ECLIPSE

The June membership meeting will be held on Thursday, June 21, 2007 at 7:30 pm at the Adventure Science Center

On Thursday, June 21, 2007 we will hold our regularly scheduled membership meeting at the Adventure Science Center. We are fortunate to have 2 speakers this month, Chloe Alexander and Taffy O'Neal.

Our first speaker will be Chloe Alexander who will speak on "The Relationship Between Galaxy Distance and Redshift." Taffy O'Neal will speak about "Star-Streak Photography for the Accurate Calculation of Stellar Declination."

These 2 gifted young ladies are both high school students and were BSAS-funded Astronomy Award winners at the 2007 Science and Engineering Fair.

Please don't miss this exciting meeting.

Message from the President

Well, we were finally able to have a Star Party on the Natchez Trace on May 19th. The weather was great, clear, not cold, not windy and no bugs. There were seven or eight observers with telescopes and we were visited by many people who saw our equipment and stopped to see what was going on. Venus and the crescent moon really put on a wonderful display. Venus was about a thumb nail to the left of the lower limb of the crescent moon. During the night we watched the moon move up and to the left until Venus was just below the moon.

Shortly after we got there and it was dark enough to see to orient out telescopes, Randy Smith came up from his telescope to announce that there was a puff of smoke from his telescope and it wouldn't work. He left to go home. About midnight, Steve Wheeler was working with his new mount, when there was a loud crash. His telescope had fallen to the ground. Evidently the slide dovetail had allowed the telescope to slide out and the telescope to fall to the asphalt pavement. We believe the damage was minimal. There was no tinkle of broken glass. Steve will let us know later after he has had more time to investigate the damage.

On the 21st I went to Lynchburg to get the contract with TAG signed for our TNSP07. There were no problems and the TAG representative, Mrs. Denise Dye will allow us to control which cabins we will use. It was just one more step in the preparation for our annual star party. We have also made the arrangement to get the bright security light turned off for the TNSP07.

Now, for the continuation of Astronomy 101.

— Seasons —

Continued on Page 2

Message from the President

Continued from Page 1

The earth spins on its axis like a gyroscope with the axis pointing in a north/south direction. We see Polaris, the "North Star" move in a tight circle about true north over each day. Polaris is approximately one degree from true north. The amount of the inclination from the poles to the plane of the orbit is 23 ½°.

Since the earth's equator is inclined to the plane of its orbit, and since it maintains nearly the same direction in space during a complete revolution, each pole is presented to the sun for part of the year, and turned away from it for the remainder. The amount of the inclination determines the boundaries of the climatic zones. The frigid zones are the regions within 23 ½° from the poles, in which the sun becomes circumpolar, and where the seasons are accordingly extreme. The torrid zone has as its boundaries the tropics of Cancer and Capricorn, 23 ½° from the equator. Here the sun may be overhead at noon; the durations of sunlight and darkness never differ greatly, and temperature changes during the year are not marked. In the temperate zones the sun never appears in the zenith, nor does it become circumpolar.

by Bill Griswold,
President

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

MAGAZINE SUBSCRIPTIONS FOR BSAS MEMBERS

We are always able to accept requests for new and renewal yearly subscriptions to SKY AND TELESCOPE and ASTRONOMY from our members in good standing.

The current yearly rates are as follows:
SKY AND TELESCOPE: $32.95
ASTRONOMY: $34.00

Checks or Money Orders should be made out to the Barnard-Seyfert Astronomical Society (BSAS) and sent to the following address:

BSAS
P. O. Box 150713
Nashville, TN 37215-0713

DUES INFORMATION

On your Eclipse mailing label is the expiration date for your current membership in the BSAS. There will be a two month grace period before any member's name is removed from the current mailing list. You will be receiving a number of warnings informing you that your membership is expiring.

Dues per year are $20.00 Regular (1 vote); $30 Family (2 votes); $15.00 Student (under 22 years of age)(1 vote); $15 Seniors (65 years or older)(1 vote); $25 Senior Family (65 years or older)(2 votes).

Contact president@bsasnashville.com if you have questions. Dues can be sent to:

BSAS
P. O. Box 150713
Nashville, TN 37215-0713

THE ECLIPSE NEWSLETTER

Editor: Pam Thomas
pam.thomas@charter.net

BSAS website:www.bsasnashville.com
BSAS Logo by Tony Campbell

Happy Birthday Charon

by Robin Byrne

This month we celebrate the first of discoveries to affect our understanding of Pluto. In 1978, James W. Christy, at the U. S. Naval Observatory, was taking photographs of Pluto to refine our understanding of its orbit. On June 22 of that same year, while studying highly magnified images of Pluto, he noticed a bulge that would appear periodically. Christy proposed that the bulge was a moon of Pluto. By looking at photographic plates dating back to 1965, the moon was confirmed.

Before it became officially recognized, the moon was called S/1978 P1. Christy proposed the name Charon, after the mythological character who would ferry the dead across the river Styx to the underworld where Pluto ruled. However, Christy changed the pronunciation. Traditionally, the "Ch" is pronounced like a hard "K," but Christy pronounced it as a soft "Sh" sound after his wife Charlene. What better way to honor his wife than to combine her name with that of the boatman to Hell! It wasn't until the end of 1985 that the moon's name was adopted by the International Astronomical Union (IAU).

The discovery of Charon finally allowed astronomers to measure some of Pluto's physical characteristics. It was found that Pluto and Charon are gravitationally locked into a 6.387 day orbit where both keep the same side facing the other. This is similar to how our Moon keeps the same side facing Earth, but in Pluto's case, Pluto also keeps its same side facing Charon. The distance between Pluto and Charon was found to be 12.163 miles, which, along with the orbital period, allowed for the measurement of the total mass of the Pluto-Charon system, but not their individual masses.

I n the 1980's, Earth crossed the orbital plane of Pluto, which placed us in the right position to observe Pluto and Charon periodically eclipse one another. These observations allowed astronomers to get their most accurate measurements of both objects' diameters. It was lucky Charon had just been discovered, since this alignment occurs only about once every 120 years or so. From these measurements, it was found that Charon's diameter of 728 miles is just a little over half of Pluto's diameter of 12,200 miles. This makes Charon, in our solar system, the largest moon relative to its planet's size. Because of their relative sizes, the center of mass of their orbits lie outside either Pluto or Charon, which has led to the two being referred to as a Double Planet system. In 2005, two new moons of Pluto were discovered using Hubble Space Telescope images. Named Nix and Hydra, these moons now make Pluto the only Kuiper Belt object known to have more than one moon.

The discovery of Nix and Hydra helped to understand the composition of Charon and Pluto. Based upon spectroscopic observations, it has been found that the surface of Charon has more water ice, while Pluto's surface has more nitrogen ice. By analyzing the orbits of Hydra and Nix, more accurate masses of Pluto and Charon could be determined. With measurements of their diameters and masses, the densities of Pluto and Charon could be found. Their densities indicate that Pluto is composed of roughly 70% rocky materials, while Charon has only 55% rock. This could help lead to an understanding of their formation.

Originally, astronomers suggested that Pluto and Charon formed together, which would have resulted in nearly identical compositions. In 2005, it was proposed that the moon was the result of an object colliding with Pluto and knocking material off to form Charon. However, such an impact would have resulted in Charon having even more ice in its composition, and Pluto even less, than they currently have. A more recent suggestion is that Pluto and Charon formed independently, and later collided. The collision would have generated enough heat to boil away some ices, helped to bring the two bodies into orbit around each other, and knocked off enough material to form Hydra and Nix.

In September of 2006, the IAU voted on a definition of what is a planet that drastically affected Pluto, and possibly Charon. It was decided that a Planet orbits the Sun, is gravitationally round (which both Pluto and Charon are), and has gravitationally cleared its orbit. Since 1992, more and more Kuiper Belt objects have been found in the vicinity of Pluto, making Pluto ineligible for planetary status based on the last criteria. A new designation of Dwarf Planet was created, which would be an object that orbits the Sun, is gravitationally round, but shares its orbit with other, similarly-sized objects. So, Pluto is now a Dwarf Planet, but currently, Charon has not yet been designated officially part of a double dwarf planet system (the IAU next needs to come up with an official definition of what is a planetary satellite - uh oh!).

In July 2015, the New Horizons spacecraft will fly past Pluto and Charon, giving us our first up-close views of these distant worlds. However, we can get our best Earth-based views of the system this month. On June 19, 2007, Pluto will be at opposition. Although, at Pluto's distance, it hardly makes much of a difference, you still should take advantage of this roughly yearly opportunity to try to find this elusive object in our night sky. And while you're trying to spot Pluto, think about Charon and all that it has revealed to us about Pluto, and about how much more there is yet to learn.

References:

Charon

http://www.solarviews.com/eng/charon.htm

NASA's Hubble Reveals Possible New Moons Around Pluto

http://www.solarviews.com/eng/plutomoons.htm

Pluto, Charon, Nix and Hydra

http://www.johnstonsarchive.net/astro/astmoons/am-pluto.html

Charon (moon) - Wikipedia, the free encyclopedia

http://en.wikipedia.org/wiki/Charon_(moon)

Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Thursday, May 3, 2007

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 May 3, 2007. A sign-in sheet was circulated in lieu of a roll call. Board members Mike Benson, Keith Burneson, Tony Campbell, JanaRuth Ford, Bill Griswold, Terry Reeves, Bob Rice, and Randy Smith were present. Board members Donna Hummell, Kris McCall, Mark Manner, and Steve Wheeler were absent. Also attending were BSAS members Joe Boyd and Lonnie Puterbaugh. A quorum being present, President Bill Griswold called the meeting to order at 7:35 P.M.

Bill Griswold complemented Webmaster Tony Campbell for his hard work on the BSAS website. Mr. Griswold commented that changes were underway to allow board members to update portions of the website. Treasurer Randy Smith handed out a financial report showing the BSAS with $ 3,137.17 in the bank.

Lonnie Puterbaugh showed the board his completed display of weighted plastic drink bottles to demonstrate differences in weight on the planets of the solar system with that of the earth equaling one pound. The bottle weights were arranged against a banner showing both the planets' relative sizes and distances...

JanaRuth Ford suggested the need for a person to handle publicity for the Society. She further suggested that the BSAS might consider participating in teacher workshops – possibly even conducting one at the Tennessee Star Party (TNSP) this fall. Lonnie Puterbaugh cited a recent email from board member Steve Wheeler stating that there was a definite need for basic astronomy knowledge among elementary school teachers. This email additionally noted that the BSAS might partner with the various school systems to help meet this need. Randy Smith commented that his instructional experience from 25 years ago fully supported this suggested lack of astronomical knowledge among teachers. The board also discussed the possibility of securing grants and holding teacher workshops at future Warner Park star parties.

Lonnie Puterbaugh cited an article in the Brentwood newspaper describing a biotech exhibit to interest kids in science at the upcoming Williamson County Fair. Also, in connection with International Sidewalk Astronomy Day on May 19, he mentioned setting up at Barnes & Noble Booksellers in the Cool Springs Mall. The board noted that this arrangement would be a good opportunity for Barnes & Noble to promote and sell astronomy books.

Bill Griswold expressed concern about members not attending scheduled star parties; Terry Reeves noted that bad weather had been a factor. Mr. Reeves reported that the recently acquired external hard drive was ready to be put in an enclosure and made available to board members for storing BSAS related documents and files. Lonnie Puterbaugh suggested that the Treasurer's and Secretary's reports should be among the first things stored.

TNSP Coordinator Keith Burneson reported that he was seeking one more speaker for this September event and announced that establishing the TNSP bank account and PayPal account were goals for the next month. In addition, Mr. Burneson stated that regular steering committee would soon be held. He also mentioned that setting menus with the caterer and securing vendors were ongoing efforts. Bill Griswold noted that signing a contract with the Tennessee Alabama Georgia (TAG) camp management and controlling the security lights at that site were also on the agenda.

Lonnie Puterbaugh suggested that we might consider doing "naked eye astronomy" with green laser pointers to show the constellations at Warner Park's Blue Moon Star Party on May 31. Bill Griswold said that he had already contacted Warner Park Naturalist Heather Gallagher about this.

There being no further business to discuss, President Griswold asked for a vote to adjourn the meeting; the board unanimously voted to do so at 8:45 P.M.

Respectfully submitted,
Bob Rice
Secretary

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held on Thursday, May 17, 2007

President Bill Griswold called the meeting to order at 7:35 P.M. in the Adventure Science Center (ASC) and welcomed new members and guests. Mr. Griswold asked for any corrections to the minutes of the previous meeting held on April 19, 2007 as published in the May 2007 edition of the *Eclipse* newsletter. There being none, the minutes were approved by a unanimous voice vote.

Bill Griswold reminded attendees about these upcoming star parties and events:

- May 19 – Private star party at the Natchez Trace 435.5 mile marker – 7:00 PM until 3:00 AM
- May 31 – Blue Moon star party & open house at Warner Park
- June 16 – Annual picnic @ Spot Observatory w/workshops & observing – bring food & chairs
- July 14 – Private star party at the Natchez Trace 435.5 mile marker

Treasurer Randy Smith reported that the Society had a bank balance of $3,065.45. Mr. Smith announced that members could now renew club rate subscriptions to *Sky & Telescope* magazine directly with the publisher.

Tennessee Star Party (TNSP) Coordinator Keith Burneson reported that arrangements had been made to remove the bulb from last year's annoying security light near the observing field at the Tennessee-Alabama-Georgia (TAG) site. Bill Griswold pointed out that the Lynchburg Electrical Coop had agreed to do this at no charge. Mr. Burneson noted that a contract had not yet been signed with the TAG management.

Program Coordinator JanaRuth Ford reported that for the June meeting Chloe Alexander will speak on "The Relationship Between Galaxy Distance and Redshift" and Taffy O'Neal will speak about "Star-Streak Photography for the Accurate Calculation of Stellar Declination." These two high school students were BSAS-funded Astronomy Award winners at the 2007 Science and Engineering Fair. Ms Ford said that hopefully, if his schedule allows, *Amateur Astronomy* magazine editor Charlie Warren will speak at our July meeting. In addition, she reported that Vanderbilt graduate student William Teets will speak at our August meeting about his research on T Tauri Stars – A Look at Our Sun's Adolescence.

JanaRuth Ford also announced that NASA's Night Sky Network (NSN) had received a four year grant from the National Science Foundation and that the BSAS will receive $250.00 per year for the duration of the grant. The BSAS will need to provide 25-30 hours of outreach "method testing" for all four years. There will be 20 astronomy clubs participating in this testing: 10 with good outreach records (like the BSAS) and 10 that do not have well-developed outreach programs.

Bill Griswold introduced BSAS member Lonnie Puterbaugh who delivered a presentation on Radio Astronomy at the Very Large Array (VLA). Mr. Puterbaugh pointed out that the VLA, located near Socorro, New Mexico, was probably best know to the public through its depiction in the motion picture *Contact* starring Jodie Foster. However, he explained that, unlike its presentation in that movie, the VLA had never been used in any search for extraterrestrial life. Mr. Puterbaugh used a short video on the basic properties of light to introduce astronomical features in the radio range of the electromagnetic spectrum. He emphasized that, unlike other radio telescopes that used a single large parabolic dish antenna, the VLA employed a large number of separate antennae mounted on rails that could be moved into different configurations. Mr. Puterbaugh concluded his presentation with a short video accompanied by music that showed the VLA in operation.

Lonnie Puterbaugh introduced BSAS member Joe Boyd who delivered a presentation on the Green Bank Radio Telescope (GBT) located in eastern West Virginia. Drawing upon a recent trip he and his wife, Mary, made to this facility, Mr. Boyd presented a short video on the basics of radio astronomy and noted that the GBT is the largest moving object on land. He emphasized the GBT's extensive use in mapping hydrogen throughout the Milky Way and also pointed out its role in mapping Venus' surface and in discovering a smaller companion galaxy to the Milky Way. In addition, Mr. Boyd showed pictures of other smaller radio telescopes located at the Green Bank site.

Kris McCall showed a series of images from her trips to other radio telescope sites including one that had a 16 inch ball bearing in its construction. She also described a past trip to Mount Palomar. Ms. McCall also reported that the construction of the new planetarium at the ASC was on schedule.

Joe Boyd reported that the local planning commission was supporting a light-free zone for the entire county near Tamke-Allen Observatory operated by Roane State Community College. Dark Sky Committee Chair Powell Hall invited all members to attend meetings of this committee.

Since there was no further business to discuss, President Griswold declared the meeting adjourned at 9:30 P.M.

Respectfully submitted,
Bob Rice, Secretary

ACTIVITIES and EVENTS

June1—30, 2007

6/1 FULL MOON, Jupiter 6° N of Moon

6/7 BSAS Board of Directors mtg., 7:30 p.m. at Girl Scout Office

6/8 LAST QUARTER

6/10 Mars 5° S of Moon

6/13 Moon 0.9° N of M45

6/15 NEW MOON

6/16 BSAS Annual Picnic Spot Observatory 4:00 p.m.

6/18 Conj. of Venus & Moon

6/19 Conj. of Saturn & Moon

6/21 BSAS Membership mtg. 7:30 p.m. at ASC

6/22 FIRST QUARTER

6/28 Jupiter 6° N of Moon

6/30 FULL MOON

July 1—31, 2007

7/2 Venus 0.8° S of Saturn

7/3 Conj. of Moon & Neptune

7/5 BSAS Board of Directors mtg., 7:30 p.m. at Girl Scout Office

7/7 LAST QUARTER

7/9 Mars 6° S of Moon

7/13 Mecury 9° S of Moon

7/14 Private Star Party Natchez Trace (mile marker 435) 8:30 p.m., NEW MOON

7/16 Conj. Of Saturn & Moon

7/17 Venus 3° S of Moon

7/19 BSAS Membership mtg. 7:30 p.m. at ASC

7/22 FIRST QUARTER

7/25 Jupiter 6° N of Moon

7/30 FULL MOON

*All times listed are Central Time

BSAS
P. O. Box 150713
Nashville, TN 37215-0713