

Upcoming Events

Board of Directors Meeting

July 1st at the Cumberland Valley Girl Scout Council Building – 7:30 pm

August 6th at the Cumberland Valley Girl Scout Council Building – 7:30 pm

Membership Meeting

July 15th at the Adventure Science Center – 7:30 pm

August 19th at the Adventure Science Center – 7:30 pm

Star Parties

July 10th - BSAS Private Star Party at Natchez Trace mile marker 435.5

July 17th - BSAS Public Star Party at Long Hunter State Park - 8:30-10:30 pm

August 7th - BSAS Annual Picnic and Private Star Party at Spot Observatory 4:00p.

August 14th - BSAS Public Star Party at Warner Park Special Events Field - 8:30-10:30 pm

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Monthly Membership Meeting

Thursday, July 15, 2010
Adventure Science Center
7:30 pm



MTSU has both a new telescopic observatory and a naked-eye observatory. At this month's meeting, Dr. Eric Klumpe will give a status report of both facilities, providing details that illustrate the utility of each facility in MTSU's astronomy courses and public outreach program.



From The President

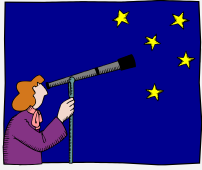
Greetings and clear skies from your president. I hope everyone is bearing up under the summer heat. While it is nice to have warm comfortable nights for viewing the sky, the flip side is that we have to deal with hot days. I recently was out at Kitt Peak near Tucson Arizona and the nights were actually cool up on the mountain. The days in town were near 100°, though. The difference was all in the humidity. The saying they always use in the desert climates is "but it's a dry heat so it isn't bad". That may be true when it is only in the 90's but when it is 105° it just feels like a blast furnace. It's hot!

Our efforts to set up a mechanism to have our club astrophotographers submit their images to bsasnashville.com for the new brochure have run into a technical snag. Fortunately, we have located another 100 or so old brochures we can use at upcoming star parties and events so a bit of delay in the selection and eventual publication won't hurt us too much. Keep watching the website for an announcement on how you can submit your image. In the meantime, you can lay out plans to make that perfect image you have wanted to try and get it ready for submitting. The vote for the best image will be put off for at least a month or two so you have time to take all the frames and do all the processing to make the perfect image.

I want to thank Dr. Chuck Higgins for his interesting talk on the rotation rates of the gas giants at last month's meeting. The fact that they don't have a single rotation rate is something that many of us probably never knew about but being big balls of gas makes that possible. I was especially interested in hearing that the rotation rate of Saturn seems to be changing. Obviously there is a lot going on inside the gas giants that we simply do not understand. Our speaker for the July meeting is the final in our MTSU summer speaker series.

Dr. Eric Klumpe is the man most responsible for the construction of the naked-eye observatory in the center of the MTSU campus known as the Uranidome. Naked-eye astronomy is an overlooked form of astronomy that can be very rewarding if you know what, where and how to look. Observing the motions of the five visible planets, the Sun and Moon against the background of the fixed stars occupied much of the history of mankind.

Continued on Page 2



"It's not that I'm so smart, it's just that I stay with problems longer."

Albert Einstein
1879-1955

FREE TELESCOPES!

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, and a waiting list may be 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.

Observing Highlights

all times listed are Central Standard Time

LUNAR PHASES

July 2010

07/04 LAST Quarter
07/11 NEW Moon
07/18 FIRST Quarter
07/26 FULL Moon

August 2010

08/03 LAST Quarter
08/10 NEW Moon
08/16 FIRST Quarter
08/24 FULL Moon

OBJECTS VISIBLE THIS MONTH

Messier Objects:

Galaxies:

M83

Globular Clusters:

M3, M4, M5, M53, M68, M80

**Delta Aquarids meteor shower:
July 28-29**

**Capricornid meteor shower:
July 29-30**

From the President, cont.

Before the invention of the telescope early in the 17th century naked-eye astronomy was the only way to observe. The Uranidome on the MTSU campus is a fascinating structure with lots of interesting features that show you how to make all sorts of astronomical observations. It is in the center of campus and open to the public so if you haven't been down to Murfreesboro the see it you should take the trip some Saturday afternoon. You'll be glad you did.

Speaking of astronomical observing, I would like to make a plug for looking at something more than pretty clusters, nebulae and galaxies. Observing variable stars can be an intellectually rewarding experience and you don't need a lot of expensive equipment to do it with. There is a large variety of variables and observing some of them can even be done with the naked eye. The easiest one to observe is the star Algol. It currently rises just before midnight and is a partially eclipsing binary. Algol is the second brightest star in the constellation Perseus and is normally a magnitude 2 star so it is visible even in the light polluted skies of the city. Sky & Telescope even publishes times of minima for Algol. The dimming is a little over a full magnitude and takes place over a couple of hours before the system returns to its normal brightness. Algol is just one of many variable stars, some of which have an even greater change in brightness but can only be reached with a telescope. If you are interested in doing serious variable star observing there is even an organization set up to help you. The American Association of Variable Star Observers (www.aavso.org) was formed in 1911 and has an extensive network of observers around the world. A few of their members use high end equipment costing over a hundred of thousand dollars but most use the kinds of equipment you might see at one of our star parties: a 10" SCT and an inexpensive CCD. Some even do eyeball observing through small refractors. Whatever level you might be interested in, from naked-eye observing of Algol it to going out and getting a CCD and larger 'scope, I encourage you to explore the joys and intellectual stimulation of variable star observing. There is an excellent article in the August Astronomy on variable star and other types of observing being done by amateurs that you should check out if you are interested in learning more.

Dr. Spencer Buckner
President

Happy Birthday Deep Impact

by Robin Byrne

This month we celebrate the fifth anniversary of an event that has helped to reveal more information about comets and our solar system's origin. The eighth in NASA's Discovery Mission series, Deep Impact was designed to rendezvous with, and then send an impactor probe into, a comet. Before, during and after the collision, the flyby spacecraft monitored the results. The goal was to better understand the composition and physical structure of comets. It all began January 12, 2005, when the Deep Impact spacecraft was launched from Cape Canaveral atop a Delta II rocket. By July of the same year, Deep Impact had caught up with its target.

Comet Tempel 1 was discovered by Ernst Tempel in 1867. With an orbital period of 5.5 years, this comet has passed through the inner solar system innumerable times. Comets are thought to be composed of primordial materials from which all of the planets and moons formed. However, unlike the planets and moons, the interiors of comets are composed of ice, gas and dust particles that have been largely unchanged since the solar system's birth. Meanwhile, the outer layers undergo changes with each pass of the Sun. With such a short orbital period, an impact with Comet Tempel 1 provides an unique opportunity to study both the primordial materials in its interior, as well as the changes the surface of comets undergo as they near the Sun.

Late evening, July 3, 2005, at a distance of 83 million miles from Earth, the Deep Impact flyby spacecraft released the impactor. The impactor maneuvered into the comet's path while the flyby spacecraft moved to a safe distance for observing what happened next. Early morning, July 4, the fireworks began. The copper-tipped impactor, running on its own batteries, flew toward the comet. Up to the final seconds prior to impact, onboard cameras continuously sent images of the comet's nucleus back to Earth. Meanwhile, the flyby spacecraft waited to record optical and infrared images of the impact, the material released, and of the resulting crater.

The spacecraft itself wasn't the only one watching the early 4th of July show. Also monitoring the event from space were the Spitzer, Hubble and Chandra orbiting observatories. From Earth, several professional and amateur telescopes were trained on the comet for any sign of brightening. Others monitored for any visible naked-eye changes. Enough brightening did occur to saturate the flyby spacecraft's cameras, and was recorded by all telescopic observations, though naked-eye observers did not detect any change. Those without a direct means of observing the impact were able to watch nearly real-time images of the impact on several internet sites.

Some of the questions scientists were hoping to answer with this mission included: do comets lose all of their dust and gas to space, or does some of it remain sealed in the comet's interior? What is the internal structure and composition of a comet, and how does the interior differ from the surface? What clues can comets give us to how our solar system formed? What would happen if a comet collided with Earth? The early results started to answer some of these questions.

Immediately after impact, spectra of the ejected debris showed signs of microscopic dust, water ice, carbon dioxide ice and hydrocarbons. Analysis of how the comet reacted to the impact indicate that the comet is held together by gravitational forces (rather than being frozen together), and that it is more of a loose conglomerate of materials, instead of a tightly packed snowball.

The discovery of water ice was particularly exciting. Water ice inside of comets had been known about for some time, but what surprised scientists was the discovery of sparsely distributed water ice on the comet's surface. Is there some mechanism that redistributes water to the surface? Comets are one possible way water was delivered to the newly formed Earth. Having a better understanding of how water is distributed within a comet will better aid in modeling the delivery of that water to Earth. Also observed was an abundance of organic compounds, such as hydrocarbons, in the interior of the comet. The presence of water and hydrocarbons may provide clues to the origins of life, since both are fundamental to life on Earth.

Observations made by the Spitzer Space Telescope provided additional information about the comet's composition. Observing in the infrared, Spitzer analyzed material ejected by the impact. Not surprisingly, much of the comet's "dust" was comprised of abundant compounds, such as silicates (the same materials that make up most of the rocks on Earth's surface). What was unexpected was the discovery of clay and carbonates. On Earth, these require liquid water to form. If a comet is in a constant frozen state, where did these come from? One thought is that the materials from which the planets formed were more mixed than previously thought. Materials found in the warmer regions near the Sun (where liquid water would have existed) may have mingled with frozen outer solar system materials to form into comets.

There were other compositional surprises discovered by Spitzer. Compounds that contain iron were observed. Iron had never before been detected in a comet. Some of the hydrocarbons detected are also new to comet observations. The silicates that were detected were incredibly fine-grained, smaller than sand, and included olivine, which is more commonly associated with inner solar system objects, such as asteroids and terrestrial planet interiors, than with comets found in the outer solar system.

All that has been discovered about the composition and structure of Comet Tempel 1 will now be used by astronomers to better model the materials and events of our solar system's formation. Why are we here? Where did we come from? These are fundamental questions that humankind has been asking for millennia. The Deep Impact mission has provided one more piece of the puzzle of our existence. So, this Fourth of July, as you enjoy the fireworks, pause to remember the amazing fireworks that occurred 5 years ago and 83 million miles away - fireworks that celebrated not just the birth of a nation, but the birth of our entire solar system.

References:

Deep Impact: Mission Fact Sheet
<http://deepimpact.umd.edu/mission/factsheet/factsheet.html>

NASA - Deep Impact Team Reports First Evidence of Cometary Ice
http://www.nasa.gov/mission_pages/deepimpact/media/deepimpact_water_ice.html

NASA - NASA's Spitzer and Deep Impact Build Recipe for Comet Soup
http://www.nasa.gov/mission_pages/deepimpact/media/spitzer-di-090705.html

Board Meeting Minutes – June 3, 2010

Bob Rice, Secretary

The board of directors of the Barnard-Seyfert Astronomical Society met in regular session at the Cumberland Valley Girl Scout Council Building in Nashville, Tennessee on June 3, 2010. A sign-in sheet was passed around in lieu of a roll call. Board members Dr. Spencer Buckner, Tony Campbell, JanaRuth Ford, Bill Griswold, Dr. Donna Hummell, Santos Lopez, Kris McCall, Bob Norling, Dr. Terry Reeves, and Bob Rice were present. Board members Curt Porter and Theo Wellington were absent. A quorum being present, President Dr. Spencer Buckner called the meeting to order at 7:35 P.M.

Treasurer Bob Norling reported that the Society had \$2,309.01 in its regular checking account and \$150.03 in its equipment account. Dr. Spencer Buckner announced these upcoming star parties and events: Jun 04 - Requested star party for campers at Camp Hillmont in White Bluff, Tennessee, Jun 11 - Public binocular star party @ the Warner Parks Nature Center, Jun 12 - Private star party @ mile marker 412 on the Natchez Trace Parkway, Jun 18 - Public star party @ Bells Bend Nature Center from 8:30 to 10:30 P.M., and Jun 08, 10, & 15 - Requested sidewalk astronomy events at the Dickson, Tennessee library.

Responding to a question from Dr. Donna Hummell, Dr. Buckner announced that the annual BSAS picnic was being postponed until probably some time in August due to recent flood damage of the proposed location at BSAS member Mark Manner's Spot Observatory. Dr. Buckner said that he should know something more definite by next month.

Bob Rice, reporting for the Program Committee, handed out a subject outline and a brief biography for speaker Dr. Chuck Higgins' program on "Giant Planet Rotation Periods" at the June 17 membership meeting. Mr. Rice also handed out copies of the program schedule for the rest of 2010 noting that September was the only month for which there was no subject or speaker. Santos Lopez volunteered to speak on "Debunking the 2012 Myth" in August if that month's scheduled "What's Up?" program could be moved to September. The board quickly decided that this could be easily done. Kris McCall offered to publicize Mr. Santos' presentation on the Adventure Science Center's (ASC) website.

Dr. Donna Hummell reported on potential updates to the BSAS' public information brochure and suggested that the cover photo of M51 might be changed - possibly to some more recent image taken by member Steve Wheeler. Dr. Spencer Buckner commented that member Mark Manner, who took the cover image of M51, had no objection to doing that. The board discussed several related possibilities including: letting members vote on potential cover photos, posting potential cover photos on the BSAS' website for member viewing, solicitation of photos from members to be announced at the June 17 meeting, and to also announce this in the June Eclipse newsletter if it has not yet gone out.

Tony Campbell moved that the BSAS have a contest for members to submit potential photos to be used on the brochure cover with the winning photo to be selected by the July board meeting. Bob Norling seconded this motion that, following a brief discussion, passed by a unanimous voice vote.

Continuing with proposed updates to the brochure, Dr. Donna Hummell suggested deleting several specific contacts and telephone numbers. In addition, she posed the question of the need for written waivers regarding the use of photos of children. Dr. Spencer Buckner suggested that the existing photos of children be removed from any new brochure. Kris McCall suggested that using photos of children taken at the ASC's 2010 Astronomy Day event would be permissible because a sign in the room prominently stated that pictures taken there might be published later. Ms McCall said that she would email links to these photos taken by Theo Wellington to the board members. Santos Lopez asked if "The Barnard-Seyfert Astronomical Society" or just "Barnard-Seyfert Astronomical Society" was the club's proper legal name; Bob Rice said that he would check on this. Dr. Terry Reeves stated that he might have some pictures from earlier BSAS events that might be used. Bill Griswold suggested that many new members joined the BSAS because of their interest in telescopes and therefore using pictures involving people looking through telescopes was good. Mr. Griswold also stated that he had investigated potential printing costs for a new brochure and expressed his concern for controlling the expense of printing new editions. Dr. Spencer Buckner and several other board members suggested curtailing the historical references in any new brochure noting that this information could be better displayed on the BSAS' website. Mr. Griswold suggested that, to the extent possible, new editions of the brochure should contain information that would not change from year to year. The board decided that since Mr. Griswold had a copy of the old brochure on electronic media, he and Dr. Donna Hummell would use that to rough out a draft for review at the July board meeting and hopefully have a final product ready for publication in August.

Jana Ruth Ford reported that NASA's Night Sky Network had recommended that its participants use the social networking website Facebook to facilitate communication with the public. Ms Ford further stated that Warner Parks Naturalist Heather Gallagher informed her that the parks had greatly increased its attendance by using this resource. The board discussed this issue and Dr. Terry Reeves moved that the BSAS establish a Facebook account. Santos Lopez seconded his motion that was subsequently approved by a unanimous voice vote.

Dr. Spencer Buckner stated that the agenda item regarding the BSAS archive would be moved forward for discussion at the July board meeting. Dr. Terry Reeves suggested that at some point the board should also discuss what to do about the BSAS library that consisted mainly of volumes donated by members Gary Yarnall and the late Powell Hall. Since there was no further business to discuss, President Dr. Spencer Buckner declared the meeting to be adjourned at 8:42 P.M.

OFFICERS

Dr. Spencer Buckner
President

Dr. Donna Hummell
Vice-President

Bob Rice
Secretary

Bob Norling
Treasurer

Directors at Large

Tony Campbell
Jana Ruth Ford
Bill Griswold
Santos Lopez
Curt Porter
Theo Wellington
Kris McCall (ex officio)

Steve Wheeler
Newsletter Editor
wsw261@hotmail.com

Monthly meetings
are held at:



The Adventure
Science Center

800 Fort Negley Blvd
Nashville, TN 37203

Monthly Meeting Minutes – June 17, 2010

Bob Rice, Secretary

President Dr. Spencer Buckner called the meeting to order at 7:34 P.M. in the Adventure Science Center (ASC) and welcomed new members and visitors. Treasurer Bob Norling reported that the BSAS had \$2,044.01 in its regular bank account and \$150.03 in its equipment account. Dr. Buckner announced these upcoming events and star parties:

- Jun 18 - Public star party at Bells Bend Park @ 8:30 P.M.
- Jul 10 - Private star party on the Natchez Trace Parkway @ mile marker 435
- Jul 17 - Public star party at Long Hunter State Park @ 8:30 P.M.
- Aug 07 - BSAS Picnic at Spot Observatory - completely potluck with details to follow

Dr. Spencer Buckner announced that the BSAS was holding a contest for members to submit their astro-images as a replacement for the cover of the new edition of the club's public information brochure with the winning image to be selected at the July board of directors meeting. Dr. Buckner explained that members could have multiple submissions and that additional information could be found on the BSAS' website.

Dr. Spencer Buckner announced that Dr. Eric Klumpe of Middle Tennessee State University would give an update on the university's Uranidrome naked-eye observatory as the program for the July 15, 2010 membership meeting. He also announced that BSAS board member Santos Lopez would give a presentation on "Debunking The 2012 Rumor" at the August 19, 2010 membership meeting.

Sudekum Planetarium Director and BSAS board member Kris McCall introduced the GOTO Corporation's representative from Japan noting that this individual was the farthest visitor to a BSAS meeting. GOTO is the manufacturer of the Chiron Optical Star Projector System used at the ASC. Ms McCall also announced that she would be attending the International Planetarium Society's June 26-30, 2010 meeting in Alexandria, Egypt.

Dr. Spencer Buckner then introduced Middle Tennessee State University Physics and Astronomy Professor Dr. Chuck Higgins who delivered the evening's program on "Giant Planet Rotation Periods." His presentation centered on the problems for measuring rotation periods exhibited by the "gas giants" due to their lack of a solid surface and the fact that their equators rotated faster than their polar regions. Noting that the discovery of radio wave emissions from these outer planets (Jupiter, Saturn, Uranus, and Neptune) provided a new means of measurement, Dr. Higgins pointed out that only Jupiter had radio emissions strong enough to be measured on earth during the daytime. He also noted that Saturn had a variable rotation period and that its radio emissions were much influenced by the solar wind. In addition, he explained that Saturn, Uranus, and Neptune - being much more distant from earth - had radio emissions that could not be measured well from ground based radio telescopes. Instead, these planets' emissions were best measured by passing unmanned spacecraft such as Voyager II. Following his presentation, Dr. Higgins graciously answered questions from the audience.

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

BSAS Affiliations

The Astronomical League
<http://www.astroleague.org/>



The Night Sky Network
<http://nightsky.jpl.nasa.gov/>



International Dark Sky Association
<http://www.darksky.org/>



Black Holes No Joke

Space Place Partners Article, June 2010
By Dr. Tony Phillips

Kip Thorne: Why was the black hole hungry?

Stephen Hawking: It had a light breakfast!

Black hole humor—you gotta love it. Unless you're an astronomer, that is. Black holes are among the most mysterious and influential objects in the cosmos, yet astronomers cannot see into them, frustrating their attempts to make progress in fields ranging from extreme gravity to cosmic evolution.

How do you observe an object that eats light for breakfast? "Black holes are creatures of gravity," says physicist Marco Cavaglia of the University of Mississippi. "So we have to use gravitational waves to explore them."

Enter LIGO—the NSF-funded Laser Interferometer Gravitational-wave Observatory. According to Einstein's Theory of General Relativity, black holes and other massive objects can emit gravitational waves—ripples in the fabric of space-time that travel through the cosmos. LIGO was founded in the 1990s with stations in Washington state and Louisiana to detect these waves as they pass by Earth. "The principle is simple," says Cavaglia, a member of the LIGO team. "Each LIGO detector is an L-shaped ultra-high vacuum system with arms four kilometers long. We use lasers to precisely measure changes in the length of the arms, which stretch or contract when a gravitational wave passes by."

Just one problem: Gravitational waves are so weak, they change the length of each detector by just 0.001 times the width of a proton! "It is a difficult measurement," allows Cavaglia.

Seismic activity, thunderstorms, ocean waves, even a truck driving by the observatory can overwhelm the effect of a genuine gravitational wave. Figuring out how to isolate LIGO from so much terrestrial noise has been a major undertaking, but after years of work the LIGO team has done it. Since 2006, LIGO has been ready to detect gravitational waves coming from spinning black holes, supernovas, and colliding neutron stars anywhere within about 30 million light years of Earth.

So far the results are ... nil. Researchers working at dozens of collaborating institutions have yet to report a definite detection.

Does this mean Einstein was wrong? Cavaglia doesn't think so. "Einstein was probably right, as usual," he says. "We just need more sensitivity. Right now LIGO can only detect events in our little corner of the Universe. To succeed, LIGO needs to expand its range."

So, later this year LIGO will be shut down so researchers can begin work on Advanced LIGO—a next generation detector 10 times more sensitive than its predecessor. "We'll be monitoring a volume of space a thousand times greater than before," says Cavaglia. "This will transform LIGO into a real observational tool."

When Advanced LIGO is completed in 2014 or so, the inner workings of black holes could finally be revealed. The punchline may yet make astronomers smile.



Left: Laser Interferometer Gravitational-wave Observatory in Livingston, Louisiana. Each of the two arms is 4 kilometers long. LIGO has another such observatory in Hanford, Washington.

Find out more about LIGO at:
<http://www.ligo.caltech.edu/>.

The Space Place has a LIGO explanation for kids (of all ages) at <http://spaceplace.nasa.gov/en/kids/ligo/>, where you can "hear" a star and a black hole colliding!

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

MEMBER CONTRIBUTIONS



Moon (77%) Over Radnor Lake

By Steve Wheeler (newsletter editor)

Repeat after me....

"Astrophotography is expensive..."

"Astrophotography is hard..."

"Astrophotography takes a big telescope..."

NOT!

While deep sky astrophotography has its challenges, many satisfying images of the Moon can be taken with a much less complicated setup. The above image was taken with only a Canon SX110is ultra-compact zoom point and shoot digital camera on a modest tripod.

Not only can you take lunar images, but also images of constellations, conjunctions, ISS flyovers, and other sky phenomena are well within the reach of a simple point and shoot camera on a tripod. So if you have one, give it a try!

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

On your Eclipse mailing label is the expiration date for your current membership. There will be a two month grace period before any member's name is removed from the current mailing list.



We're on the Web!

See us at:
www.bsasnashville.com

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 Thursday of each month at the Adventure Science Center 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 Dr. Spencer Buckner at (931) 221-6241.

**BARNARD-SEYFERT
ASTRONOMICAL SOCIETY**
PO BOX 150713
NASHVILLE, TN 37215-0713

