

The newsletter of the Barnard Seyfert Astronomical Society, PO Box 150713, Nashville, TN 37215-0713

## Upcoming Events

### Board of Directors Meeting

November 5<sup>th</sup> at the Cumberland Valley Girl Scout Council Building  
– 7:30 pm

December 3<sup>rd</sup> at the Cumberland Valley Girl Scout Council Building  
– 7:30 pm

### Membership Meeting

November 19<sup>th</sup> at the Adventure Science Center – 7:30 pm

December 17<sup>th</sup> – December Meeting and Holiday Pot Luck Dinner at the Adventure Science Center – 6:30 pm

## Upcoming Events

West End Middle School Star Party November 6<sup>th</sup> Elmington Park on West End Ave – 7:00 pm

Private Star Party November 14<sup>th</sup> at the Natchez Trace mm 435.5 – 6:30 pm

Public Star Party November 21<sup>st</sup> at Shelby Bottoms – 8:00 pm

Public Star Party December 12<sup>th</sup> at Warner Park – 7:30 pm

Private Star Party December 19<sup>th</sup>

## In this issue:

President's Message	1
Observing Highlights	2
Outreach Update	2
Happy Birthday COBE	3
Board Meeting Minutes	4
Member Images	5
About Our Organization	6



## Monthly Membership Meeting

November 19<sup>th</sup>, 2009  
Adventure Science Center  
7:30 pm



### All I Want For Christmas Are Astronomy Presents!

Thinking of buying a telescope for a friend this Christmas? How and where do you buy one? How do you avoid junk without breaking the bank? BSAS vice-president Dr. Spencer Buckner of Austin Peay State University will address these questions and more during this informative presentation.

Also, don't forget our **December Meeting and Holiday Pot Luck Dinner** on December 17<sup>th</sup> at 6:30 pm at the Adventure Science Center.



## From The President

I want to thank everyone who helped to make the October membership meeting a success. Joe Boyd did a wonderful job as MC. I found Spencer Buckner's presentation on the Galileo's contributions to science quite engrossing. It was fascinating how much of what I learned in physics was started by Galileo. I also want to thank Rev. David Kidd for his part on Galileo and the Inquisition. This program would not have happened without the help of Americans United for the Separation of Church and State and Kris McCall's suggestion very early on that we consider having a joint meeting.

This month, I would like to encourage you to pay more attention to the night sky when you happen to be outside at night. There are a lot of things to notice from season to season. You never know when that meteor is going to streak across the sky. Also, you get a chance to briefly look for that constellation you never learned to recognize before. In addition, there is something magical about looking at the whole of the night sky with just your eyes that you can easily miss if you don't make yourself stop and look. My advice here would be the same as Jack Horkheimer's (who I used to watch on a PBS station when I lived in the San Francisco Bay Area): "Keep Looking Up!"

The November program will be presented by Spencer Buckner. The topic will be "All I Want for Christmas Are Astronomy Toys". We will be voting at the November meeting for new officers and Board members. The nominees from the Board are:

President: Spencer Buckner  
Vice-president: Donna Hummell  
Secretary: Bob Rice  
Treasurer: Robert Norling

Board members: (3 year terms)  
Santos Lopez  
Steve Wheeler

I have not yet received any other nominations from the club membership. You can make a nomination by sending me an e-mail at [terry.w.reeves@att.net](mailto:terry.w.reeves@att.net), or by calling me at 615-833-6759. I will need to know the person being nominated, the office for which they are being nominated, and who is making the nomination. You can also nominate someone from the floor at the membership meeting before we vote.

Dr. Terry Reeves  
President



*"If you want to make an apple pie from scratch, you must first create the universe."*

**Dr. Carl Sagan**  
1934-1996

### 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

#### November 2009

11/02 FULL Moon  
11/09 LAST Quarter  
11/16 NEW Moon  
11/23 FIRST Quarter

#### December 2009

12/02 FULL Moon  
12/08 LAST Quarter  
12/16 NEW Moon  
12/43 FIRST Quarter  
12/31 FULL Moon

### OBJECTS VISIBLE THIS MONTH

**Leonid meteor shower** peaks  
November 17-18.

#### Messier Objects:

*Planetary Nebula:*  
M27 – The Dumbbell Nebula  
M57 – The Ring Nebula

*Globular Cluster:*  
M30, M56, M71, M72

*Asterisms:*  
M73

## Outreach Update

*Dr. Terry Reeves, president*

In October, we had a full plate of events planned; Mother Nature had other plans. The astronomy retreat at Mark Manner's home had to be canceled again because of rain. The star party for West End Middle School had to be rescheduled. We did get to hold the public star party at Long Hunter State Park on October 24. I spent a large part of the night with my telescope pointed at Jupiter. Showing two of Jupiter's moons merge into one dot and then separate was a wonder I could not pass up. I was actually a very good night.

The star party for West End Middle School has been rescheduled for Friday night, November 6. There is also a public star party at Shelby Bottoms Nature Center on Saturday, November 21 from 8:00 PM until 10:00 PM. We will be showing the moon and planets primarily given the light pollution at the location. I found directions to Shelby Bottoms on the Sudekum Planetarium web site at <http://sudekumplanetarium.com/starparties/shelbybottoms.shtml>.

There is also a private star party scheduled for November 14 at the turnout near mile marker 435.5 on the Natchez Trace.

# Happy Birthday COBE

by Robin Byrne

This month we celebrate the anniversary of the launch of a telescope that would help to confirm how the universe began. In the 1920's, Georges Lemaitre, a Belgian priest and cosmologist, was the first to try to model the universe's beginning as a primordial atom. A few years later, Edwin Hubble discovered that the universe was expanding. These two ideas were the seeds of what would become the Big Bang.

If the universe is expanding, then that implies that the universe was once much smaller than it is today, and if you continue to extrapolate back in time, the universe would have begun quite small, indeed. Basic laws of physics state that if you compress a gas (which is what the majority of the universe is), then the temperature of that gas will increase. So, not only did the universe begin much smaller than it is today, it also was much hotter. As the universe expands, it cools. In 1948, Ralph Alpher and Robert Herman used a model of the early universe to predict the current temperature. They predicted the universe would, today, be at a temperature of 5 Kelvin (which is a mere 5 degrees above absolute zero). If this were true, then it would be radiating in the microwave part of the electromagnetic spectrum.

For several years, a number of predictions were made, but no observations. In the early 1960's, Robert Dicke at Princeton made a similar prediction, and, in 1964, his colleagues, David Wilkinson and Peter Roll, began construction of a microwave antenna to see if they could find the predicted signal. Meanwhile, not too far away at Bell Telephone Laboratories, Arno Penzias and Robert Wilson were working on a microwave antenna to use for radio astronomy and for satellite communications. Their antenna had a noise problem equivalent to a signal of 3.5 Kelvin. A chance conversation with Dicke revealed that they had stumbled upon what the Princeton team had been trying to find. Dicke's comment to his colleagues was, "Boys, we've been scooped." This observation, of what is now called the Cosmic Background Radiation (CBR) or Cosmic Microwave Background Radiation (CMB), was the first time a prediction based on the Big Bang had been confirmed by observation. Penzias and Wilson received the 1978 Nobel Prize in Physics for their discovery.

But this observation still left many people skeptical about the Big Bang. Could the temperature have another source, such as starlight scattered from distant galaxies? One way to prove it was not scattered starlight was if they could obtain a complete blackbody curve of the radiation. A blackbody curve is a graph of light intensity vs. wavelength. Objects which do not reflect light, but glow from their own energy, will radiate at all wavelengths, but at different intensities, with the peak intensity being related to the temperature of the source. If the radiation detected by Penzias and Wilson was light reflected off of dust, it would not show a complete blackbody curve, but would instead have isolated peaks of intensity at specific wavelengths. The problem was that ground based observations could not detect all of the wavelengths necessary for a complete curve. The observation would have to be made from an orbiting observatory.

In 1974, NASA called for astronomical mission proposals that would use a small or medium-sized spacecraft. The ultimate winner was the Infrared Astronomical Satellite (IRAS). However, three of the proposals dealt with cosmological observatories. In 1976, NASA brought together people from each of those proposals to design a spacecraft to make cosmological observations. What came out of that committee was the Cosmic Background Explorer (COBE). The spacecraft would carry three detectors: the Diffuse Infrared Background Experiment (DIRBE), the Far-Infrared Absolute Spectrophotometer (FIRAS), and the Differential Microwave Radiometer (DMR).

The observatory was originally scheduled to be launched from a Space Shuttle. However, due to the grounding of the Shuttle fleet after the Challenger explosion, it was redesigned for launch from a Delta rocket. On November 18, 1989, atop a Delta rocket, COBE was launched into a polar orbit around Earth. One of COBE's first tasks was to measure the blackbody curve of the CBR. Using the FIRAS instrument, COBE's observations not only showed a blackbody curve for a 2.73 Kelvin

source, but the fit to the predicted values was so close that the error bars on the plot were too small to see. The co-investigators, John Mather and George Smoot, received the 2006 Nobel Prize in Physics for this discovery.

Although originally designed to operate for 6 months, COBE continued to function for 4 years. In addition to the CBR blackbody curve, COBE also detected small variations (1 part in 100,000) in the 2.73 Kelvin background radiation. These small variations were the seeds for the large-scale structure of the universe, such as galaxies and galaxy clusters. The DIRBE instrument made contributions with observations of galaxies that emit light in the far-infrared part of the spectrum.

After COBE, the hunt to better understand the early universe continued. In 2001, the Wilkinson Anisotropy Probe (WMAP) was launched. Not only did this spacecraft refine COBE's observations of the early temperature variations, but WMAP also helped to put constraints on how much of our universe is ordinary matter (~4.5%), dark matter (~23%), and dark energy (~72.5%). Additionally, it gave the most precise estimate of the universe's age (13.73 billion years, give or take 0.12 billion years). While WMAP continues to function, in May of this year the Planck spacecraft was launched, and it will observe in even more detail the remnants of our early universe.

Where did the universe come from? How did it begin? These are fundamental questions that have been asked for as long as people have been aware of the universe around them. While the first attempts to answer these questions were solely in the realm of myth and religion, we now live in an age where science is finding more and more clues about our origins. The idea of the Big Bang has been around for about 80 years. While many observations seemed to support it, it wasn't until COBE's observation of the CBR blackbody curve that strong, indisputable confirmation had been made. Now, COBE's legacy lives on with both WMAP and Planck continuing to fine-tune our understanding. Meanwhile, there are still people who doubt the validity of the Big Bang, and who ignore the supporting evidence. As a scientist, I find this distressing. However, I take comfort in a similar historical precedent. In this International Year of Astronomy, we are celebrating Galileo's observations through his telescope. Those observations helped to confirm Copernicus' hypothesis that Earth rotated on its axis and revolves around the Sun. Despite the observational evidence, it took close to 200 years for the world to fully accept these ideas. Will it take 200 years for the Big Bang to be accepted? Perhaps. But I am optimistic that it WILL be accepted. Maybe the year 2389 will be celebrated as the 400th anniversary of COBE's launch and seminal confirmation of another revolutionary astronomical concept.

#### References:

Cosmic Background Explorer - Wikipedia  
<http://en.wikipedia.org/wiki/COBE>

Wilkinson Microwave Anisotropy Probe - Wikipedia  
<http://en.wikipedia.org/wiki/WMAP>  
 LAMBDA - Cosmic Background Explorer  
<http://lambda.gsfc.nasa.gov/product/cobe/>  
 Cosmic microwave background radiation - Wikipedia  
[http://en.wikipedia.org/wiki/Cosmic\\_microwave\\_background\\_radiation](http://en.wikipedia.org/wiki/Cosmic_microwave_background_radiation)  
 on

## October 2009 Board Meeting Minutes

*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 October 1, 2009. Board members Tony Campbell, JanaRuth Ford, Bill Griswold, Dr. Donna Hummell, Bob Norling, Curt Porter, Dr. Terry Reeves, and Bob Rice were present. Board members Dr. Spencer Buckner, Kris McCall, Theo Wellington, and Steve Wheeler were absent. A quorum being present, President Dr. Terry Reeves called the meeting to order at 7:38 P.M.

Treasurer Bob Norling reported that the BSAS had \$1,996.52 in its checking account and \$150.00 in its equipment account. Dr. Terry Reeves reported that the program for the October membership meeting would be a joint presentation by Dr. Spencer Buckner and Dr. Charles Sumner on the great scientist Galileo Galilei's astronomical accomplishments and difficulties with the church. Dr. Reeves noted that this presentation would be given first and be followed by our business meeting that, among other things, would include a reading of the Nominating Committee's recommendations for officers and board members for 2010. Dr. Reeves also reported these upcoming events and star parties:

Oct 17 – Private star party for BSAS members at Spot Observatory  
 Oct 24 – Public star party at Long Hunter State Park from 8:00 to 10:00 P.M.  
 Nov 14 – Private star party at mile marker 435.5 on the Natchez Trace Parkway  
 Nov 19 – Membership meeting with annual election of officers & board members  
 Nov 21 – Public star party at Shelby Bottoms Park  
 Dec 12 – Public star party at the Warner Parks  
 Dec 17 – Membership meeting & annual holiday potluck supper  
 Dec 19 – Private star party at the Water Valley Overlook on the Natchez Trace Parkway

Bill Griswold announced that the Star Party Committee staffed by Spencer Buckner, Kris McCall, Lonnie Puterbaugh, Terry Reeves, and himself would meet on the next Wednesday. Dr. Terry Reeves reported that several of the Society's loaner telescopes needed some work. He also suggested that two of the larger loaner scopes – a 10' f8 reflector and a 12.5' f7 reflector – were simply too heavy and unwieldy to be desirable loaners and should possibly be donated to a local school, university, or a worthy individual. Curt Porter suggested that we develop a formal inventory listing of the Society's telescopes, equipment, and accessories. Bob Norling put this suggestion into a motion that was seconded by Curt Porter and subsequently passed by a unanimous voice vote with no additional discussion.

Since there was no further business to discuss, Dr. Terry Reeves declared the meeting to be adjourned at 8:47 P.M.

**Editor's Note:** No minutes were taken for the October monthly meeting.

### OFFICERS

**Dr. Terry Reeves**  
President

**Dr. Spencer Buckner**  
Vice-President

**Bob Rice**  
Secretary

**Bob Norling**  
Treasurer

*Directors at Large*

**Tony Campbell**  
**Jana Ruth Ford**  
**Dr. Donna Hummel**  
**Curt Porter**  
**Theo Wellington**  
**Steve Wheeler**

*Ex Officio*

**Kris McCall**  
**Bill Griswold**

*Newsletter Editor*

**Steve Wheeler**  
 wsw261@hotmail.com

**Monthly meetings  
are held at:**



**The Adventure  
Science Center**

**800 Fort Negley Blvd  
Nashville, TN 37203**



## Messier 33 – The Triangulum Galaxy



### 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/>



## NGC 2423 -- Messier 47 -- NGC 2425



DSLR Images by board member and newsletter editor Steve Wheeler.

**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)
- \$15** Student\*

\* To qualify, you must be 21 or younger & enrolled in an accredited institution.

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](http://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](http://www.bsasnashville.com). If you need more information, write to us at [info@bsasnashville.com](mailto:info@bsasnashville.com) or call Joe Boyd at (615) 386-3134.

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

