly amateur speakers with events that will be of interest to all who love the night sky.

FCFSP is one of Tennessee's more remote State Parks and has exceptionally dark skies. Attendance is free, but does not include food nor lodging.

For more details, go to:
<https://www.facebook.com/events/698845590145990/?ref=22>

HAPPY BIRTHDAY ARNO ALLEN PENZIAS (FROM THE ARCHIVES)

BY ROBIN BYRNE

Our April honoree is a man who has made a big bang in more than one way. Arno Allan Penzias was born in Munich, Germany on April 26, 1933 to Karl and Justine Penzias. His father made a good living as a leather broker until 1938, when all Jews of Polish origin were ordered to be deported to Poland. The Penzias family, however, were fortunate. Upon arrival at the border, they were told that it was past the deadline for any new immigrants to enter Poland. That probably spared their lives. Many people who had entered Poland were housed in the open, where more than half froze to death.

Penzias' father made every effort to leave Germany. When England agreed to accept 10,000 Jewish children, Arno and his younger brother, Gunther, were sent off alone. Soon after, their parents acquired the paperwork to join the children. As soon as they could, the family moved to the United States. They arrived in New York City in January, 1940.

Penzias graduated from Brooklyn Technical High School in 1951 and entered City College with the plan to major in chemical engineering. In his first year, he discovered physics and changed his major. He graduated in 1954 in the top ten percent of his class.

After graduation, Penzias joined the army, where he served as a radar officer for two years. From there, he became a researcher at the Radiation Laboratory of Columbia University and began work on his graduate degrees. He received his M.A. in 1958, and his Ph.D in 1962.

His research had involved building a maser amplifier and doing astronomical observations. His first

job, as a member of the technical staff at Bell Labs, allowed Penzias to continue with his work. While at Bell Labs, he worked on radio communications, including work on the Telstar communications satellite. In 1963, Robert W. Wilson joined the staff and began a partnership with Penzias that would last for many years.



Arno Penzias Image from:
http://www.nobelprize.org/nobel_prizes/physics/laureates/1978/penzias-facts.html

One of their first jobs was to work with a very sensitive radio antenna for use in radio astronomy and satellite communications. However, there was a problem. No matter where they looked, there was a background hiss that they could not eliminate. Penzias and Wilson explored a variety of possible

sources, including the Milky Way, the Sun, and droppings from the pigeons that were nesting in the antenna, but nothing they did got rid of the noise. In 1965, Penzias mentioned the problem with a colleague in Boston and discovered that Princeton physicist Robert Dicke had predicted just such a noise should exist as a remnant of the Big Bang.

Penzias and Wilson had provided the first experimental proof of the Big Bang. In 1978, they shared the Nobel Prize for Physics for this discovery. Over the years, Penzias has risen through the ranks at Bell Labs, but continued to participate in research. Penzias discovered carbon monoxide and other compounds in interstellar gas clouds. In 1973, along with Wilson and Keith Jefferts, Penzias found the presence of deuterium (heavy hydrogen) in interstellar sources. This discovery helped to provide clues to the conditions of the Universe shortly after the Big Bang.

Besides being a superb scientist, Penzias is also an inventor and holds several patents. Among his patented inventions are a system for identifying participants in a teleconference and a computerized public transportation system.

In addition to his scientific work, Penzias has been actively involved with humanitarian and political efforts. He served as vice-chairman of the Committee of Concerned Scientists, which works for freedom of scientists in totalitarian countries. He has also worked for the freedom of all people who experience persecution. Part of his Nobel Prize money was donated to organizations that work to protect young people and Jewish immigrants.

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NASA SPACE PLACE

Old Tool, New Use: GPS and the Terrestrial Reference Frame

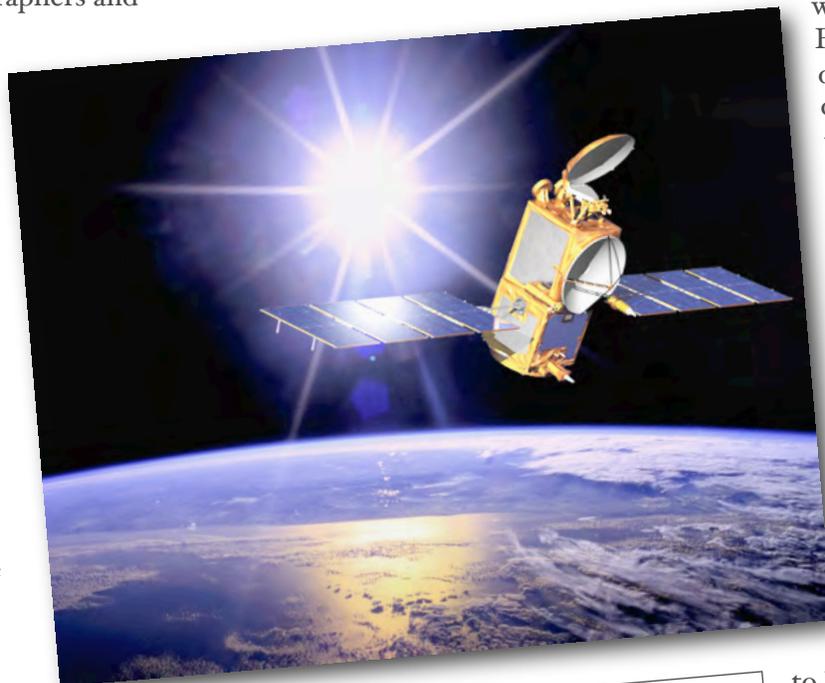
By Alex H. Kasprak

Flying over 1300 kilometers above Earth, the Jason 2 satellite knows its distance from the ocean down to a matter of centimeters, allowing for the creation of detailed maps of the ocean's surface. This information is invaluable to oceanographers and climate scientists. By understanding the ocean's complex topography—its barely perceptible hills and troughs—these scientists can monitor the pace of sea level rise, unravel the intricacies of ocean currents, and project the effects of future climate change.

But these measurements would be useless if there were not some frame of reference to put them in context. A terrestrial reference frame, ratified by an international group of scientists, serves that purpose. "It's a lot like air," says JPL scientist Jan Weiss. "It's all around us and is vitally important, but people don't really think about it." Creating such a frame of reference is more of a challenge than you might think, though. No point on the surface of Earth is truly fixed.

To create a terrestrial reference frame, you need to know the

distance between as many points as possible. Two methods help achieve that goal. Very-long baseline interferometry uses multiple radio antennas to monitor the signal from something very far away in space, like a quasar. The distance between the antennas can be calculated based on tiny changes in the time it takes the signal to reach them. Satellite laser ranging, the second method, bounces lasers off of satellites and measures the two-way travel time to calculate distance between ground stations.



Artist's interpretation of the Jason 2 satellite. To do its job properly, satellites like Jason 2 require as accurate a terrestrial reference frame as possible. Image courtesy: NASA/JPL-Caltech.

Weiss and his colleagues would like to add a third method into the mix—GPS. At the moment, GPS measurements are used only to tie together the points created by very long baseline interferometry and

satellite laser ranging together, not to directly calculate a terrestrial reference frame.

"There hasn't been a whole lot of serious effort to include GPS directly," says Weiss. His goal is to show that GPS can be used to create a terrestrial reference frame on its own. "The thing about GPS that's different from very-long baseline interferometry and satellite laser ranging is that you don't need complex and expensive infrastructure and can deploy many stations all around the world."

Feeding GPS data directly into the calculation of a terrestrial reference frame could lead to an even more accurate and cost effective way to reference points geospatially. This could be good news for missions like Jason 2. Slight errors in the terrestrial reference frame can create significant errors where precise measurements are required. GPS stations could prove

to be a vital and untapped resource in the quest to create the most accurate terrestrial reference frame possible. "The thing about GPS," says Weiss, "is that you are just so data rich

when compared to these other techniques."

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MISCELLANEOUS

Happy Birthday

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In 1998, Penzias officially retired, but did not stop working. He now serves as an advisor for various companies in Silicon Valley that work on developing new technologies.

Observational proof of the Big Bang was one of the key moments that led to the widespread acceptance of this controversial idea. Although there are still people who refuse to believe this theory, more and more observational evidence has accumulated that continues to confirm the basic premise that our Universe had a beginning, including a recent discovery that confirms the inflationary model. Our understanding of the Universe and our origins has been enhanced by the work of Arno Penzias. For that, we honor him.

Resources:

Arno Penzias Biography

<http://www.nea.com/Partners/Bios/Menlo/APenziasBio>

<http://www.infoplease.com/ce6/people/A0838219.html>

Penzias, Arno Allen

<http://www.infoplease.com/ce6/people/A0838219.html>

<http://www.infoplease.com/ce6/people/A0838219.html>

MediaMente: Arno A. Penzias

http://www.mediamente.rai.it/mediamentetv/learning/ed_multimediale/english/bibliote/biografi/p/penzias.htm

http://www.mediamente.rai.it/mediamentetv/learning/ed_multimediale/english/bibliote/biografi/p/penzias.htm

http://www.mediamente.rai.it/mediamentetv/learning/ed_multimediale/english/bibliote/biografi/p/penzias.htm

Nobel Laureate Arno Penzias Retires After 37 Years at Bell Labs by Gordon Bishop

<http://www.bell-labs.com/user/feature/archives/penzias/>

NASA Space Place

(continued from page 4)

You can learn more about NASA's efforts to create an accurate terrestrial reference frame here: <http://space-geodesy.nasa.gov/>.

Kids can learn all about GPS by visiting <http://spaceplace.nasa.gov/gps> and watching a fun animation about finding pizza here: <http://spaceplace.nasa.gov/gps-pizza>.

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

Reflections

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I am still seeking speakers for upcoming months. I will continue to ask for your help. Many of you have interests in aspects of this hobby that may not be mainstream, but are still part of our very broad hobby. I want to invite you to share your interest with the entire club as a keynote speaker.

May's meeting will also feature Terry Alford for sharing the year's full lunar eclipses as our "Constellation Quest" for the month. Our Keynote speaker will be BMAC's own Brandon Stroupe. His topic: "What You Can See with a DSLR Camera." If you have any interest at all in using a camera on the night sky, you don't want to miss this presentation.

See you at the next meeting. Until next time, clear skies.

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



Edited by Adam Thanz:
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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/>

🍏 Made on a Mac!

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