

The ECLIPSE

January
2014

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:

January 15, 2014, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike

Program Topic:

How To Use Your Telescope
(details on page 5)

Next BSAS Board Meeting:

January 8, 2014

From the President

I can't believe it's already been a year! The start of a new year is traditionally a time to look back to see what we've done, and then to look forward to what we want to accomplish in the coming year. I know we have a number of new members, and I hope you are enjoying your time with BSAS. Please let me or any board member know what we can do to make membership in BSAS valuable to you, from assistance with gear to programs at meetings. I know I have learned a lot over the years from some of our long-time members. We came out with a new brochure last year, take some home from a meeting to give to any interested friends.

One thing that didn't go well last year was not something we can control... the weather! With only a few days left as I write this, Nashville has recorded 54 inches of rain, more than seven inches above normal (and there is rain in the forecast).

Quite a few star parties were cancelled outright, and very few had great skies. So this was a challenging year for observing both personally and for public outreach. Hopefully the coming year will allow us a few nice clear nights that are above freezing.

Despite the weather, we had some fun at our favorite sites, and managed to also bring telescopes to other groups from Girl Scouts to a birthday party. I visited both Pickett State Park and Nathan Bedford Forrest State Park as a member of BSAS. The parks are realizing that the night sky is something they can offer their guests, and we can help them get

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Observing Highlights January and February

Planets
Jupiter
Uranus
Mars
Neptune

Open Clusters
M52, NGC457 (ET),
M103, NGC654, NGC663,
NGC884/869
(*Double Cluster*),
M34, M45, M36,
M37, M38, M35,
M41, M50, M47,
M46, M93

Variable Stars
Beta Persei (*Algol*),
Omicron Ceti (*Mira*),
R Leporis
(*Hind's Crimson Star*)

Globular Clusters
M79

Nebulae
NGC7293 (Helix),
M76 (Little Dumbell),
NGC1499 (California),
M1, M42 (Orion),
M43, M78

Galaxies
M31 (*Andromeda*),
M32, M110,
M33 (*Triangulum*),
M74, M77

Multiple Star Systems
Eta Cassiopeiae,
Gamma Arietis,
Gamma Andromedae,
Beta Orionis (*Rigel*),
Alpha Geminorum (*Castor*)

Upcoming Star Parties

Sat 1/4 7:00-9:00	Edwin Warner Park
Fri 1/24 7:00-9:00	Bells Bend Outdoor Center
Sat 1/25	BSAS Trace MM 412
Sat 2/8 7:00-9:00	Shelby Bottoms Nature Center



Jan 1
Jan 30



Jan 7
Feb 6



Jan 15
Feb 14



Jan 23
Feb 22

Happy Birthday Spirit by Robin Byrne

This month we celebrate the “life” of a rover who had a lot of spirit. Launched on June 10, 2003, the Mars Exploration Rover Spirit successfully landed in Gusev Crater on Mars January 3, 2004. Its twin, Opportunity, landed three weeks later on the other side of the red planet.

Both rovers are almost 5 feet tall, 7.5 feet wide, and 5 feet long and weigh almost 400 lbs. Running on a six-wheeled rocker-bogie system allowed them to easily traverse rough terrain. The rover was equipped with a logic system, allowing it to choose its own route when traveling. Although the top speed was 2 inches per second, they more typically moved slower - less than half an inch per second. A camera mounted at a height of 5 feet provided views similar to what a person standing on Mars would see, and provided the information needed to plan the rover’s route. A robotic arm placed the various instruments up to the samples being studied. Being solar powered, the rovers were designed to operate during the day and rest at night.

With a primary goal of finding evidence for water in the Martian past, the instruments on board helped with that search. The Pancam (Panoramic Camera) takes images of the local terrain to help determine what area to explore in more detail. Mini-TES (Miniature Thermal Emission Spectrometer) would provide initial information about composition to help narrow down which rocks to study in more detail. It was also designed to

study the temperatures in the atmosphere layers of Mars. If a rock or soil sample was of interest and contained iron, then they would study it in more detail with the MB (Mössbauer Spectrometer). For determining other elemental compositions, the APXS (Alpha Particle X-Ray Spectrometer) would take care of the rest. Magnets were used to gather magnetic dust samples. The RAT (Rock Abrasion Tool) could eat away at the surface of a rock to expose the unweathered interior for further analysis. And, finally, the MI (Microscopic Imager) provided high-resolution up-close images of rock and soil samples.

The evidence for water was the primary objective, so the landing site was chosen because it was expected to have been watery in the past. Gusev Crater was thought to have been a lake at one time. There are features that look like waterways leading into the crater, which adds to the credibility of that hypothesis. After the landing, the site was renamed Columbia Memorial Station in honor of the seven astronauts killed in the Space Shuttle Columbia disaster.

The mission was designed to last 90 days. Spirit went well beyond that goal, and that extra time was well spent, despite some glitches along the way. Just a little over 2 weeks after landing, the first problem arose. The computer system became stuck in a “reboot loop” that kept encountering an error. It wouldn’t shut down and it wouldn’t boot

Spirit, continued

up, and the batteries were quickly being drained. The error was found to be in the flash memory. The NASA engineers had a way to bypass the flash memory, get the system booted up, and send the necessary commands to fix the problem. That's one potential disaster avoided.

The first hints at water were found in March, 2004. A rock, nicknamed "Humphrey," was formed from magma, which in and of itself wasn't that interesting. But what was inside that magma was a different story. Crystallized minerals, most likely deposited by water flowing through the rock, were found throughout the interior. This was the first evidence for water depositing materials on the surface of Mars. At its next stop, a rock called "Pot of Gold" was found to contain hematite. This mineral typically forms in the presence of water. Near the start of its second year, Spirit found soil that contained salt - another sign that water had been present. Near the end of 2005, a rock formation dubbed Comanche revealed the presence of magnesium iron carbonate. Carbonates not only form in water, but in FRESH water. All other previous water finds had indicated acidic water, which would not have been conducive to life. This was the first evidence of life-friendly conditions.

Spirit's mission is often looked upon as being plagued with bad luck, but there was some good luck, as well. Near the beginning of 2005, Spirit's power levels were dropping. The most likely culprit

was dust obscuring the solar panels. However, sometime on March 9, 2005, the power suddenly shot up. The best explanation for what happened is that a dust devil passed over the rover, and acting like a vacuum cleaner, cleared the dust off of the solar panels. Spirit was back to its energetic self. Then in 2006, its next problem arose. One of the front wheels stopped working. The NASA team's solution? Drive backwards, dragging the wheel. Much of the next year was spent not moving around much, because of the faulty wheel. But about a year later, in March 2007, the dragging wheel led to an exciting discovery. As it was being dragged, the wheel uncovered ground that was similar to places on Earth where water from a hot spring meets up with volcanic rocks. These places on Earth are perfect havens for microbial life and this location on Mars may have been equally hospitable. Between global dust storms and Martian winter, most of 2008 was a loss due to low power levels. There was concern that the power would not return to useable levels. But again, Spirit got lucky when a series of wind events blew off enough dust to boost the power levels once more.

It seemed inevitable, though, that Spirit's luck would eventually run out. May 1, 2009 saw the beginning of the end. While en route to its next destination, Spirit suddenly found itself trapped in soft soil with not enough traction to break free. NASA engineers tried a variety of tests with mockups of the rover and similar soil conditions.

Spirit, continued

Meanwhile, a second wheel, now in the rear, stopped working. When 2010 arrived, and Spirit was still stuck, the decision was made to use it in place, rather than continuing to try to move. However, the orientation to the Sun was not allowing the rover to power up fully. When Spirit missed a scheduled communication session, the best guess was that it had lost enough power to go into a preset hibernation mode until the power levels were back up. The last time we heard from Spirit was eight days prior, on March 22, 2010. NASA continued to hold out hope for another cleaning event, and sent signals to Spirit for over a year. On May 24, 2011, it was officially announced that the Spirit mission has ended.

Originally designed to last 90 Martian days (sols), where one sol is roughly equivalent to 24 hours 39 minutes, Spirit kept going for 2208 sols, instead. Expected to drive, at most, 0.4 miles, Spirit, instead, covered 4.8 miles. Not too shabby for a mission with so many

problems. Meanwhile, Spirit's twin rover, Opportunity, is still going strong, coming up on its 10th anniversary. And Opportunity is not alone on the planet. Mars Science Laboratory Curiosity has been there for over a year and shows no signs of stopping anytime soon.

Despite all the obstacles it faced, Spirit showed a lot of spirit and determination in its exploration of Mars. It's a story that should inspire us all.

References:

Mars Exploration Rover Mission: Overview
marsrovers.jpl.nasa.gov/overview/

Spirit (rover) - Wikipedia
[en.wikipedia.org/wiki/Spirit_\(rover\)](http://en.wikipedia.org/wiki/Spirit_(rover))

NASA Science - Spirit
science.nasa.gov/missions/mars-exploration-rover-spirit

**Next BSAS meeting
January 15, 2014, 7:30 pm
Cumberland Valley
Girl Scout Council Building
4522 Granny White Pike**

The January meeting of the Barnard-Seyfert Astronomical Society will focus on how to use a telescope and other astronomical gadgets. Whether you just received a telescope for Christmas or have one gathering dust in the closet, bring it to the meeting for some one on one instruction! Be sure to bring the manual and other parts that came with your telescope, if they're available.

If you plan on bringing a telescope to the meeting, let us know beforehand by emailing your name along with the brand and model of the telescope to info@bsasnashville.com. This way, we'll be prepared to assist you.

From the President, continued from page 1

started doing this. The more groups that see the night sky as valuable, the more leverage we have in trying to preserve the dark.

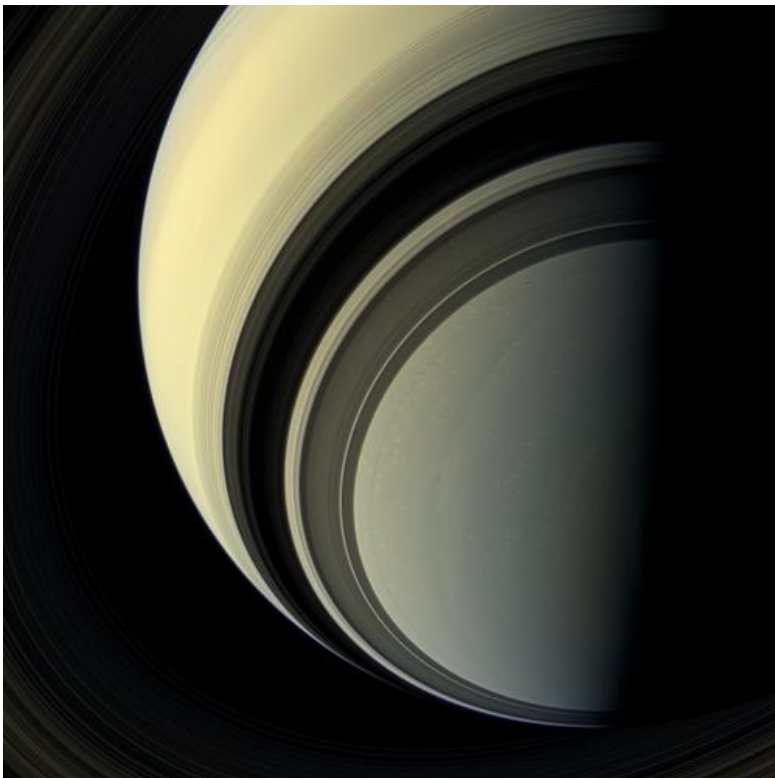
Vice President Joe Boyd has worked to bring back our local chapter of the International Dark Sky Association, and many of you indicated an interest in this. Hopefully we will get this organized in the coming year.

I hope many of you will be present at our January meeting - we will be helping our guests learn how to use the great astronomy toys they got for Christmas. I know of several people who will be there, and we have some publicity for this event, so come on out to the regular meeting on January 15. There are a lot of telescopes in closets all over Nashville, let's see if we can get some of them out under the night sky!

While we didn't quite get the "comet of the century" this past year, 2014 will have plenty of sights to get us outside at odd hours of the night...and day! Look forward to the total Lunar Eclipse on April 15th and a very partial Solar Eclipse at sunset October 23rd. So keep your binoculars, cameras and telescopes handy. The show that the universe puts on every night is always changing and never disappointing.

Clear, dark skies,

Theo Wellington



'Tis the Season

December 23, 2013

Winter is approaching in the southern hemisphere of Saturn and with this cold season has come the familiar blue hue that was present in the northern winter hemisphere at the start of NASA's Cassini mission. The changing blue hue that we have learned marks winter at Saturn is likely due to reduction of ultraviolet sunlight and the haze it produces, making the atmosphere clearer and increasing the opportunity for Rayleigh scattering (scattering by molecules and smaller particles) and methane absorption: both processes make the atmosphere blue.

Images taken using red, green and blue spectral filters were combined to create this natural color view. The images were taken with the Cassini spacecraft wide-angle camera on July 29, 2013.

<http://photojournal.jpl.nasa.gov/catalog/PIA17176>

**Barnard-Seyfert Astronomical Society
Minutes of the Regular Meeting of the Board of Directors
Held on Wednesday, December 4, 2013**

The board of directors of the Barnard-Seyfert Astronomical Society (BSAS) met in regular session at the Cumberland Valley Girl Scout Council Building in Nashville, Tennessee on Wednesday, December 4, 2013. Present were Theo Wellington, Kris McCall, Spencer Buckner, Bob Norling, Bill Griswold, Bud Hamblen, Melissa Lanz and Poppy Simmons. A quorum being present, President Theo Wellington called the meeting to order at 7:32 PM. Theo Wellington asked for corrections to the minutes of the previous board meeting held on November 6, 2013, and, there being none, asked for a motion declaring them to be approved as published in the December 2013 edition of the Society's Eclipse newsletter. Spencer Buckner so moved and Bill Griswold seconded his motion, which was subsequently passed by a unanimous voice vote. Treasurer Bob Norling did not make a treasurer's report owing to his moving house.

Bob Norling reported that he has placed the order for the RASC Observer's Handbook. Spencer Buckner reported that the Universal Workshop said there was trouble with the printing of the 2014 Astronomical Calendar.

Upcoming star party dates and times

Saturday, December 7, Public Star Party at Shelby Bottoms 7:00 - 9:00 PM

Saturday, December 28, Private Star Party at Natchez Trace MM 435.5

Tuesday, December 31, Public Star Party at Pickett State Park

Saturday, January 4, Public Star Party at Edwin Warner Park (7:00 - 9:00 PM)

Bill Griswold reported that the permit from the National Park Service for the Natchez Trace sites now include Friday, Saturday and Sunday of the weekend, instead of just Saturday. This will allow flexibility to reschedule private star parties when the weather is bad.

Owing to the weather forecast for December 7, Kris McCall suggested that we substitute December 14 at the Adventure Science Center for the event that had been scheduled for December 7 at the Shelby Bottoms Nature Center. This date is the date of the monthly Second Saturday event at the Sudekum Planetarium. Spencer Buckner made the motion to change the date of the event and Bob Norling seconded. The motion passed on unanimous voice vote.

Minutes of the Regular Meeting of the Board of Directors, continued

Programs for meetings:

- Brad Hill has not responded further on making a presentation at the December 18 meeting.
- January 15 meeting - call for volunteers for “How to Use a Telescope” sessions.
- Josh Emery is up for the February 19 meeting.
- A Messier Marathon “What’s Up” was suggested for the March 19 meeting.
- Allyn Smith is up for the April 16 meeting.

Poppy Simmons requested assistance in working up a “star lore” presentation for a future meeting.

Mike Benson should be available to make a presentation on double stars and the Astronomical League Double Star Club.

The staff of Bowie Nature Park, Fairview, Tennessee, has selected the following schedule for star parties:

Friday, April 25, 2014, 8:00 - 10:00 PM

Friday, July 25, 2014, 8:30 - 10:30 PM

Friday, September 26, 2014, 7:00 - 9:00 PM

Friday, November 21, 2014, 7:00 - 9:00 PM

Joe Boyd was unable to attend and report on the loaner form.

Chuck Schlemm had suggested that the society buy a white light solar filter for the society’s 10” dob he currently has custody of. The solar filter will be used for astronomy outreach. The board agreed to have Chuck purchase the filter and that Bob Norling will reimburse Chuck for the cost of the filter from the society’s equipment fund. Kris McCall made the motion in favor. Bob Norling seconded the motion. The motion was carried by unanimous voice vote.

On December 18, the Girl Scout room will be opened at 6 PM, thirty minutes prior to the scheduled meeting time, for setup. The society’s banquet supplies will be obtained from Bob Rice, who may be able to attend the meeting. Poppy Simmons suggested that serving dishes be labeled.

Theo suggested that the society honor Bob Rice with a plaque for his outstanding service as secretary. Southern Trophy was suggested as a vendor. Spencer Buckner made the motion. Bill Griswold seconded. The motion was carried by unanimous voice vote.

Minutes of the Regular Meeting of the Board of Directors, continued

Kris McCall moved that Joe Boyd be honored with a service plaque to recognize his services in putting the society on a firm basis in law. Bill Griswold seconded and the motion was carried by a unanimous voice vote.

The board voted by email to honor Bill Griswold with a plaque.

Theo Wellington and Bob Norling will check with SunTrust Bank, where the society's accounts are located, about online payments to the society for dues, and report to the board.

Bill Griswold reported that the Girl Scouts wanted \$25 per meeting for use of their building or \$600 for 12 member meetings and 12 board meetings in 2014. This is compared to \$10 per meeting previously. The board agreed to pay the Girl Scouts \$600 for the meeting spaces, with a provision in the agreement for a prorated refund of the fee if the building becomes unavailable during 2014. Kris McCall made the motion, Spencer Buckner seconded, and the motion was carried by a unanimous voice vote.

Bill Griswold reported that one member still receives the Eclipse in hard copy form and that the cost of producing and mailing the form exceeds the \$15 premium in the membership fee. Melissa Lanz suggested that the society continue to absorb the difference in cost. The board agreed to reimburse Bill Griswold for the cost of ink to produce the hard copy. Kris McCall made the motion, Poppy Simmons seconded, and the motion was carried by a unanimous voice vote.

There being no further business, Bob Norling moved for adjournment, Spencer Buckner seconded, and the meeting was adjourned at 8:34 PM.

Respectfully

Bud Hamblen, Secretary

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, December 18, 2013

The Barnard-Seyfert Astronomical Society held its monthly membership meeting for December at the Girl Scouts of Middle Tennessee, 4522 Granny White Pike, Nashville, Tennessee, on December 18, 2013.

Prior to the meeting the society held its annual covered dish supper and silent auction, starting at about 6:30 PM. The society provided the entrée and drinks, and members provided side dishes and desserts. Terry Reeves provided the invocation before the meal. We enjoyed an evening of fellowship and good food. The silent auction was conducted during the meal and generated \$277.50 to the benefit of the society from the sale of astronomy related items donated by members.

President Theo Wellington called the meeting to order at 7:48 pm. Thirty-six members and guests were present. Theo Wellington asked for a motion to approve the minutes of the November 20, 2013, membership meeting as published in the December 2013 issue of the Eclipse. Spencer Buckner made the motion, Butch Miller seconded, and the minutes were approved by a unanimous voice vote. The treasurer's report was not presented.

Theo Wellington mentioned the following star parties:

Public star party on December 21, 2013, which is expected to be rained out.

Public star party on January 4, 2014, 7:00 PM to 9:00 PM, at Edwin Warner Park.

BSAS private star party on December 28, 2013, at Natchez Trace Mile Marker 435.5.

Public star party on New Year's Eve, December 31, 2013, at Pickett State Park, Jamestown, Tennessee. This event is in support of the park's effort to be designated a dark sky site. A bunkhouse is to be provided for astronomers. See Theo Wellington or contact the park for details. Janaruth Ford mentioned that Henry Horton State Park, Chapel Hill, Tennessee, also is holding a similar event on December 31, 2013.

Bob Rice, Bill Griswold and Joe Boyd were introduced by Theo Wellington and presented with plaques of appreciation by the society in recognition of their great efforts on behalf of the society and its goals. This is little enough recognition for many years of service.

Mike Benson mentioned the broadcast of the Paul Winter Consort Winter Solstice Concert to be broadcast on NPR stations December 21, 2013.

Bob Norling distributed the annual calendars and handbooks in fulfillment of orders previously received.

Minutes of the Membership Meeting, continued

Theo Wellington introduced Tom Murdic, an experienced astroimager and former president of the society, who presented a talk on astroimaging. He recommended planning your imaging sessions, knowing your equipment, selecting your objects, being flexible to meet changing conditions, getting enough sleep and having fun. We had a lot of fun listening to his presentation. As part of his presentation Tom provided beautiful prints of his November 11, 2013, image of Comet Lovejoy.

There being no further business, the meeting was adjourned at about 8:30 PM.

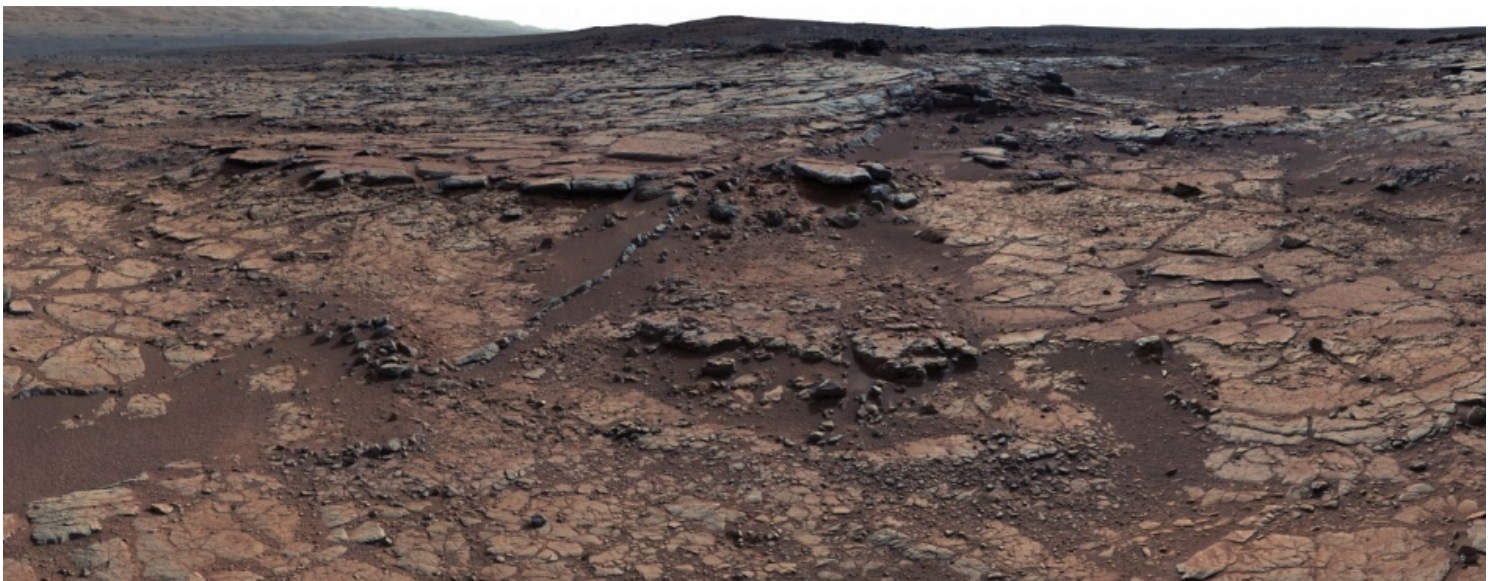
Respectfully submitted,

Bud Hamblen, Secretary

Telescope for Sale - \$300

Orion 70mm refractor
Orion 9 x 50mm finder scope
Orion Epic ED-2 eyepiece (22mm)
2x Barlow Lens
Orion Skyview Deluxe EQ
mount with tripod

contact: Dana Forlines
(615) 248-1994



Yellowknife Bay Formation on Mars - Image Credit: NASA/JPL-Caltech/MSSS

<http://www.nasa.gov/content/yellowknife-bay-formation-on-mars>

Become a Member of BSAS!

Visit bsasnashville.com to download and print an application for membership.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

Then fill it out and bring it to the next monthly meeting or mail it along with your first year's membership dues to:

BSAS
P.O. Box 150713
Nashville, TN 37215-0713

Annual dues:

\$20 Individual
\$30 Family
\$15 Senior (+65)
\$25 Senior Family (+65)
\$12 Student*

* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

You can check the status of your membership at bsasnashville.com.

There will be a two month grace period before any member's name is removed from the current distribution list.

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.