The ECLIPSE

October 2011
Volume 4, Issue 10

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

Upcoming Events

Board of Directors Meeting

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

November 3rd at the Cumberland Valley Girl Scout Council Building – 7:30 pm

Membership Meeting *(note new dates and location)*

October 19th at the Cumberland Valley Girl Scout Council Building – 7:30 pm

November 17th at the Cumberland Valley Girl Scout Council Building – 7:30 pm

Star Parties

October 1st – BSAS Public Star Party at Long Hunter State Park

October 8th – BSAS Public Star Party at Adventure Science Center

October 29th - BSAS Private Star Party at Natchez Trace mile marker 412

November 5th – BSAS Public Star Party at Edwin Warner Park

November 26th - BSAS Private Star Party at Natchez Trace mile marker 435.5

In this issue:

What's Up in the Fall Skies

Wednesday, October 19, 2011
Cumberland Valley Girl Scout Council Building
7:30 pm

Dr. Terry Reeves and **Steve Wheeler** will be giving an overview of objects currently visible in binoculars and telescopes. See you there!

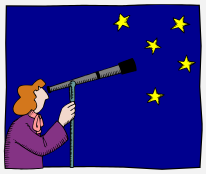
From The President

Greetings from your BSAS president. If you haven't been out observing recently, you have missed it. The fall skies of late September and early October have had some of the best seeing conditions we have had in central Tennessee in a long time. The Clear Sky Clock for our October 8 Star Party at the Adventure Science had us in the darkest blue which is a rare event for us. No telling how long these conditions will last so make the most of it. Drag out the 'scope and do some stargazing!

Speaking of stargazing, by the time you get this message we will have already had our two public star parties for October but there is still the private star party on the Natchez Trace at mile marker 412 on October 29. The Cumberland Astronomical Society will be hosting the Tennessee Fall Star Gaze at Fall Creek Falls State Park the same weekend: October 28 – 30. Early next month, on November 5, we will be hosting a star party at Edwin Warner Park starting at 7:30pm. So, there are a number of opportunities for stargazing for you to take advantage of. If you don't have a telescope, that's OK, come out anyway. We amateur astronomers are always happy to show off our 'scope to anyone and everyone that will stop and take a look. If you are planning on buying a telescope, a BSAS star party is an excellent opportunity to see a variety of different telescopes and look through each to see which might be the style you are interested in.

There is news from around the solar system this month. The Mercury Messenger mission has completed its first Mercurian year in orbit around the swiftest of planets. The people at NASA and JPL that run the mission have produced a global map of the planet showing incredible detail. The science being returned by the Messenger is starting to answer some of the questions about Mercury and leading to more questions yet to be answered.

Continued on Page 2



"There are only two ways to live your life. One is as though nothing is a miracle.

The other is as though everything is a miracle."

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

October 2011

10/04 FIRST Quarter
10/12 FULL Moon
10/20 LAST Quarter
10/26 NEW Moon

November 2011

11/02 FIRST Quarter
11/10 FULL Moon
11/18 LAST Quarter
11/25 NEW Moon

OBJECTS VISIBLE THIS MONTH

Messier Objects:

Open Star Clusters:

M11, M18, M24, M25, M26

Nebulae:

M16, M17

Globular Clusters:

M55, M75

From the President, cont.

In the other direction, the Dawn spacecraft in orbit around the asteroid Vesta has reached its low orbit altitude and begun detailed imaging of the largest asteroid (now that Ceres is classified as a dwarf planet and not an asteroid). The surface of Vesta is turning out to be one of the most battered and tortured worlds out there. The southern half of the asteroid seems to be several billion years younger than the northern half, perhaps only one or two billion years old. It also sports a huge mountain near the south pole that rivals Olympus Mons of Mars for the tallest mountain in the solar system. Considering that Vesta is less than a tenth the diameter of Mars, that's one big mountain. The science team hasn't yet named the mountain although they have named a number of craters after the Vestal virgins. The Dawn mission is scheduled to continue orbiting Vesta until July 2012 and then it will depart for Ceres for a rendezvous with the dwarf planet in early 2015. Elsewhere, the Mars Opportunity rover continues rolling on after 7½ years. The little rover that won't quit has reached Endeavor Crater and is exploring the rocks around it. The next rover to Mars, the Mars Curiosity, is scheduled to launch sometime between November 25 and December 18. A landing site inside Gale Crater on the Elysium Planitia has been chosen for this compact car sized rover. And, of course, the Cassini mission to Saturn continues to return some of the most incredible images of Saturn and its moons. Cassini has now been in Saturnian orbit for over seven years.

Before I close I would like to thank Dr. Eric Klumpe for his fascinating program at the September membership meeting. Dr. Klumpe has spoken to the club a number of times now and each time has been enlightening. It is always a pleasure hearing from him. This month's speakers are our own Steve Wheeler and Dr. Terry Reeves giving us a look at "What's Up in the Fall Skies". We have a "What's Up" a few times each year and they are always some of my favorites. With targets ranging from easy with a pair of binoculars to challenging with a 10" 'scope, there is something for everyone no matter how light polluted your skies may be. The meeting is Wednesday October 19 at the Cumberland Valley Girl Scout Council building on Granny White Pike and Harding Place. See you there.

Clear Skies!

Dr. Spencer Buckner
President

Happy Birthday Anders Celsius

by Robin Byrne

This month, we celebrate the life of an astronomer whose name lives on whenever we measure the temperature. Anders Celsius was born November 27, 1701 in Uppsala, Sweden. His father, Nils Celsius, was a professor of astronomy, his paternal grandfather, Magnus Celsius was a mathematician, and his maternal grandfather, Anders Spole, was an astronomer. Coming from such a family, it is no wonder that Anders followed a career in science, as well.

With his strong mathematical skills, Anders pursued a degree in astronomy at Uppsala University, where his father taught. While a student there, he was respected enough to be named secretary of the Royal Society of Sciences in Uppsala. He would continue to hold that position until his death. Shortly after graduation, in 1730, Anders was named a professor of astronomy at Uppsala University, where he remained for the rest of his life. The same year he began working at Uppsala University, Celsius published his first book, detailing a method for determining the distance between the Earth and the Sun.

One of Celsius' first areas of study was the aurora. Working with Olof Hiorter from 1716 to 1743, Celsius was the first to suggest that there was a connection between the aurora and Earth's magnetic field. Using a compass, he found that the magnetic field was stronger when aurora were occurring. He published a book of his findings in 1733.

In 1732, Celsius began a four-year journey he called his "grand tour." Traveling to Germany, Italy and France, Celsius visited all of the major European observatories and worked with many notable astronomers. It was while he was in Paris, that the seeds were planted for his next major work.

Isaac Newton had suggested that Earth was not shaped exactly like a sphere, but was, instead, wider at the equator. To determine if this were true, it would be necessary to measure a one degree section of Earth near the pole, and another onne degree section near the equator. The French Academy of Sciences proposed doing just that. Celsius suggested measuring the northern arc in Tornea, in the Lapland region of Sweden. The equatorial arc would be measured in, what is today, Ecuador. The expedition leader to Lapland was Pierre Louis Maupertius, and Celsius served as the sole astronomer in the group. His participation in this project, and subsequent publications, gained Celsius much respect with the Swedish government.

Celsius cashed in on this recent popularity with the Swiss authorities by garnering the financial support to build an observatory at Uppsala University. Completed in 1741, the Uppsala Astronomical Observatory was filled with state-of-the-art equipment Celsius had amassed during his tour of European observatories, and was dedicated to the study of the universe.

With the new observatory at his disposal, Celsius began a series of observations of stars, with the intent of measuring their brightness. Up to this point, stellar magnitudes were merely estimated by their visual appearance.
Celsius used plates of glass that were slightly colored. The magnitude of a star was determined by the number of glass plates needed to make the star too dim to see. The brightest star, Sirius, required 25 plates to obscure it. Celsius published a catalog of magnitudes for 300 stars, with an accuracy within 0.4 magnitudes.

However, what Celsius is best known for is his temperature scale. Thermometers work because certain liquids, like alcohol and mercury, expand when they are heated, and contract when cooled. That doesn't change from thermometer to thermometer. What can be changed is what conditions are used to establish the calibration points for the scale. At the time of Celsius, several scales were in existence, most of which used a division of 100 units. Celsius, too, proposed a scale with 100 divisions, but his was unique in that he used physical phenomena to establish the end points. In his original scale, Celsius set the temperature of boiling water to be 0˚ and the temperature of freezing water to be 100˚. This was later reversed, in 1745, by Carl Linnaeus. Celsius was very precise in his determination of the calibration points, running experiments to make sure that the freezing point didn't vary with latitude or with atmospheric pressure. He also measured how the boiling point DID vary with air pressure, and established a way to compensate, depending on what the pressure was. Celsius presented his scale to the Royal Society of Sciences, and proposed calling it the "Centigrade" scale, which derives from Latin for "hundred steps." In 1948, it was adopted almost worldwide, and called the Celsius scale.

Celsius continued to work on many projects. Working for the Swedish General map, he discovered that Scandinavia is slowly rising in altitude. This was later found to be due to ice from the last major ice age, melting, thus reducing the downward pressure on the land. Celsius was an early supporter of adopting the Gregorian calendar in Sweden. However, it wasn't until 10 years after his death that the nation made the change. He also, in his spare time, wrote poetry, and had begun a science fiction story located on Sirius, but died before finishing it.

Anders Celsius was stricken with tuberculosis at the age of 42, and died soon thereafter on April 25, 1744. He was buried next to his grandfather, Magnus, in Uppsala. For someone who lived such a short life, Anders Celsius certainly made the most of his time, and his incredible body of work is a testament to his diligence. Despite America's stubborn refusal to convert to the metric system, it is slowly infiltrating our everyday lives. Many public displays of time and temperature include both Fahrenheit and Celsius temperatures. The next time you drive by one of these displays, give a cheer for Anders Celsius and all of his accomplishments.

Board Meeting Minutes – September 1, 2011

Bob Rice, Secretary

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 September 1, 2011. A sign-in sheet was passed around in lieu of a roll call. Board members Dr. Spencer Buckner, Steve Cobb, Jana Ruth Ford, Bill Griswold, Bob Norling, Dr. Terry Reeves, and Bob Rice, were present. Board members Dr. Donna Hummell, Santos Lopez, Kris McCall, Curt Porter, and Theo Wellington were absent. A quorum being present, President Dr. Spencer Buckner called the meeting to order at 7:44 P.M.

Treasurer Bob Norling reported that the BSAS had $2,068.48 in its regular checking account and $407.36 in its equipment account. Mr. Norling also reported that, having reimbursed Bill Griswold for his personal payment to the Cumberland Valley Girl Scout Council, the BSAS' rental fees were paid up through December 2012 to meet at that location. Mr. Norling announced that he had a current copy of the BSAS' liability insurance policy which he presented to Secretary Bob Rice for the Society's records. Dr. Spencer Buckner stated that he would contact Dr. Eric Klumpe, who will speak at the September 21 public membership meeting, about having dinner with the board beforehand – a practice that was followed for speakers several years ago. Bob Rice announced that he would be out of town for that meeting and asked that someone take the minutes in his absence.

Dr. Spencer Buckner announced these upcoming star parties:

- Sep 23 – Public star party at Bells Bend Nature Center from 8:00 P.M. to 10.00 P.M.
- Sep 24 – Private star party at Natchez Trace parkway mile marker 435.5 from dusk to whenever.
- Oct 01 – Public star party at Long Hunter State Park from 7:30 P.M. to 9:30 P.M.

Jana Ruth Ford announced that St. Bartholomew's Episcopal Church at 4800 Belmont Park Terrace in Nashville was planning an evening observing session for the Fall Astronomy Day on October 1, 2011.

Dr. Spencer Buckner reiterated that the BSAS's public membership meetings will change from the third Thursday of each month to the third Wednesday at the Cumberland Valley Girl Scout Council Building starting with the upcoming August 17 meeting. He stated that board meeting dates would also change to the first Wednesday of each month beginning on January 4, 2012. However, Dr. Buckner suggested that the BSAS should continue to explore other places for future meetings – possibly in association with an educational institution. Some suggestions for potential alternate sites included Montgomery Bell Academy and Nashville State Community College.

Bill Griswold, reporting for the Nominating Committee, announced these recommended candidates to serve as officers and board members during 2012: President – John Harrington; Vice President – Joe Boyd; Treasurer – Bob Norling; Secretary – Bob Rice; Board Members at Large – Kris McCall and Melissa Lanz. Curt Porter, whose current board position will expire at the end of 2011, was nominated to complete the remaining year of board member Santos Lopez's term for 2012 since Mr. Lopez is moving out of town. The Committee will announce these recommendations at the October public membership meeting with the election to take place at the following November meeting. Members may also nominate candidates from the floor at the November election. All newly elected officers and directors will be introduced at the December meeting and assume their duties at the January 2012 meeting.

Dr. Spencer Buckner announced that the Society had scheduled speakers for all public membership meetings through November 2011. Bob Rice said that he would try to find a speaker for the December 2011 Christmas Potluck Supper meeting. Dr. Buckner reported that negotiation of a memorandum of understanding with the Adventure Science Center regarding the BSAS' use of their facility as a meeting place was now officially terminated. Both Dr. Buckner and the board expressed regret that an agreement was not reached, but all were pleased that the process nonetheless ended on a friendly basis. Bob Norling, on behalf of the board, thanked Bill Griswold for his hard work in obtaining space at the Cumberland Valley Girl Scout Council Building as a replacement meeting site.

Since there was no further business to discuss, President Dr. Spencer Buckner declared that the meeting was adjourned at 8:27 P.M.

Monthly Meeting Minutes – September 21, 2011

Bob Rice, Secretary

President Dr. Spencer Buckner called the meeting to order at 7:30 P.M. in the Cumberland Valley Girl Scout Council Building in Nashville, Tennessee and welcomed new members and visitors. Treasurer Bob Norling reported that the BSAS had $2,108.48 in its regular bank account and $407.33 in its equipment account. Dr. Buckner announced a multitude of upcoming star parties and events:

- Sept 23: a public star party at Bells Bend Nature Center from 8:00 to 10:00PM.
- Sept 30: a private star party at mile marker 433.5 to begin at sunset
- Sept 30: a public star party at Bowie Park in Fairview, TN from 8:00 to 10:00PM
- Oct 1: a public star party at Long Hunter State Park from 7:30 to 9:30PM
- Oct 8: a public star party at Adventure Science Center from 7:30 to 9:30PM as part of International Observe the Moon Night

Dr. Buckner also reiterated that the next BSAS Membership Meeting would be on October 19th at the Girl Scout Council Building.

Dr. Buckner then introduced Middle Tennessee State University's Professor Eric Klumpe who delivered the evening's program on "Complexity in the Universe." Dr. Klumpe began by explaining the many constraints on the development and survival of life on other planets. For life (at least as we know it) to evolve and survive, Dr. Klumpe explained that a planet must be fortunate enough to possess many specific attributes, including the following:

Habitable Zone: A planet must orbit in its host star's habitable zone so that it is neither too hot nor too cold. Earth for example orbits close to the inner edge of our sun's habitable zone, while Mars orbits just beyond the zone. The size of the habitable zone varies in accordance with the type of star in question.

Atmospheric Pressure: The atmospheric pressure on the planet must be sufficient for water to exist as a liquid.

Surface Gravity: The planet's surface gravity must be high enough to retain water, but not so high that excess amounts of lighter gases like ammonia and methane are retained.

Reflectivity: The planet's overall reflectivity (also called its "albedo") must not be so high that too much energy from its star is reflected (and runaway glaciation occurs), nor so low that too much energy is absorbed (risking a runaway greenhouse effect).

Rotation/Spin Rate: The planet must not rotate so slowly that excessive differences arise between its day and night sides.

Magnetic Fields: The planet must have a conductive, fast-rotating core that gives rise to a substantial magnetic field, so that the planet is shielded from high-energy particles from its star.

Parent Star: The planet's parent star must produce enough high-energy ultraviolet light to permit photosynthesis by plants on the planet, but not so much UV light that living cells are damaged.

Location: The planet must be in a generally circular (not excessively eccentric) orbit in order to avoid severe annual temperature swings. The planet should typically orbit only a single star, although NASA's Kepler spacecraft very recently detected a planet in orbit around a binary star (Kepler-16b). Moreover, the planet shouldn't be located so far from its host galaxy's center that its region lacks the heavy elements and organic molecules essential to life.

In an unexpected turn, Dr. Klumpe then came to the thesis of his presentation: that the chances of so many requirements being fulfilled simultaneously anywhere in our universe would seem to be vanishingly small (called by some the "Goldilocks" thesis). Therefore perhaps we should consider the possibility that the existence of life implies a deeper design at work in our universe.

Dr. Klumpe then concluded his presentation by graciously answering questions from the audience. Since there was no additional business for discussion, President Buckner declared the meeting to be adjourned at approximately 9:15PM.

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/

The Adventure Science Center
http://www.adventuresci.com

Dark Clues to the Universe

Space Place Partners Article September 2011
By Dr. Marc Rayman

Urban astronomers are always wishing for darker skies. But that complaint is due to light from Earth. What about the light coming from the night sky itself? When you think about it, why is the sky dark at all? Of course, space appears dark at night because that is when our side of Earth faces away from the Sun. But what about all those other suns? Our own Milky Way galaxy contains over 200 billion stars, and the entire universe probably contains over 100 billion galaxies. You might suppose that that many stars would light up the night like daytime!

Until the 20th century, astronomers didn't think it was even possible to count all the stars in the universe. They thought the universe was infinite and unchanging.

Besides being very hard to imagine, the trouble with an infinite universe is that no matter where you look in the night sky, you should see a star. Stars should overlap each other in the sky like tree trunks in the middle of a very thick forest. But, if this were the case, the sky would be blazing with light. This problem greatly troubled astronomers and became known as "Olbers' Paradox" after the 19th century astronomer Heinrich Olbers who wrote about it, although he was not the first to raise this astronomical mystery.

To try to explain the paradox, some 19th century scientists thought that dust clouds between the stars must be absorbing a lot of the starlight so it wouldn't shine through to us. But later scientists realized that the dust itself would absorb so much energy from the starlight that eventually it would glow as hot and bright as the stars themselves.

Astronomers now realize that the universe is not infinite. A finite universe—that is, a universe of limited size—even one with trillions of stars, just wouldn't have enough stars to light up all of space. Although the idea of a finite universe explains why Earth's sky is dark at night, other factors work to make it even darker.

The universe is expanding. As a result, the light that leaves a distant galaxy today will have much farther to travel to our eyes than the light that left it a million years ago or even one year ago. That means the amount of light energy reaching us from distant stars dwindles all the time. And the farther away the star, the less bright it will look to us.

Also, because space is expanding, the wavelengths of the light passing through it are expanding. Thus, the farther the light has traveled, the more red-shifted (and lower in energy) it becomes, perhaps red-shifting right out of the visible range. So, even darker skies prevail.

The universe, both finite in size and finite in age, is full of wonderful sights. See some bright, beautiful images of faraway galaxies against the blackness of space at the Space Place image galleries. Visit http://spaceplace.nasa.gov/search/?q=gallery.

This Hubble Space Telescope image of Galaxy NGC 4414 was used to help calculate the expansion rate of the universe. The galaxy is about 60 million light-years away. Credit: NASA and The Hubble Heritage Team (STScI/AURA)

Messier 31 – The Andromeda Galaxy
Image by Steve Wheeler

48 x 300s (240 min) @ iso 1600

- Mount: Orion Atlas EQ-G
- Camera: Canon Digital Rebel XT (Baader UV/IR Mod)
- Filters: IDAS LPS FIlter
- Imaging OTA: Stellarvue SV102ED
- Guiding OTA/Camera: Astronomy Technologies AT66ED/Orion Starshoot Autoguider
- Field Flattener: Stellarvue SFF7-21 Photographic Flattener

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.

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 Wednesday of each month at the Cumberland Valley Girl Scout Council Building 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.

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