

The ECLIPSE

June
2015

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:

June 17, 2015, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic: *TBD*

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From the President:

Well, it is official now, Tennessee formally dedicated its first dark sky park!

Pickett-Pogue Dark Sky Park is the 18th in the United States, and one of only five dark sky parks east of the Mississippi River. See a promotional piece done by the State here:

<https://youtu.be/IYQa1aUuNV4>

We hope you will take advantage of this park, if you go please let the park know that it is the dark skies that brought you there. We also hope to have more events there; it would be great for a weekend retreat.

Change is a good thing. One change that I hope to make soon is to transition our membership to the Night Sky Network. This is a web based resource run by both NASA's Jet Propulsion Lab and the Astronomical Society of the Pacific. The site will make it easy for you to update your member information, control how often you would like to receive emails, check your membership expiration date and sign up for events as well. At the same time we hope to add the capability to pay dues online. I hope this will open up new avenues of communication both from us to you... and from you back to the club! I spent this weekend with members of clubs from several states, and those who use the Night Sky Network had nothing but great things to say about how helpful it is.



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Observing Highlights June and July

Open Clusters

M48, M44 (*Beehive*), M67,
Mel111 (*Coma Star Cluster*),
M6 (*Butterfly*), M7, M23

Galaxies

M81, M82,
NGC3115 (*Spindle Galaxy*), M95,
M96, M105, M108,
M65/M66/NGC3628
(*Leo Triplet*),
M109, M98, M99, M106, M61, M100,
M84, M85, M86, M49,
M87, M88, M91, M89, M90, M58,
M104 (*Sombrero Galaxy*), M59,
M60, M94,
M64 (*Black-Eye Galaxy*),
M63 (*Sunflower Galaxy*),
M51 (*Whirlpool Galaxy*),
M83, M101/M102

Variable Stars

R Leonis

Nebulae

NGC3242 (*Ghost of Jupiter*),
M97 (*Owl*), NGC6302 (*Bug*),
NGC6309 (*Box*),
NGC6543 (*Cat's Eye*)

Globular Clusters

M68, M53, M3, M5, M80, M4, M107,
M13, M12, M10, M62, M19, M92,
M9, M14

Multiple Star Systems

Gamma Leonis (*Algieba*),
M40, Gamma Virginis (*Porrima*),
Alpha Canum Venaticorum
(*CorCaroli*),
Zeta Ursae Majoris (*Mizar*),
Epsilon Bootis
(*Izar or Pulcherrima*)
Mu Bootis (*Alkalurops*),
Beta Scorpii (*Acrab*),
Alpha Herculis (*Rasalgethi*)

Upcoming Star Parties

Saturday 6/13	Private Star Party Natchez Trace Parkway Mile Marker 433
Saturday 6/20 9:00 - 11:00 pm	Public Star Party Long Hunter State Park
Saturday 7/18	Private Star Party Natchez Trace Parkway Mile Marker 412 (Water Valley Overlook)
Friday 7/24 8:30 - 10:30 pm	Public Star Party Bowie Nature Park (Fairview)
Friday 8/14 8:30 - 10:30 pm	Public Star Party Bells Bend Outdoor Center

Happy Birthday William Crabtree by Robin Byrne

This month we celebrate the life of a man who helped advance England into the realm of modern astronomy. William Crabtree was born in Broughton Spout in England. His date of birth is not fully known. The year has been established to be 1610, but the exact date is, at best, speculated to have been in June. His education was at the Manchester Grammar School, which was known to provide a solid Latin education. Although likely attached to the Collegiate Church, Crabtree never attended college himself.

Crabtree worked as a cloth merchant in Manchester. Income from this work, along with the wealth of his wife's family, helped to fund his true passion - astronomy. Although there is some uncertainty of whether Crabtree ever met Jeremiah Horrocks in person or not, it is possible their paths crossed in Manchester as Horrocks made his way between home in Liverpool and college in Cambridge. What is known is that the young astronomy major and the avid amateur astronomer began corresponding via mail in 1636. By this time, Crabtree had established a reputation of being an accomplished astronomer, well versed in all aspects: telescopic observations of planet motions, as well as, mathematical computations of future planetary positions.

Crabtree and Horrocks became the core of a group of astronomers based in the north of England. They called themselves "Nos Keplari" because they were followers of Johannes Kepler. Even though he was studying astronomy in college, Horrocks would not have been taught the "new" ideas of Kepler and Galileo in school. So, in effect, both Crabtree and Horrocks were self-taught amateur modern astronomers. One issue they noticed was that astronomical tables, including Kepler's Rudolphine Tables, did a poor job of predicting such astronomical events as conjunctions and eclipses. With his more accurate positional observations, Crabtree embarked on rewriting the Rudolphine Tables.

Because of the shortcomings of the published tables, Crabtree and Horrocks put their faith in their own observations and calculations. Kepler's tables had predicted that Venus would transit the Sun in 1631, but the timing made it impossible to observe from Europe. Based on the tables, it would over one hundred years before another opportunity would arise. Crabtree and Horrocks decided to use their planetary observations to see if another opportunity might actually occur sooner than that. Based on their calculations, Venus should transit the Sun on November 24, 1639 (based on the then-in-use Julian Calendar; December 4 using the Gregorian Calendar). Horrocks

William Crabtree, continued

was able to show that transits of Venus should always occur in pairs every 122 years, separated by 8 years.

Horrocks began observing the day before, due to possible errors in the precision of his calculations, but saw nothing. The following day, through partly cloudy skies, both Crabtree and Horrocks, at separate locations, caught Venus just taking a one arcminute bite out of the Sun's disk at 3:15 pm. Using a projected image of the Sun onto a 6 inch circle subdivided into 1 degree sections to more accurately measure Venus' position, Horrocks caught two more glimpses at 3:35 and 3:45 pm. Being near the solstice in northern England, the Sun set shortly after the last observation. Crabtree and Horrocks were the only two people on the planet to observe this event.

The data from these observations ended up being invaluable. First, Horrocks was able to get a more precise measurement of Venus' orbit, especially the precise position and time where its orbit crosses the ecliptic.

The second discovery had to do with Venus' size. Based on its bright appearance in the night sky, it was presumed that Venus was a large planet. The expectation was that Venus would be at least 3 arcminutes in size. However, the transit showed how small Venus was in comparison to the Sun. In particular, Crabtree's more accurate observations showed Venus to be 1.03 arcminutes in diameter, providing the data for a much more accurate estimate of Venus' true relative size. Actual numerical sizes of solar system objects wouldn't be determined for another 200 years. The discrepancy between expected and true size led Horrocks to later study of how people overestimate the size of bright objects when seen in a dark sky.

Sadly, both men led short lives. In 1641, the day before a planned meeting of Horrocks and Crabtree, Horrocks died at the age of 23. Three years later, Crabtree died on August 1 1644. He was 34 years old.

The legacy of Crabtree and Horrocks was honored during the most recent Venus



William Crabtree, continued

transits. On June 9, 2004, the day after the first of another pair of transits, a nameplate commemorating William Crabtree was dedicated near an area known as Crabtree Croft. Another plaque was unveiled not far away at a house that was likely Crabtree's during the time that his astronomical work took place. Crabtree is also honored in a mural located in Manchester Town Hall. Painted in 1903 by Ford Maddox Brown, the mural depicts, with much poetic license, Crabtree observing the Venus transit.

Early 17th century astronomy was a time of great upheaval. The debate between the classical geocentric model of the solar system and the modern heliocentric model was in full swing. The newly invented telescope was just finding its place in astronomical research. Astronomy was still focused on observing events and recording them in tables. What Crabtree and Horrocks did was move astronomy away from purely documenting phenomena into the realm of true science. They used observations and computations to make predictions of future events. Their work paved the way to a deeper understanding of the heavens. Although much of the computational work was accomplished by Horrocks, if not for the inspiration and collaboration of William Crabtree, none of it may have occurred.

References:

William Crabtree - Wikipedia
en.wikipedia.org/wiki/William_Crabtree

William Crabtree, Venus Genius - Salford City Council
www.salford.gov.uk/venustransit.htm

Horrocks, Crabtree and the 1639 transit of Venus by Allan Chapman
astrogeo.oxfordjournals.org/content/45/5/5.26.full

Send your cool astrophotos to
[eclipse@bsasnashville.com!](mailto:eclipse@bsasnashville.com)

From the President, continued

xkcd

June is a wonderful month to encourage your friends, neighbors and co-workers to look at the evening sky. Jupiter and Venus begin the month high and bright, about 20° apart. Over the course of the next few weeks they will show us why we called them “wandering stars” to begin with. They will slowly converge until on June 30th they are a mere $1/3$ degree apart. You don’t need a telescope to watch this, just your own two eyes! And of course a clear evening sky. Although Venus will still be stunningly bright, it will only be 34% illuminated at month’s end, showing a nice crescent. On June 20, the young crescent Moon, Venus and Jupiter will make a nice small triangle in the sunset sky. Meanwhile, Saturn will rule the night. The rings are nice and wide open this year, making for a stunning view.

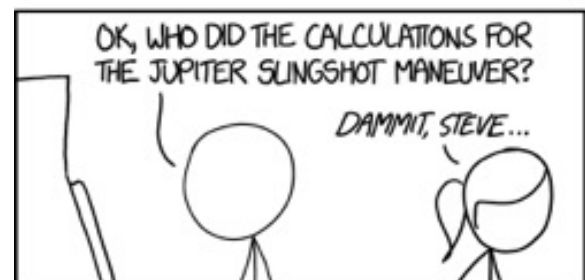
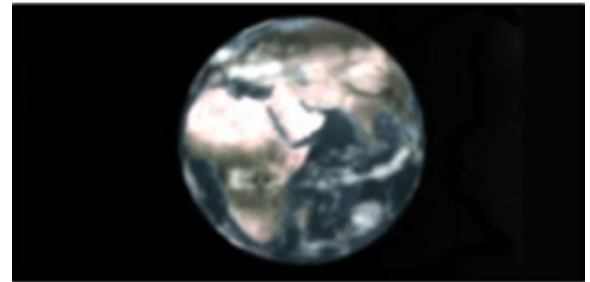
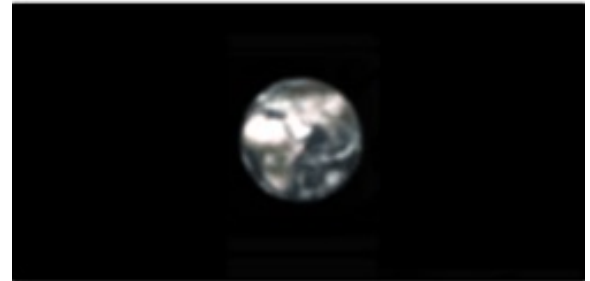
Remember that you don’t have to own a telescope to come on out to a star party! Come on out and enjoy the night sky with fellow BSAS members and our guests. June 20 we will be at Long Hunter State Park. Have a picnic dinner early, and then come to the group camp for the star party. Surely it will have dried out a bit by then, allowing us to enjoy the planets and the rising summer sky. See you there!

Clear dark skies,

Theo Wellington

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June 17, 2015, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Topic: TBD



Barnard-Seyfert Astronomical Society
Minutes of the Regular Meeting of the Board of Directors
Held On Wednesday, May 6, 2015.

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held May 6, 2015, at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, TN 37204. Present were Joe Boyd, Gary Eaton, Bud Hamblen, Rob Mahurin, Bob Norling, and Theo Wellington, constituting a quorum. Theo Wellington called the meeting to order at 8:00 PM, and asked for a motion to approve the minutes of the January 7, 2015, board meeting. Gary Eaton so moved, Joe Boyd seconded, and the minutes were approved as printed in the June, 2015, issue of the Eclipse. Bob Norling reported that there was \$1498.13 in the regular account and \$1,619.44 in the equipment account. Bob Norling reported that he would ask the bank to refund an unexpected \$12.00 account maintenance fee back to the regular account.

Resolution 2015-05-06: To approve the on-line membership form as presented by Theo Wellington at the May 6, 2015, board meeting.

Theo Wellington presented the new on-line membership form, and asked that the board approve the form. Bob Norling moved the resolution and Joe Boyd seconded, The resolution was adopted by unanimous voice vote.

Joe Boyd commented that the Nashville Chapter of the IDA would have a brief meeting after the May 20, 2015, general meeting.

There being no further business, the meeting was adjourned at 9:00 PM.

Respectfully submitted,
Bud Hamblen, Secretary

**Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, May 20, 2015.**

The Barnard-Seyfert Astronomical Society held its monthly membership meeting for January at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, Tennessee, on Wednesday, May 20, 2015. President Theo Wellington called the meeting to order at 7:30 PM. Bob Norling communicated via Theo Wellington that there was \$1,570.31 in the regular account and \$1,619.49 in the equipment account.

Miss Suzanne Eastwood and Miss Mary Landis Gaston described their science fair project, "Orbital Calculation and Spectrographic Classification of Select Near Earth Asteroids". Miss Eastwood and Miss Gaston are students at St Cecilia Academy, and were Alternate High School Grand Prize winners at the 2015 Middle TN Science and Engineering Fair held at Austin Peay State University in March, 2015. Miss Eastwood and Miss Gaston were presented a cash award from the BSAS.

Curt Porter asked for help locating parts of a Bofors antiaircraft gun mounting to be used to support a dish antenna. Joe Boyd asked those interested in the Nashville Chapter of the International Dark-Sky Society to verify their membership in the IDA.

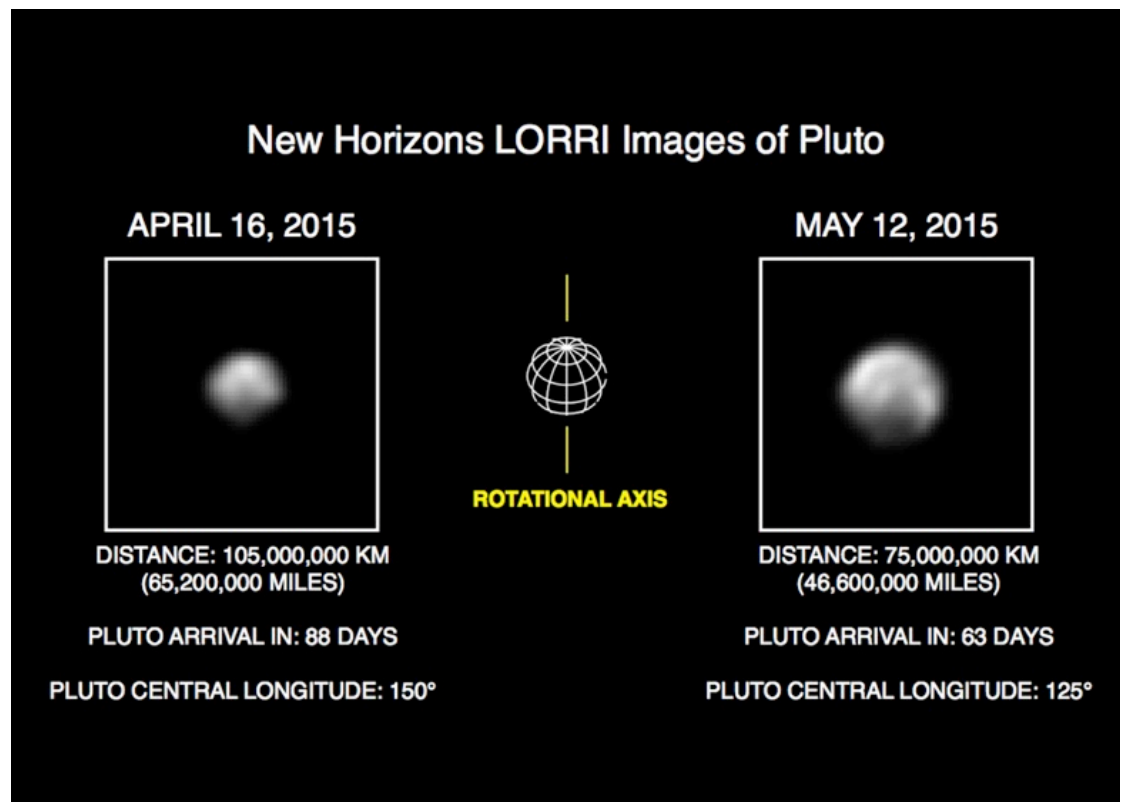
There being no further business the meeting was adjourned at 8:20 PM.

Respectfully submitted,
Bud Hamblen, Secretary

NASA's New Horizons Sees More Detail as It Draws Closer to Pluto

The images were taken from just under 50 million miles (77 million kilometers) away, using the Long-Range Reconnaissance Imager (LORRI) on New Horizons. Because New Horizons was approximately 20 million miles closer to Pluto in mid-May than in mid-April, the new images contain about twice as many pixels on the object as images made in mid-April.

Image Credit: [NASA](#)





Dawn Spirals Closer to Ceres, Returns a New View

A new view of Ceres, taken by NASA's Dawn spacecraft on May 23, shows finer detail is becoming visible on the dwarf planet. The spacecraft snapped the image at a distance of 3,200 miles (5,100 kilometers) with a resolution of 1,600 feet (480 meters) per pixel. The image is part of a sequence taken for navigational purposes.

After transmitting these images to Earth on May 23, Dawn resumed ion-thrusting toward its second mapping orbit. On June 3, Dawn will enter this orbit and spend the rest of the month observing Ceres from 2,700 miles (4,400 kilometers) above the surface. Each orbit during this time will be about three days, allowing the spacecraft to conduct an intensive study of Ceres.

Image credit: [NASA/JPL-Caltech/UCLA/MPS/DLR/IDA](#)



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There will be a two month
grace period before any
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About BSAS

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.

The BSAS meets on the third Wednesday of each month at the Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.

Membership entitles you to subscriptions to *Astronomy and Sky & Telescope* at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.

In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.

Most information about BSAS and our activities may be found at bsasnashville.com. If you need more information, write to us at info@bsasnashville.com or call Theo Wellington at (615) 300-3044.

Free Telescope Offer!

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact info@bsasnashville.com.