



The ECLIPSE



The Newsletter of the Barnard-Seyfert Astronomical Society

Organized in 1928

December 2012

The Membership meeting will be held on December 19, 2012 at the Cumberland Valley Girl Scout Council Building located at the intersection of Harding Place and Granny White Pike.

Come join us Wednesday evening December 19th at 6:30 P.M. - One hour earlier than our usual meeting time - for our annual Christmas Pot-Luck Supper & Silent Auction. Just bring a side dish of your choice & the club will supply the entrees, drinks, plates, silverware, etc. Also please bring any books or other items – even if just vaguely astronomy related – that you would like to donate for our fund-raising Silent Auction that will run concurrently with the supper. BSAS member Bud Hamblen will give a brief presentation on his observation of the November 13, 2012 total solar eclipse that was visible from the Southern Pacific. In addition, we may also have a presentation by a BSAS member & astronomy graduate student on her recent planetary studies! All BSAS members along with their family & guests are welcome.

Upcoming Events

Board of Directors Meeting, December 5 at the Cumberland Valley Girl Scout Building – 7:30 pm

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FROM THE PRESIDENT

As 2012 winds down, it's time once again for changes in the leadership of our club. As is our long tradition, the BSAS Nominating Committee recently met to consider a slate of officers and directors to propose for 2013. Without further ado, here is the slate of nominees:

- President: Theo Wellington, who works as an educator at the Adventure Science Center and Sudekum Planetarium, has agreed to be nominated for President of our club. Theo's passion for astronomy is boundless, as demonstrated during her excellent presentation on the transit of Venus during our May membership meeting.
- Vice-President: Joe Boyd has agreed to be nominated to continue serving in the VP role. Joe is a past president of the BSAS and brings a wealth of knowledge to the VP role. Joe worked as an attorney and legal instructor for many years, has been active in the local Civil Air Patrol chapter, and is a former U.S. Navy officer.
- Secretary: Bob Rice has agreed to be nominated once again to serve as our Secretary. Bob faithfully produces well-crafted minutes of our membership and board meetings. He is a retired auditor with the Tennessee State Comptroller's Office, is active in the local Boy Scouts district, and first became a member of the BSAS in 1956 (!).
- Treasurer: Bob Norling has agreed to be nominated once again to serve as our Treasurer, a role he performs with quiet

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OFFICERS

John Harrington
President
HarringtonJohn@bfusa.com

Joe Boyd
Vice-President
boydjoe@comcast.net

Bob Rice
Secretary
brice_65@yahoo.com

Bob Norling
Treasurer
rdncpa@mindspring.com

Spencer Buckner
Ex-officio
buckners@apsu.edu

Directors at Large

Steve Cobb
s.a.cobb@comcast.net

Bill Griswold
bgriz@comcast.net

Melissa Lanz
melissa_lanz@yahoo.com

Kris McCall
planetmccall@gmail.com

Curt Porter
curt_w_p-bsas@yahoo.com

Theo Wellington
tmwellington@comcast.net

Bill Griswold
Newsletter Editor
bgriz@comcast.net

Observing Highlights

Moon phases

December 2012
12/06 LAST Quarter
12/13 NEW Moon
12/20 FIRST Quarter
12/28 FULL Moon

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

Objects:

Globular Clusters
M15, M2, M72, M75,
M30, M79

Open Clusters

M73, M29, M39, M52, NGC457
(ET), M103, NGC654, NGC663,
NGC884/869
(Double Cluster), M34, M45,
M36, M37, M38

Nebula

NGC7000 (North America),
IC5146 (Cocoon), NGC7293
(Helix), M76 (Little
Dumbell), NGC1499 (California),
M1, M42 (Orion), M43, M78

Galaxies

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

Multiple Star Systems

Gamma Delphini, Polaris

Variable Stars

Mu Cephei (Herschel's Garnet Star),
Beta Persei (Algol), Omicron Ceti
(Mira), R Leporis (Hind's Crimson
Star)

Planets

Uranus, Neptune, Jupiter

Star Parties for months of December 2012 and January 2013

- December 8: Private Star Party at Natchez Trace Parkway
MM 435.5
- December 15: Public Star Party at Edwin Warner Park at
Special Events Field (airplane field) at 7:30PM
- January 12: Private Star Party at Natchez Trace Parkway
MM 435.5
- January 18: Public Star Party at Bells Bend Nature Center
at 7:00PM

Happy Birthday Apollo 17

by Robin Byrne

This month we celebrate the last time man left Earth orbit. Although the Apollo missions were originally scheduled up through Apollo 20, by 1972 interest in continuing going to the Moon was waning and funding was drying up, so the decision was made to make Apollo 17 the last Moon mission.

But before they could go, a landing site needed to be chosen. Because this was our last chance to bring home samples from the Moon, it was important to find a site that would be different from all the previous landings. The first goal was to find a site where old highland material was available. Second, they also wanted to find young (less than 3 billion years old) volcanic material. From orbit, they wanted the orbital track to cover new areas that had not yet been studied extensively during previous missions, but still overlap some of the older mission paths to study the same features with new instruments. Ultimately, the decision was made to land in the Taurus-Littrow valley. The south wall of the valley had recently experienced a landslide and would be a good location for finding old highland material, and one of the craters had a dark rim that could indicate new volcanic material (however, the samples brought back found that was not the case).

Crew rotations were designed so that one mission's backup crew would be the prime crew 3 flights later. Gene Cernan, Ron Evans and Joe Engle had been the backup crew for Apollo 14, so they were slated to be the Apollo 17 crew. Meanwhile, Harrison Schmitt, the only professional geologist in the astronaut corps, would have flown on Apollo 18. Due to the cancellation of the later missions, the scientific community pressured NASA to fly Schmitt on the last mission. NASA agreed, but then had to decide whether to replace Joe Engle with Schmitt, or to replace the entire crew with the Apollo 18 crew. The decision was made for Gene Cernan to be the mission Commander, Ron Evans the Command Module Pilot, and Harrison Schmitt the Lunar Module Pilot.

On December 7, 1972 at 12:33 am Apollo 17 launched from the Kennedy Space Center. This was the only night launch of the Apollo missions, and was visible up to 500 miles away. After reaching Earth orbit and confirming that everything was working properly, the third stage of the Saturn V rocket was lit, and the crew left Earth orbit on their way to the Moon. Three days later, they reached their destination and entered lunar orbit. Cernan and Schmitt immediately began preparing the Lunar Module and by the next day, they were heading for their landing site. Evans would remain alone in the orbiting Command Module for the next three days.

Apollo missions were designated by letters to indicate what would occur. The first Moon landing by Apollo 11 was a G-type mission. H-type missions included precision landings, a two-day stay on the Moon, and two Lunar Extravehicular Activities (LEVA's). Apollo 17 was a J-type mission, which meant staying on the Moon for three days, three LEVA's, more scientific equipment, and the use of the Lunar Roving Vehicle (LRV). This was the third, and last, J-type mission. The LRV was put to good use throughout the mission. Not only did it carry the astronauts to the various sites they wanted to sample, but also held their tools, communication equipment, scientific instruments, and carried back all of their rocks. During Apollo 17, they traveled over 20 miles in total.

A wide variety of scientific experiments were conducted during the mission. Apollo 17 was the only Moon mission to carry the Traverse Gravimeter Experiment (TGE), which measured the local gravitational intensity at various locations around the landing site. This would then give clues about what materials would be found below the surface. The landing crew also performed the Surface Electrical Properties experiment. It was comprised of a transmitter near the Lunar Module and a receiver on the LRV. At various stops they would measure the strength of an electrical signal sent

from the lander to the rover through the ground. This confirmed the almost entire lack of water in the lunar soil. They also deployed explosives to be set off after they left the Moon's surface. Seismographs put in place by this crew and previous Apollo crews across the Moon could then measure the seismic waves and create a preliminary model of the Moon's structure. And, of course, they gathered a wide variety of lunar samples wherever they went, including the unusual orange sand. Meanwhile, in orbit, Ron Evans was using the Scientific Instrument Module (SIM) to perform three different experiments. The lunar sounder bounced electromagnetic signals off of the Moon to determine the structure to a depth of 0.81 miles. The Infrared Scanning Radiometer created a thermal map of the Moon's surface. The Far-Ultraviolet Spectrometer made measurements of the composition and density of the Moon's tenuous atmosphere. While in transit between the Earth and Moon, the crew conducted experiments to try to determine the source of light flashes that many of the astronauts observed through their closed eyelids while trying to sleep. They confirmed what had been expected, that the flashes were due to cosmic rays hitting the retina.

On December 14, 1972 Cernan and Schmitt left the Moon's surface and joined up with Evans in lunar orbit. Once all samples were transferred to the Command Module, the Lunar Module was jettisoned so that it could crash into the Moon for another seismic experiment. On December 19, they safely arrived back home on Earth. The Command Module is now on display at the Johnson Space Center in Houston, Texas.

Many records were broken in this mission. The LRV drove farther than on any previous mission, the 75 hours Cernan and Schmitt stayed on the Moon was (and still is) a record amount of time on the Moon, and they brought back a record-breaking 243 pounds of Moon rocks. But beyond the records, this mission stands out as the last time anyone ventured out of Earth orbit. NASA is hoping to change that with the Orion and SLS launch vehicles. It has been 40 years since we have been to the Moon. It is time for us to boldly go back to the Moon and onward to asteroids and Mars. Ten years from now, I don't want to still be saying that Apollo 17 was the last time we left Earth orbit.

References:

Apollo 17 - Wikipedia

http://en.wikipedia.org/wiki/Apollo_17

NASA - Apollo 17

http://www.nasa.gov/mission_pages/apollo/missions/apollo17.html

Lunar and Planetary Institute - Apollo 17

http://www.lpi.usra.edu/lunar/missions/apollo/apollo_17/

List of Apollo mission types - Wikipedia

http://en.wikipedia.org/wiki/List_of_Apollo_mission_types

Barnard-Seyfert Astronomical Society

Minutes of the Regular Meeting of the Board of Directors

Held On Wednesday, November 7, 2012

President John Harrington called the meeting of the BSAS board of directors to order at 7:41pm on November 7, 2012 at the Cumberland Valley Girl Scout Council Building. Members present: Joe Boyd, Spencer Buckner, Steve Cobb, Bill Griswold, John Harrington, Bob Norling, Curt Porter and Theo Wellington. Absent: Melissa Lanz and Kris McCall. President Harrington asked for any changes or additions to the minutes of the October 3, 2012 board of directors meeting. None being proposed, Steve Cobb moved and Bill Griswold seconded a motion to approve the minutes which subsequently passed by unanimous vote.

Treasurer Bob Norling reported that the club has \$2188.23 in the regular account and \$1016.07 in the equipment account. He also mentioned that orders were being taken for the Kalmbach Publishing Company's *Deep Space Mysteries Calendar*, Guy Ottewell's *Astronomical Calendar*, and the Royal Astronomical Society of Canada's *Observer's Handbook* with a deposit of \$5 required for each. The actual order for the books and calendars is expected to take place shortly after the membership meeting on November 28, 2012.

President Harrington announced the following upcoming star parties:

- November 10 private star party at Natchez Trace mile marker 412 (Water Valley Overlook)
- November 16 public star party at Bowie Nature Park starting at 7:30pm
- November 17 public star party at Shelby Bottoms Nature Center starting at 7:30pm
- December 8 private star party at Natchez Trace mile marker 435.5
- December 15 public star party at Edwin Warner park starting at 7:30pm

Bill Griswold explained that the errors in the November *Eclipse* newsletter were due to formatting bugs between his computer and the version of the President's message sent to him by John Harrington. John stated that he would resend the President's message in plain text and work with Bill to get the problem corrected. Bill Griswold stated that once the problems were fixed he would resend the *Eclipse* to all members. A discussion about the President's Message then ensued in which it was agreed that it need not be of any significant length. While a space will be left open each month for the President's Message, it could be anything from a brief paragraph to a page or more at the discretion of the president. Bill Griswold requested he receive the message at least four days before the end of the month to give him time to put the newsletter together.

President Harrington brought it to the attention of the board that Pickett State Park was seeking status as an official Dark Sky Site, recognized by the International Dark Sky Association. The park rangers had requested that the BSAS sponsor their application. President Harrington had informed the rangers that they may also wish to contact the Cumberland Astronomical Society since they are physically closer to Pickett State Park. A formal motion was not called for at the meeting as the process of getting recognition from the IDA was still in its infancy. All members present encouraged President Harrington to continue his contact with the Pickett State Park rangers and to keep the board informed on the progress. At the same time the board approved a motion (Curt Porter moved and Steve Cobb seconded) that Vice-president Joe Boyd spearhead an effort to revitalize the Middle Tennessee chapter of the International Dark Sky Association. The chapter had been organized several years ago but suffered from the loss of both of its principle leaders in a one year period and fell into idleness.

President Harrington thanked the members of the combined Star Party committee and Nominations

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committee for their efforts at a marathon session on Thursday November 1 at his home. The finalized dates for the public star parties that Kris McCall had put together (thanks from all for the major effort Kris puts in making all the arrangements) was approved by the committee. A list of possible private star parties on the Natchez Trace was proposed and Bill Griswold agreed to contact the park rangers to get approval for the club. John Harrington agreed to contact Mark Manner about possible dates for the Messier Marathon and annual BSAS picnic.

The Nominations committee proposed the following slate of candidates for 2013:

- President...Theo Wellington
- Vice-president...Joe Boyd
- Treasurer...Bob Norling
- Secretary...Bob Rice
- Director-at-large...Bill Griswold
- Director-at-large...Poppy Simmons
- Director-at-large...Spencer Buckner to fill the last two years of Theo Wellington's term.

In addition, the board formally approved (moved by Joe Boyd and seconded by Steve Cobb) moving the vote on new officers and directors to the December 19, 2012 membership meeting instead of the November meeting as called for in the bylaws.

President Harrington announced that Heritage Christian Academy was asking for speakers to talk to their home schoolers about astronomy. Interested volunteers should contact John Harrington for details. President Harrington also mentioned that the Boy Scouts were planning on building an observatory at Latimer Reservation and were seeking advice and support from the BSAS and other interested parties. They are still in preliminary plans and aren't sure what they want but several members expressed a willingness to help out with advice in whatever the Boy Scouts decide to do. Finally, John Harrington expressed his desire to see the club make a concerted effort to attract college students into the club by contacting astronomy instructors at the local colleges and universities. The possibility of a non-voting board position reserved for college students was suggested but no formal motion was made. As he will be leaving the presidency at the December meeting, Mr. Harrington urged the incoming president to further pursue outreach to local colleges and universities.

Having no more business before the board, John Harrington adjourned the meeting at 8:50pm.

Prepared by Spencer Buckner for Secretary, Bob Rice

End of minutes of Board of Directors meeting

President's Message continued from Page 1

- efficiency. Bob is a retired certified public accountant who worked for Price Waterhouse and then had his own firm. He enjoys genealogy when not out stargazing.
- Director at Large: Prof. Spencer Buckner has agreed to be nominated to serve out the remaining two years of Theo's term on the BSAS Board. Prof. Buckner has taught at Austin Peay State University since 1999 and holds a Ph.D. in Physics from Texas Tech University.
- Director at Large: Poppy Simmons, a relatively new member of the BSAS, has agreed to be nominated to serve as a Director at Large. Poppy works in the meeting and convention business. Besides astronomy, her interests include playing the guitar and foreign travel.

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- Director at Large: Bill Griswold, who faithfully edits The Eclipse each month, has agreed to be nominated to serve another term as a Director. Bill is an aeronautical engineer who worked at Avco Aerostructures (now Vought Aircraft) for many years and is a longtime BSAS member, having first become a member in 1947 and with Carl Seyfert as his astronomy professor at Vanderbilt University.
- Director at Large: Finally, as is BSAS tradition (and as stated in our bylaws), I'll become a Director by virtue of being the immediate past President of our club. Let me say that, while I've thoroughly enjoyed leading the BSAS for the last year, the demands of my day job make it impractical for me to try to serve again.

In summary, we're fortunate to have a wealth of highly capable members who are passionate about astronomy. I'd like to give a particular tip of the hat to Curt Porter, who will be finishing out his term as a Director this year. Curt has contributed mightily to the BSAS and we hope he will stay closely involved with our club going forward!

All members of the BSAS will have the opportunity to vote on nominees or to propose alternatives at the December membership meeting.

Clear skies and happy holidays to all,
John Harrington

End of Board of Directors Minutes

Barnard-Seyfert Astronomical Society Minutes of the Monthly Membership Meeting Held On Wednesday, November 28, 2012

President John Harrington called the meeting to order at 7:43 P.M. on November 28, 2012 at the Cumberland Valley Girl Scout Council Building in Nashville, Tennessee; this meeting would normally have been held on November 21 but was moved forward a week because of a potential conflict with the Thanksgiving holiday. Mr. Harrington welcomed members and visitors. Treasurer Bob Norling reported that the BSAS had \$2,188.23 in its regular account and \$1,016.07 in its equipment account.

John Harrington announced these upcoming star parties:

- Dec 08 – Private star party at mm 435.5 on the Natchez Trace Parkway;
- Dec 15 – Public star party at Edwin Warner Park from 7:30 P.M. to 9:30 P.M; and
- Jan 18 – Public star party at Bells Bend Outdoor Center from 7:30 P.M. to 9:30 P.M.

John Harrington announced that Jack Spearman, President of the Cumberland Astronomical Society, had informed him that a member of that organization was offering an eight inch Schmitt-Cassegrain telescope for sale and that Mr. Spearman could be contacted for more information. BSAS member John Walker announced that he had a ten inch Orion dobsonian telescope for sale.

John Harrington announced that the BSAS will have its annual Christmas potluck dinner at the upcoming December 19 membership meeting. He explained that the BSAS will again supply the meat, drinks, plates, cups, and utensils and the members may bring side dishes of their choice. He also noted that the meeting will begin at 6:30 P.M. with dining commencing shortly thereafter

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Kris McCall reminded members that a silent auction will also be ongoing during the meeting and supper as a fund raiser for the BSAS.

Mr. Harrington announced that the annual election of BSAS officers and directors for 2013 will also be held at the December 19 membership meeting and related these Nominating Committee recommendations: President – Theo Wellington; Vice-President – Joe Boyd; Secretary – Bob Rice; Treasurer – Bob Norling; and Board Members at Large: – Dr. Spenser Buckner (to fill the last two years of current director Theo Wellington’s term); Bill Griswold; and Poppy Simmons. Mr. Harrington stated that a brief bio of each candidate will appear in the December 2012 *Eclipse* newsletter and pointed out that nominations will also be solicited from the floor at the election. He then thanked board member Curt Porter, whose term is expiring, for his service to the BSAS; this was followed by a round of applause from all present. Curt Porter announced that he had placed the nametags that were not picked up by members at previous meetings on the front sign-in table. He also announced that Poppy Simmons will be overseeing the club’s directional arrow signs used at star parties.

John Harrington introduced Dr. Spencer Buckner, a BSAS past-president and currently Associate Professor of Physics and Astronomy at Austin Peay State University, who delivered the evening’s program on “Making the World’s Largest Mirrors.” The subject of Dr. Buckner’s presentation involved the latest activities and accomplishments of the University of Arizona’s Steward Observatory Mirror Lab (SOML) in Tucson, Arizona – a place he has professionally visited five times. Amazingly, the SOML is physically located underground directly beneath the bleachers of the University’s football field! But this is exactly where the largest telescope mirrors in the world are being produced – currently 8.4 meter behemoths (almost 28 feet in diameter) - in a process that takes about four years. Two of these mirrors are now housed in the Large Binocular Telescope located on Mount Graham in southwestern Arizona.

Dr. Buckner described and showed pictures – some made by him during his visits – of the elaborate and demanding processes involved during the incredible heating, casting, and polishing of these huge glass assemblies. All of the raw glass materials are supplied for eight million dollars by a corporation in Japan with the sand coming from Florida’s gulf coast. Using an amazing array of machinery (such as a rotating furnace) and advanced optical, thermal, and mechanical engineering skills, all of the mirrors are assembled with computer-controlled adjustable sections to utilize the latest adaptive optical techniques for overcoming atmospheric disturbances. The latest project underway is the Giant Magellan Telescope that will use seven 8.4 meter mirrors for a combined diameter in excess of eighty feet and will be located in Chile sometime around 2020. Currently two of its mirrors have been completed. Also in the works is the Large Synoptic Survey Telescope (LSST) that will use one wide angle 8.4 meter mirror to systematically survey the entire sky each week in multiple colors. One of its many applications will include detecting potentially dangerous near-earth objects. The LSST is projected to be in service around 2022. Dr. Buckner concluded by enthusiastically answering a lengthy series of questions from the audience.

Since there was no further business to discuss, President Harrington declared the meeting to be adjourned at 8:51 P.M.

Respectfully submitted,
Bob Rice, Secretary

Become a Member of the BSAS!

Download and print the Application for membership from 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. If you need more information, write to us at 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.