



# The ECLIPSE



The Newsletter of the Barnard-Seyfert Astronomical Society

Organized in 1928

January 2013

## The Membership meeting will be held on January 16, 2013 at the Cumberland Valley Girl Scout Council Building located at the intersection of Harding Place and Granny White Pike at 7:30 pm.

So you got a new telescope or other astronomical gizmo for Christmas? And you're not exactly sure how to use it? Then – whether you're a member or not - by all means please bring it and join Dr. Spencer Buckner at our January 16<sup>th</sup> membership meeting for his presentation of "I Got a Telescope for Christmas – Now What?" After briefly covering the basic telescope types and their operation, he and other BSAS members will be available to assist owners with their new gifts. Hope to see you then!

### Upcoming Events

Board of Directors Meeting, January 9 at the Cumberland Valley Girl Scout Building – 7:30 pm

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### From the President:

Greetings! The world didn't end, so a new year of astronomical opportunities is before us.

A quick introduction: if you haven't met me at star parties or meetings, I'm the incoming president Theo Wellington. No, it's not short for anything. I also have the honor of being the first elected woman president of the BSAS, although the post has been held by a woman who graciously filled out a term. I've always had an interest in things which for some reason were considered for men (running, astronomy, science in general), but I believe we are just in a transition to more equal participation. I've worked with a science team at my kids' high school for almost a decade, and no one thinks twice about girls being on the team.

Past president John Harrington started discussions on a number of ways that the club might expand and grow, and I hope to continue those initiatives as we go through 2013. For example, we'd like to invite and make welcome some of our local college students. If you encounter opportunities for outreach or new members, take advantage of these! We have business cards available with our website and Facebook page addresses, grab some at the next meeting or star party to share with anyone interested. (And if you haven't visited these sites – please do!)

Working in the planetarium I also meet a lot of people who tell me they have telescopes they don't know how to use...hopefully we can get a few of these to a future telescope clinic. Astronomy is such an accessible science; our goal is to help people enjoy the sky that everyone can see.

The Transit of Venus this past year was a great opportunity to involve a huge number of people in watching a rare astronomical event. We have at least one and maybe two such events coming in

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## Observing Highlights

### Moon phases

January 2013  
01/04 LAST Quarter  
01/11 NEW Moon  
01/18 FIRST Quarter  
01/26 FULL Moon

February 2013  
02/03 LAST Quarter  
02/10 NEW Moon  
02/17 FIRST Quarter  
02/25 FULL Moon

### Objects:

Globular Clusters  
M79

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

Nebula  
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)

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

Planets  
Uranus, Jupiter

## January & February 2013 Star Parties

Jan 12 Private star party at mm 412 (Water Valley Overlook) on the Natchez Trace Parkway

Jan 18 Public Star party at Bells Bend Nature Center from 7:00 to 9:00 PM

Feb 09 Private star party at mm 435.5 on the Natchez Trace Parkway

Feb 16 Public star party at Shelby Bottoms Park from 7:00 to 9:00 PM

## Happy Birthday IRAS

by Robin Byrne

This month we celebrate the 30th anniversary of the first orbiting infrared telescope to map the entire sky. On January 25, 1983 at the Vandenberg Air Force Base atop a Delta 3910 rocket, the 3.6 x 3.24 x 2.15 meter Infrared Astronomical Satellite (IRAS) was launched into space 900 km above Earth. Following a polar orbit around Earth, it completed one circuit every 100 minutes.

Built as a joint venture between the United States (NASA), the Netherlands (NIVR) and the United Kingdom (SERC), IRAS was designed to observe in the infrared part of the spectrum. The telescope design was a Ritchey-Chretien with a 0.6 meter aperture and a 5.5 meter focal length. The main collecting area was comprised of 62 infrared detectors. These were able to resolve down to 0.5 minutes of arc when observing at 12 microns, and 2 minutes of arc at 100 microns. The other two main instruments were the Low Resolution Spectrometer (LRS) and the Chopped Photometric Channel (CPC). The LRS observed light with wavelengths in the 8 - 22 micron range. It took spectra of roughly 5000 sources brighter than 10 Janskys. The CPC was used for low-resolution mapping of the sky. Although it didn't function as well as expected, it did provide maps at 50 and 100 microns. To know for sure the intensity of the sources observed, 10 thermal calibration sources were mounted behind the secondary mirror. These provided stable pulses of infrared to use as references. They were composed of a 1 mm square substrate of diamond that could be heated to 200 Kelvin in less than a second. A small hole in the secondary mirror allowed the source to shine through to the detectors.

Because detecting infrared requires cold temperatures (just as observing faint objects require dark conditions), the telescope needed to be cooled. This was done by mounting the telescope in a tank of superfluid helium. This kept the telescope at a temperature of 2 Kelvin (-456 °F). The 73 kg of helium was enough to provide cooling for about 300 days. An aperture cover protected the telescope during launch and for the first week in orbit, which was also cooled with helium. This was ejected, but a sunshade remained to block direct sunlight or light reflected off of Earth from entering the telescope.

IRAS was an unqualified success. It completed an all-sky survey at wavelengths from 8 to 120 microns through four filters, cratered on 12, 25, 60 and 100 microns. Approximately 96% of the sky was mapped four times (once through each filter). Over 350,000 infrared sources were discovered. Of those, about 75,000 are thought to be starburst galaxies. Other sources are thought to be stars with dusty disks around them, including Vega. IRAS also provided the first direct image of our galaxy's center.

When mapping the entire sky, it was important to have as little noise as possible. Because our solar system is a thermal source, the same part of the sky was observed from different points in our orbit, so that it was looking through different parts of the solar system. There were also non-astronomical sources to be sorted out. IRAS itself was one source, plus dust orbiting Earth, as well as satellites and other debris from the space program. As an example, a dust particle 100 microns across, within 18 km of the telescope, at a temperature of 200 Kelvins would be detected as a strong source through 3 of the 4 filters. Cosmic rays and radiation trapped in Earth's magnetic field were also a nuisance.

To discover new objects, IRAS would observe the same part of the sky multiple times. First it would look a few seconds later to remove signals from random radiation. Then it would look back a few hours later to discount any slower-moving objects in our solar system. Finally, the same location would be observed a few weeks to months later to eliminate more distant, even slower-moving solar system objects, such as asteroids. In the process of eliminating moving objects in our solar system, IRAS discovered three asteroids, six comets, and a dust trail connected to comet Tempel-2. One of the

asteroids discovered was Phaethon, which is the source for the Geminid meteor shower.

After 10 months of mapping the sky, the superfluid helium supply ran out. This marked the end of IRAS' useful lifetime. On November 22, 1983, the mission came to an end. The telescope, however, is still in Earth orbit. While IRAS was the first, many infrared telescopes have followed in its footsteps, including: the Infrared Space Observatory (1995), the Spitzer Space Telescope (2003), the AKARI Space Telescope (2006), and WISE (2009), not to mention the upcoming James Webb Space Telescope, set to launch in 2018. As technology continues to improve, our views of the infrared universe will continue to amaze us, but it is worth remembering how it all began with IRAS.

References:

IRAS - Wikipedia

<http://en.wikipedia.org/wiki/IRAS>

LAMBDA - Infrared Astronomical Satellite

<http://lambda.gsfc.nasa.gov/product/iras/>

IRAS Explanatory Supplement

<http://irsa.ipac.caltech.edu/IRASdocs/exp.sup/>

President's message, continued from Page 1

the New Year. In early March, Comet C/2011 L4 (PANSTARRS) will pass by, possibly brightening to magnitude -1 in the early evening sky about mid month. This should just be a teaser for Comet C/2012 S1 (ISON), which will be visible first perhaps just after Halloween in the pre-dawn sky, becoming very bright by Thanksgiving, then rounding the Sun November 28. If this sungrazer makes it around, it will then be visible for another month in the evening AND the morning skies, as its path arcs into the northern sky. Brightness estimates, for what they are worth at this point, are as high as the full Moon. So even if it falls short, it should still make for some excellent public events.

I'm looking forward to helping you share our enjoyment of the night sky!

Clear dark skies,

Theo Wellington  
President

## Barnard-Seyfert Astronomical Society Minutes of a Regular Meeting of the Board of Directors Held On Wednesday, December 5, 2012

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 December 5, 2012. A sign-in sheet was passed around in lieu of a roll call. Board members Joe Boyd, Bill Griswold, John Harrington, Melissa Lanz, Bob Norling, Curt Porter, Bob Rice, and Theo Wellington were present. Board members Dr. Spencer Buckner, Steve Cobb, and Kris McCall were absent. BSAS member and ALCor (Astronomical League Correspondent) Mike Benson also attended. A quorum being present, President John Harrington called the meeting to order at 7:45 P.M.

John Harrington asked for corrections to the minutes of the previous board meeting held on November 7, 2012 and, there being none, pronounced them to be accepted as published in the December 2012 edition of the *Eclipse* newsletter. Treasurer Bob Norling reported that the Society had \$1,788.58 in its regular checking account and \$1,016.07 in its equipment account. Mr. Norling announced that he had ordered the 2013 editions of the Royal Astronomical Society of Canada's *Observer's Handbook*, Kalmbach Publishing Company's *Deep Space Mysteries Calendar*, and Guy Ottewell's *Astronomical Calendar* to be sold to members at a discount from the regular newsstand price. He recommended selling the *Handbooks* for \$25.00 and the *Mysteries Calendar* for \$10.00. He noted that a specific price for the Ottewell's *Calendar* could not be set until he received an invoice from the publisher. John Harrington encouraged the board to get the word out about bringing items for the silent auction at the upcoming annual Christmas party.

John Harrington announced these upcoming star parties:

- Dec 08 – Private star party at mm 435 on the Natchez Trace Parkway,
- Dec 15 – Public star party at Edwin Warner Park at 7:30 P.M. (Special Events Field),
- Jan 18 – Public star party at Bells Bend Nature Center at 7:30 P.M, and
- Feb 16 – Public star party at Shelby Bottoms Nature Center at 8:00 P.M.

Mr. Harrington acknowledged and thanked board member Kris McCall for her hard work in putting together the BSAS' 2013 star party list.

John Harrington reported that on November 30, 2012 he and Theo Wellington made a presentation on the solar system to a group of 5<sup>th</sup> grade home school students at Heritage Christian Academy; this was followed by solar viewing through telescopes outside. Mr. Harrington stated that he and Ms Wellington also planned to meet with Dyer Observatory's Director Rocky Alvey and possibly it's Outreach Astronomer Dr. Billy Teets about ways of attracting more college students to become BSAS members. Bill Griswold asked the board if they wished to renew the club's room rental agreement with the Cumberland Valley Girl Scout Council Building for 2013. Joe Boyd moved to do so and John Harrington seconded his motion that carried by a subsequent unanimous voice vote without additional discussion. Mr. Griswold pointed out that the board meeting scheduled for July 3, 2013 was just one day before the Fourth of July holiday. The board considered this and moved the meeting date to July 10, 2013.

Mike Benson suggested that the board consider changing the club's *Eclipse* newsletter's current stylized telescope logo back to the original photo-logo that depicted an actual eclipse. Mr. Benson also suggested including a list of all of the organizations to which the BSAS belonged. Bob Rice volunteered to acquire the meats, utensils, and other supplies for the December 19 Christmas Party.



Theo Wellington announced that the Adventure Science Center (ASC) might have an opening for their "Rusty Rocket" show and that they may have a "rocket day" on March 2, 2013. Ms Wellington also announced two possibly visible comets during 2013: PannStars in the low-western sky during March and ISON in the early morning during October through December. In addition, she pointed out that local backgrounds could be added to the popular Stellarium computer application and noted that she had done this for the surroundings at Shelby Bottoms Park. Joe Boyd announced that he had "volunteered" John Harrington and Theo Wellington to make a presentation at Blakeford at Green Hills.

John Harrington, whose term as BSAS president is expiring, thanked the membership and board for allowing him to serve in that capacity during 2012. Curt Porter, whose term as a board member is also expiring, announced that he will continue to serve as the Chairman of the Sign Committee that oversees the directional signs used at the club's star parties. Mr. Porter suggested that a list of the BSAS' committee chairpersons be included in the *Eclipse* newsletter. Bob Norling suggested that a list of nearby astronomy clubs might also be included. Mr. Porter suggested that a "text only" option be added as a fallback link for the club's website.

Since there was no additional business to discuss, President John Harrington declared the meeting to be adjourned at 9:55 P.M.

Respectfully submitted,  
Bob Rice, Secretary

## **Barnard-Seyfert Astronomical Society Minutes of the Monthly Membership Meeting Held on Wednesday, December 19, 2012**

Members began arriving at the Cumberland Valley Girl Scout Council Building around 6:30 P.M. – an hour earlier than our usual starting time – for the Society's December meeting, annual Christmas potluck dinner, and silent auction. Following our long-standing tradition the BSAS provided the meats, drinks, plates, and dining utensils while the members brought a sumptuous array of side dishes and desserts. Setting the food on the tables was combined with fellowship and casual conversations. President John Harrington asked Bill Griswold to say the blessing and everyone then went through the self-serving line. Dining was intermingled with visits to examine and place bids on items at the silent auction tables.

John Harrington called the meeting to order at 7:43 P.M. and welcomed members and guests. Mr. Harrington reported that the BSAS' current bank balances were little changed from last month's balances of \$1,788.58 in its regular checking account and \$1,016.07 in its equipment account. He then announced these upcoming star parties for 2013:

- Jan 12 – Private star party at mm 412 (Water Valley Overlook) on the Natchez Trace Parkway,
- Jan 18 – Public star party at Bells Bend Nature Center from 7:00 to 9:00 P.M.,
- Feb 09 – Private star party at mm 435.5 on the Natchez Trace Parkway, and
- Feb 16 – Public star party at Shelby Bottoms Park from 7:00 to 9:00 P.M.

He asked members to see Secretary Bob Rice about their 2013 calendar and handbook orders. Theo Wellington introduced guest Jessica House from the Tennessee State Parks Office.

John Harrington commenced the annual election of BSAS officers and directors for 2013 by announcing these candidates recommended by the Nominating Committee: President – Theo Wellington; Vice-President – Joe Boyd; Secretary – Bob Rice; Treasurer – Bob Norling; board members at large to serve three year terms – Bill Griswold and Poppy Simmons; and Dr. Spencer Buckner to finish out the remaining two year term of board member Theo Wellington who was nominated to serve as President.

This election would normally have been held at the previous November membership meeting but was moved back a month due to the November meeting date's being changed because of its proximity to the Thanksgiving holiday. Mr. Harrington then asked for nominations from the floor and, since there were none, asked for a motion to accept the recommended slate of candidates by acclamation. A member so moved and another member seconded this motion that was subsequently approved by a unanimous voice vote of the attending members. The newly elected officers and directors will assume their duties at the January 9, 2013 board of directors meeting.

John Harrington introduced BSAS member Bud Hamblen who delivered the evening's program about his trip to Australia to observe the November 14, 2012 total eclipse of the sun. Mr. Hamblen explained that his trip to Australia was handled through Insight Cruises and was sponsored by Sky and Telescope Magazine. His observing destination was originally scheduled for Cairns in Far North Queensland but predicted cloudy skies resulted in a "Plan B" detour to Mareeba in the same general region. He said that their observing site was literally in a rural area off the side of the road. Mr. Hamblen described totality as being an eerie and wonderful experience with the corona glowing around the sun's moon-shadow darkened disk. He noted that prominences could easily be seen through even modest binoculars and that hot air balloons went aloft to provide views for their riders. Mr. Hamblen displayed a striking photo of mid-eclipse totality taken by engineer Eric Holcomb. He also showed his own photos of side trips taken to "The Dish" radio telescope, the Siding Observatory, the Royal Botanical Gardens, the Sydney Aquarium, the cliffs near Bondi beach (famous for surfing), and the Great Barrier Reef which he toured in a catamaran. Mr. Hamblen concluded by mentioning upcoming solar eclipses including next year in Africa, 2016 in Indonesia, and 2017 in the USA. He then graciously answered questions from the audience.

John Harrington told the audience that he had enjoyed serving as the BSAS' President and stated that he was especially pleased with the first telescope clinic earlier this year and looked forward to a joint meeting with the Cumberland Astronomical Society sometime in the near future. Mr. Harrington then introduced President-Elect Theo Wellington noting that she was the first female to be elected to that office. Ms Wellington – with her characteristic good humor – explained that she grew up with an interest in astronomy and space travel while the US was landing on the moon and pursued that interest into college where she earned a degree in astronomy without ever particularly noting or caring that that these endeavors were at the time typically considered to be things that men did. She said that she was proud of her daughter Danika, who was in the audience, for being a graduate student of Planetary Science in Arizona and noted that Danika's interest in that subject was fueled by attending BSAS meetings and star parties. Ms Wellington further noted that there was a lot of room for girls in astronomy today and that new telescope users need to be encouraged. She stated that the possibility of two bright comets during 2013 might provide good public outreach opportunities. Following a tradition started several years ago, John Harrington passed the president's floppy gavel to Ms Wellington.

Since there was no additional business to discuss, President Harrington declared the membership meeting to be adjourned at 8:55 P.M.

Respectfully submitted,  
Bob Rice, Secretary

## Become a Member of the BSAS!

Download and print the Application for membership from [www.bsasnashville.com](http://www.bsasnashville.com) (Adobe® Acrobat Reader® required).

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, which include membership in the BSAS and Astronomical League, and subscriptions to their newsletters, are:

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

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

All memberships have a vote in BSAS elections and other membership votes.

Also included are subscriptions to the BSAS and Astronomical League newsletters.

### IMPORTANT DUES INFORMATION

To find the expiration date for your current membership, visit our web site at <http://www.bsasnashville.com> and click the Renewals link.

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

## About Our Organization

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 [www.bsasnashville.com](http://www.bsasnashville.com). If you need more information, write to us at [info@bsasnashville.com](mailto:info@bsasnashville.com) or call John Harrington at (615) 739-4500.

[BSAS on Facebook](#)

## 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 Lonnie Puterbaugh at 615-661-9540.