

# Bays Mountain Astronomy Club

☞ *BMAC Picnic: July 26* ☞

## REFLECTIONS

Greetings fellow amateur astronomers! June's meeting was another good one with Jason's hosting of "Appalachian Skies - Spring" and Greg Love's "Binoculars for Astronomy." Thank you, Greg & Jason for your excellent and informative presentations.

It's time for the annual picnic! We'll be going to Natural Tunnel State Park in VA on July 26th. We'll be at the Gazebo and is open to family members. Maps from Bays Mountain to the park and the Natural Tunnel map can be found in this issue and on the club web page on the Bays Mountain Park website. If you still need help, let me know and I will send you turn by turn directions and e-mail them to you. The picnic will start at 6 p.m. rain or shine. Eating will start around 6:45 p.m. The star party that follows is weather permitting and is open to the park campers. The park will shuttle them up to our location.

We ask for everyone attending to bring a dish to share. The Bays Mountain Park Association will provide paper and plastic, some 2 liter sodas, and ice. I forgot to tell you at the last meeting that everyone needs to bring a chair(s) as there is

BY WILLIAM TROXEL

no available seating at the location. If you want to bring your scope, please feel to do so. We can always use more scopes. Hope to see you on July 26th.

I wanted to thank each of you for the honor you showed me by electing me as your chairman for another year. I take this responsibility very seriously. I will do my best to be the face of Bays Mountain Astronomy Club for you and the public. I still believe that we can continue to make our club a group we can all be proud of and a place that others will enjoy visiting. Please feel free to contact me anytime. Again thank your for your support.

I wanted to give you an update on the Boy Scout outreach initiative. I have submitted all the paperwork and completed all the background items that the BSA requested. I am just waiting for the final results from them. I have started putting together information books for both observatories and Adam & Jason. Once we get the final approval, I will have a check sheet to give each of you and explain the process.

Sally Hale has agreed to help me with some of the correspondence for events. Thank you, Sally, for your

## Calendar

### Special Events

July 26 *BMAC Annual Picnic. Meet at the Gazebo at Natural Tunnel State Park in VA, 6 p.m. Bring a dish to share along with your own chair and a telescope.*

### SunWatch

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

Mar. - Oct., weather permitting.

BMACers are always welcome to help.

### BMAC Meetings

7 p.m., Discovery Theater:

Aug. 1 Meeting et al.TBD.

Sep. 5 Meeting et al.TBD.



willingness to do this. Should you have any contacts in areas that may have free information that we could use at Astronomy Day programs, please get that information to me so that we can get requests out to them in a timely manner. Greg Love has agreed to help me with planning future Astronomy Day programs as well as developing other club events for consideration by the members. Be watching for updates. If you would like to serve or be a part of other activities, I would love to talk to you about ways to get you involved in our club and it's goals.

I have posted the themes for the upcoming meetings on [bmaastro](http://bmaastro) in the area of Constellation Quest and topics for Amateur Astronomer Corner. I welcome your ideas for topics and constellations for the upcoming meetings.

Until next month, clear skies.

## STAR STUFF

BY TERRY ALFORD

Let us see what is going on in the Solar System this July. It will not get really dark until around 10 p.m., so spread on some skeeter repellent and get prepared to stay out late. But before we do some nighttime observing, don't forget the Sun. Ol Sol is still putting on a show. Many sunspots are often visible with a white light filter. In H-alpha light, the Sun varies from day to day with prominences and filaments and sometimes a flare. I clearly remember the SUNday in 1999 that was a recommended project of the International Year of Astronomy planners. Dr. Gary Henson (ETSU) and two lab assistants set up two 8-in Schmidt/Cassegrain telescopes and two PSTs at the Gray Fossil Site. The 8-in scopes were equipped with white-light filters and of course, the PST only worked in H-alpha light. I dropped by to help, but with four scopes set up all we saw was a bland Sun. No sunspots, no prominences, nothing but a featureless solar disk. So take advantage of viewing our star while a lot of activity is still going on.

Mercury puts on a pretty good show towards the middle of the month. It will then be to the lower left of Venus. The tiny planet reaches greatest western elongation of  $21^\circ$  on July 12. If you put a scope on it at fairly high power (and the air is steady) you should see a half lit disk.

Venus is still in the morning sky but it is dimming down to -3.8 magnitude. It also shrinks slightly in diameter to 11".

The Moon will be just past first quarter when it makes a close appearance with Mars on July 5. On the 7th, it will come very close to Saturn. By the way, Full Moon is on

Saturday, the 12th and New Moon on Sunday, the 27th.

On July 3, the Earth reaches aphelion, or it's farthest distance from the Sun. It is amazing how many non-astronomy folks still think that the Earth is CLOSEST to the Sun during the middle of Summer.

The Earth is rapidly speeding away from Mars in our two perspective orbits. Thus, the "Red Planet" will shrink in diameter down from 9.7" to 7.9" by month's end. It also dims in magnitude from 0.0 to +0.4. If you want to tweak a few last details out of Mars with your scope plan on observing at twilight when the planet first becomes visible. Oh, and Mars has another close conjunction with Spica. It is that retrograde motion thing again. In July, Mars and Spica will be only  $1.3^\circ$  apart. That is barely more than the width of your index finger held at arm's length.

Our two largest asteroids, Ceres and Vesta continue their dancing closer and closer. Although they are physically far apart, they will appear as almost touching each other from an Earth-based observer. On July 4 and 5, these two big hunks of rock will be just 10 arc minutes apart. Use a finder map online to locate these bad boys. At magnitudes 8.5 and 7.8, they will even be visible in binoculars.

Jupiter is very low in the western sky at the start of the month and by mid-month it disappears into the Sun's glare.

Saturn is in western Libra and it is still an excellent telescopic target. It dims only slightly to -5 mag by the end of the month. But the rings are

tilted favorably at  $21^\circ$  and Saturn is still a lovely and striking sight.

Uranus and Neptune are now visible in the morning sky. In fact they are near the meridian around dawn. Go to *Sky and Telescope* or *Astronomy* mag's web pages for finder charts.

There are three known minor meteor showers this month. Minor but fairly long lasting. They are the Alpha Capricornids, the Delta Aquarids and the Pisces Austrinids, all coming from the south. So if we see some meteors flying from the south during our annual picnic there is a good chance we will be seeing Delta Aquarids. This particular shower peaks on July 28 but runs from July 24 to August 6.

**StarFest 2014**

The details for our annual astronomy convention/star gathering event from our club has been set. The dates are October 17-19, 2014.

Read all about it here:

<http://www.baysmountain.com/astronomy/astronomy-club/?GTabs=4>

## HAPPY BOOK REVIEW: "EMPIRE OF THE STARS"

BY ROBIN BYRNE

**"Empire of the Stars: Obsession, Friendship, and Betrayal in the Quest for Black Holes" Reviewed by Robin Byrne**

This month, we return to the ol' bookshelf. A recent trip included a stop in a used book store, where I found "Empire of the Stars" written by Arthur I. Miller. The book is about Subrahmanyan Chandrasekhar and his life, focusing on his discovery that there is a limit to the mass of a white dwarf.

We begin with Chandra's early life. He was brought up in a very proper Indian household. His father was a civil servant working for the railroad, but Chandra's uncle, Raman, was a well known physicist, and there was clearly a rivalry between Chandra's father and Raman. Chandra began to show signs of greatness while in school, when he performed research with his uncle, published his first papers, and gave public lectures. By the time he finished college, he was clearly a rising star, so it was natural that he would travel to England to attend Cambridge, where he would work on his PhD. It was on the ship, traveling to England, that Chandra made his discovery: beyond a certain mass, a white dwarf will collapse to nothingness. He couldn't

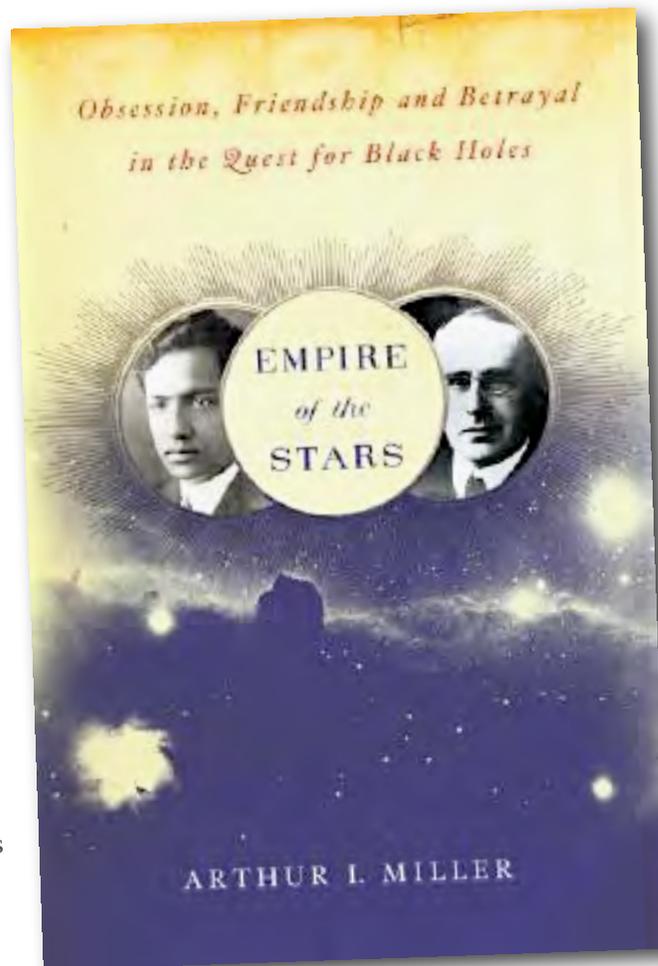
wait to share this breakthrough with the world.

At Cambridge, Chandra worked with Arthur Eddington. Eddington was considered the preeminent expert on stars, so it was natural for Chandra to latch onto him. However, Eddington had his own ideas about stars, and

Eddington tore his arguments apart. If Chandra had won his audience at first, Eddington made sure Chandra had no supporters by the time he was through. It was a slaughter. Chandra never fully recovered from this public humiliation.

The book takes us through all of Chandra's life and work, but this early setback clearly left its mark. Even after Chandra was vindicated, and won the Nobel Prize in Physics for this discovery, he didn't feel appreciated. While at Cambridge, Chandra did not receive the same offers of positions as his white colleagues. Prejudice against his color was at work. When he came to America, within the scientific community, his treatment was better, but discrimination in other settings was still a regular occurrence. Although he continued to work in a wide variety of areas in astrophysics, and published several books, he resented only being remembered for his earliest work.

The life of Chandrasekhar spans a time when astronomers went from knowing next to nothing about stars to having detailed models of stellar interiors and their life cycles. When Chandra began his work, the idea of nuclear fusion powering stars had not yet been proposed. The concepts of neutron stars and black holes had not been dreamt of, let alone accepted.



the notion that a white dwarf, or anything, could collapse into nothingness was outrageous. He was not supportive. It all came to a head at a meeting of the Royal Astronomical Society in 1935. Chandra presented his work, and

*(Continued on page 5)*

## NASA SPACE PLACE

**A Glorious Gravitational Lens****By Dr. Ethan Siegel**

As we look at the universe on larger and larger scales, from stars to galaxies to groups to the largest galaxy clusters, we become able to perceive objects that are significantly farther away. But as we consider these larger classes of objects, they don't merely emit increased amounts of light, but they also contain increased amounts of mass. Under the best of circumstances, these gravitational clumps can open up a window to the distant universe well beyond what any astronomer could hope to see otherwise.

The oldest style of telescope is the refractor, where light from an arbitrarily distant source is passed through a converging lens. The incoming light rays—initially spread over a large area—are brought together at a point on the opposite side of the lens, with light rays from significantly closer sources bent in characteristic ways as well. While the universe doesn't consist of large optical lenses, mass itself is capable of bending light in accord with Einstein's theory of General Relativity, and acts as a gravitational lens!



The first prediction that real-life galaxy clusters would behave as such lenses came from Fritz Zwicky in 1937. These foreground masses would lead to multiple images and distorted arcs of the same lensed background object, all of which would be magnified as well. It wasn't until 1979, however, that this process was confirmed with the observation of the Twin Quasar: QSO 0957+561. Gravitational lensing requires a

good fortune, including one accessible to astrophotographers with 11" scopes and larger: Abell 2218.

Located in the Constellation of Draco at position (J2000): R.A. 16h 35m 54s, Dec. +66° 13' 00" (about 2° North of the star 18 Draconis), Abell 2218 is an extremely massive cluster of about 10,000 galaxies located 2 billion light years away, but it's also located quite close to the zenith for northern hemisphere observers,

making it a great target for deep-sky astrophotography. Multiple images and sweeping arcs abound between magnitudes 17 and 20, and include galaxies at a variety of redshifts ranging from  $z=0.7$  all the way up to  $z=2.5$ , with farther ones at even fainter magnitudes unveiled by Hubble Space Telescope. For those looking for an astronomical challenge this summer, take a shot at Abell 2218, a cluster responsible for perhaps the most glorious gravitational lens visible from Earth!

Learn about current efforts to study gravitational lensing using

NASA facilities: <http://www.nasa.gov/press/2014/>

[january/nasas-fermi-makes-first-gamma-ray-study-of-a-gravitational-lens/](http://www.nasa.gov/press/2014/january/nasas-fermi-makes-first-gamma-ray-study-of-a-gravitational-lens/).

Kids can learn about gravity at NASA's Space Place: <http://spaceplace.nasa.gov/what-is-gravity/>.

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



*Abell 2218. Image credit: NASA, ESA, and Johan Richard (Caltech). Acknowledgement: Davide de Martin & James Long (ESA/Hubble).*

serendipitous alignment of a massive foreground galaxy cluster with a background galaxy (or cluster) in the right location to be seen by an observer at our location, but the universe is kind enough to provide us with many such examples of this

MISCELLANEOUS

Happy Birthday

(continued from page 3)

While the author's goal was to tell the story of Chandra, and clearly had a bias in his favor, his depiction of Eddington paints a very unpleasant picture. Eddington is presented as being pompous, malicious, and completely certain in his own righteousness. Chandra is not the only one who ends up being intellectually bullied by Eddington. But at the same time, Chandra continued to consider Eddington as a friend throughout his career, which

may be why Eddington's betrayal cut so deep. Both men had their flaws, and Miller is not afraid to give the reader a glimpse of these imperfections.

For an enjoyable read about the history of stellar astronomy, the people who ultimately figured it all out, and especially the life of Subrahmanyan Chandrasekhar, I highly recommend "Empire of the Stars."

Empire of the Stars: Obsession, Friendship, and Betrayal in the Quest for Black Holes by Arthur I. Miller, Houghton Mifflin, 2005

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

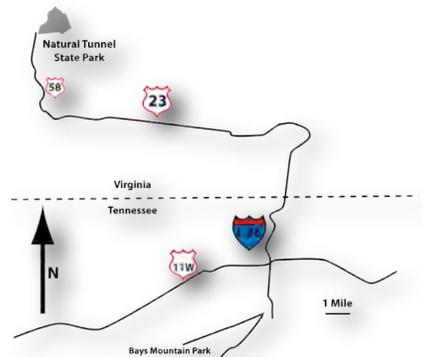
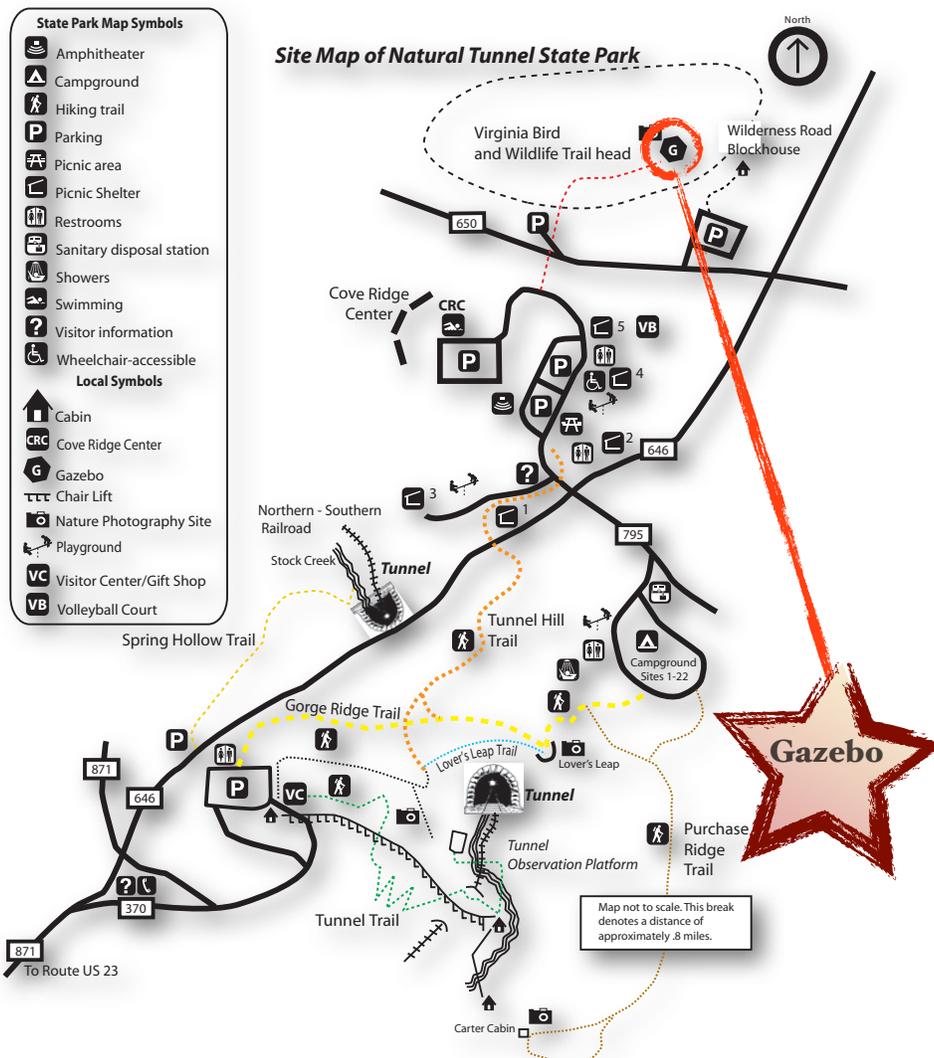


Robin has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

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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