The ECLIPSE

The Newsletter of the Barnard-Seyfert Astronomical Society

Organized in 1928

August 2012

The Membership meeting will be held on August 15, 2012 at the Cumberland Valley Girl Scout Council Building located at the intersection of Harding Place and Granny White Pike at 7:30 pm.

Dr. Scott Hawley, Assistant Professor of Physics at Belmont University, will deliver a presentation on "Numerical Relativity," a discipline combining elements of computational physics, nonlinear wave mechanics, astrophysics, and gravitation theory. Dr. Hawley is also an accomplished singer-songwriter and musician who combines his enthusiasm for physics and music by teaching physics classes for Audio Engineering Technology students.

Upcoming Events

Board of Directors Meeting, August 1 at the Cumberland Valley Girl Scout Building – 7:30 pm

Membership Meeting, August 15 at the Cumberland Valley Girl Scout Building – 7:30 pm

In this issue

President's Column

The Venus transit last month got me thinking: daytime astronomy's pretty cool, even if there is only one star out! The fact that the sun's overwhelmingly powerful glare could be reduced to a pleasant level by a relatively inexpensive filter was an epiphany--why restrict my viewing and imaging to the night? So, as The Beatles once sung, "I'll follow the Sun!" (at least until the planets rise again at a convenient time).

The first step in my solar observing campaign was to review some basics about the sun, including its structure (from inside out): core, radiative zone, convection zone, photosphere, chromosphere, corona. When we view the sun through common "white light" filters, we see the photosphere, shining with countless photons emitted in all directions from the layers below. More exotic hydrogen-alpha (HA) filters view the next-higher-level chromosphere (meaning the Venus transit actually lasted an additional minute or two in HA 'scopes as Venus crossed a broader sun), while the beautiful but ethereal corona becomes visible only during total eclipses. Temperature variations are extreme: from an unimaginably hot 15 million degrees Kelvin at the solar core (where thermonuclear reactions fuse hydrogen into helium) to a relatively cool 6,000 degrees Kelvin in the photosphere and 10,000+ degrees Kelvin in the chromosphere, and then back up to a million degrees Kelvin or more in the corona.

Most of us will focus on the photosphere, so I'll follow suit. Any reasonably sharp telescopic view will show the photosphere covered by grainy-looking "granulation," each tiny granule the 1,000 kilometer-wide top of one of the millions of convection cells rising up from the hot plasma of the convection zone below. The sun's face will usually also have a few dark dimples--the sunspots that we all know, which are the relatively cool (4,000 degrees Kelvin) markers of where powerful solar magnetic field lines have bunched up. The dark

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Observing Highlights for August and September

Moon phases

August 2012

08/01 FULL Moon
08/09 LAST Quarter
08/17 NEW Moon
08/24 FIRST Quarter
08/31 FULL Moon

September 2012

09/08 LAST Quarter
09/15 NEW Moon
09/22 FIRST Quarter
09/29 FULL Moon

Objects:

Globular Clusters
M14, M9, M19, M62, M56, M71, M26, M22, M28, M54, M69, M70, M55

Open Clusters
M6, M7, M11 (Wild Duck), M26, M18, M23, M24, M25, M21,

Nebula
M57 (Ring), NGC 6543 (Cat's Eye), M27 (Dumbbell), M16 (Eagle), M17 (Swan), M20 (Trifid), M8 (Lagoon)

Asterisms
Cr399 (Coat Hanger)

Multiple Star Systems
Double-Double (Epsilon Lyrae)
Albireo (Beta Cygni)
Graffias (Beta Scorpii)

Planets
Mars, Saturn, Pluto

Star Parties for months of August and September

Aug 10 Public Star Party at Bowie Nature Park (Fairview) 8:30 – 10:30 pm. Perseid meteors (finally a good year with no Moon), Mars, Saturn, double stars, star clusters, nebulae

Aug 11 Public Telescope Clinic (7:00 pm) & Star Party (8:30 – 10:30 pm) at Edwin Warner Park Perseid meteors (finally a good year with no Moon), Mars, Saturn, double stars, star clusters, nebulae

Aug 18 Private Star Party at Natchez Trace Parkway mm 435.5

Sep 15 Private Star Party at Natchez Trace Parkway mm 412 (Water Valley Overlook)

Sep 21 Public Star Party at Bells Bend Nature Center 8:00 – 10:00 pm
Moon, double stars, star clusters, nebulae

Happy Birthday Kuiper Belt

by Robin Byrne

This month we celebrate a part of our solar system, which was only recently confirmed to exist. The story begins in 1987, when David Jewitt was curious about why the outer solar system appeared to be empty. Working with his graduate student, Jane Luu, they began searching for something beyond Pluto. The search spanned 5 years, and included the use of telescopes at Kitt Peak, Cerro Tololo, and Mauna Kea. The technique was not significantly different from how Clyde Tombaugh discovered Pluto: take two photographs of a region of sky, separated in time by hours to days, and place the two images in a blink comparator so that the stars line up. By "blinking" between the images, anything that moves will stand out. As CCD technology improved during the time of this search, the process was done electronically. Finally, on August 30, 1992, the first such object was found. It's official designation is (15760) 1992 QB1, although it is informally called simply, QB1.

In comparison to Pluto, QB1 has many similarities. Its orbit around the Sun is similar in size, although more circular than Pluto's. Where Pluto's orbit spans from as close as 29.7 AU out to its most distant point at 48.9 AU, QB1's orbit only ranges from 40.9 to 46.6 AU. But, with a similar average distance, their orbital periods only differ by about 40 years. Oddly, QB1 has never been named. Jewitt and Luu had suggested the name Smiley, after the astronomer Charles Hugh Smiley, but there was already an asteroid with that name. However, there are a class of Kuiper Belt Objects named after it, called "cubewano's" (Q B 1 o's).

With the discovery of QB1 also came the confirmation of the Kuiper Belt. The Kuiper Belt covers the region spanning from approximately 30 to 50 AU from the Sun. Thousands of Kuiper Belt Objects (KBO's) are now known to exist, including three dwarf planets (Pluto, Haumea and Makemake), while up to 70,000 or more are predicted to inhabit the region. Beyond the Kuiper Belt is a region called the "scattered disc," which is thought to be the source of short period comets. These are known as Scattered Disc Objects or SDO's. This region is where the dwarf planet Eris resides. While objects in the Kuiper Belt have fairly stable orbits, those in the scattered disc are more susceptible to perturbations, which could send them toward the inner solar system in the form of a comet.

Whether an object is part of the Kuiper Belt or the scattered disc ultimately depends on its relationship with Neptune. Within the Kuiper Belt, the objects fall, mostly, within a range of orbital resonances with Neptune's orbit. On the near side, at 39.5 AU, the orbits are in a 2:3 resonance, where for every three orbits of Neptune, the KBO experiences two orbits. This is where Pluto is found. Other objects that are found in the 2:3 resonance region are also known as "Plutinos." On the outer edge of the Kuiper Belt, at approximately 48 AU, there is a 1:2 resonance. This allows Neptune's gravity to maintain the belt's stability, much in the same way that Jupiter and, to a lesser degree, Mars keep the Asteroid Belt stable. The objects in the region between the two resonances are called "classical" KBO's and are the ones also referred to as cubewanos. Meanwhile, the SDO's, with much more elongated orbits, range out to 100 AU but come in close enough to the outer edge of the Kuiper Belt to feel Neptune's gravitational

influence, which perturbs their orbit either inward to the Sun, or outward, possibly being ejected from the solar system.

Compositionally, very little is known about KBO's due to their small size and great distance. There is some indication of the presence of frozen methane, ammonia and water. There also appear to be two populations of Kuiper Belt Objects, based on both their color and orbital characteristics. One group have orbits that are closer to the plane of the solar system and have a reddish color. Pluto is a member of this group. The other population have orbits that are more tilted relative to the plane of the solar system (up to 30°) and have colors that are closer to gray or white.

In 2015, we will finally get a better picture of the Kuiper Belt and its inhabitants. The New Horizons spacecraft, which launched in 2006, will arrive at Pluto on July 14 2015. After flying past the dwarf planet, a second KBO (yet to be determined) will be its target. The plan is to observe at least one example of the two populations found in the Kuiper Belt. From lowly QB1 to Pluto to all of the thousands of KBO's, the Kuiper Belt holds keys to understanding the origins of our solar system. It is exciting to think that in just a few years, we will unlock more of the mysteries of a region we've only known about for 20 years.

References:

1992 QB1 - Wikipedia

http://en.wikipedia.org/wiki/(15760)_1992_QB1

Chiron and Friends - 1992 QB1

by Zane B. Stein

http://www.zanestein.com/QB1.htm

Kuiper Belt - Wikipedia

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

SHOP AND/OR SWAP (new)

The BSAS is trying out a SHOP AND/OR SWAP section in the Eclipse.

1. Each participant must be a fully paid up member in good standing in the BSAS;
2. She/He must furnish the text in Text, Word or a compatible format. Pictures will be jpeg or equal (640x480).
3. Your contact address must be included so that all negotiations may be done independently of the BSAS or the Eclipse.
4. Your ad will be posted free for a period of two consecutive Eclipses, but must be removed as soon as a sale or swap has occurred. Contact The Eclipse editor, Bill Griswold, at bgriz@comcast.net.

There are no new ads for this month, but this is where it will happen.

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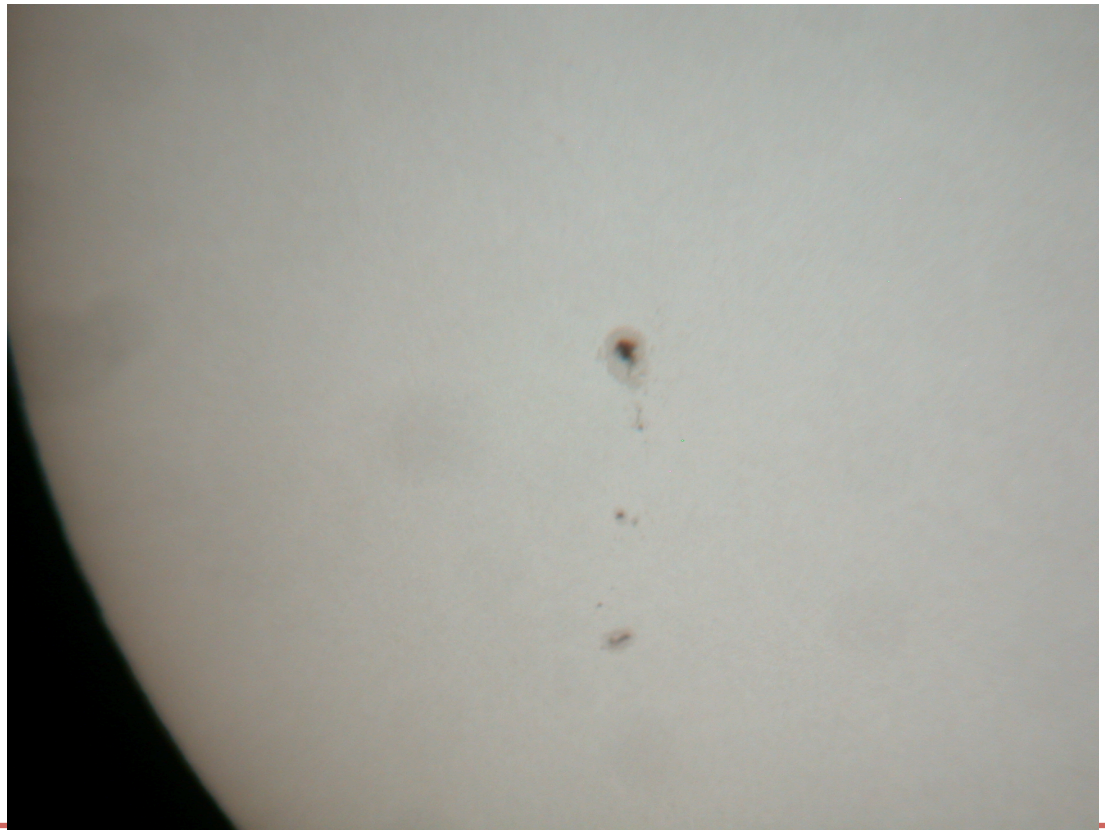
umbras at the center of each sunspot mark the strongest fields, while the grayish penumbras outline less powerful fields. Sunspots tend to come in pairs. Ever wondered why? One spot in each pair has a positive magnetic field, the other a negative one.

Enough theory for now. The actual results of solar imaging by amateurs can be wonderfully detailed, particularly early in the morning when convection currents (this time in our own atmosphere) are minimal. Best of all, exposure times are gratifyingly short (around a thousandth of a second), making it easy to "freeze" the seeing and get a better look at the star whose warmth and light help make life possible on our little planet. The attached white-light image--quickly shot with a 4" refractor on an alt-az mount--easily shows granulation and sunspot structure in the photosphere. Basic white-light solar imaging really is fairly simple to learn; why not give it a try?! Just remember to always use appropriate filters to tame the sun's power.

Clear skies to all,



Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Wednesday, July 11, 2012

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 July 11, 2012; this was a week later than the regularly scheduled meeting date that fell on July 4, a national holiday. A sign-in sheet was passed around in lieu of a roll call. Board members Dr. Spencer Buckner, Joe Boyd, Steve Cobb, Bill Griswold, John Harrington, Melissa Lanz, Kris McCall, Bob Norling, Curt Porter, Bob Rice, and Theo Wellington were present. All board members being in attendance, President John Harrington called the meeting to order at 7:34 P.M.

John Harrington announced that the owners of Camp Idyllwild in Duck River, Tennessee had sent a letter and a $200.00 check as a donation to the Society in appreciation of BSAS member John Walker "… who has generously donated of his time to educate children (and parents) who attend Camp Idyllwild about the wonders of astronomy." The board immediately and unanimously adopted a resolution thanking Mr. Walker for his efforts in promoting astronomy education at Camp Idyllwild.

John Harrington announced these upcoming star parties:

- Jul 20 – Public star party at Bell's Bend Outdoor Center at 8:30 P.M.
- Jul 21 – Private star party at mm 412 (Water Valley Overlook) on the Natchez Trace Parkway.
- Aug 10 – Public star party at Bowie Nature Park (Fairview) at 8:30 P.M.
- Aug 11 – Public star party and telescope clinic at Edwin Warner Park at 7:00 P.M.
- Aug 18 – Private star party at mm 435.5 on the Natchez Trace Parkway.

John Harrington stated that the club needed to publicize the upcoming telescope clinic being held at Edwin Warner Park on August 11. The board noted that the previous clinic held at Long Hunter State Park on June 23 had a very low turnout; this was generally attributed to the unseasonably hot and humid weather – sometimes exceeding 103 degrees - during that week. Kris McCall suggested that a description of what a telescope clinic entails should also be provided. Ms McCall said that she would put a notice about the clinic in the Sudekum Planetarium's monthly star chart and also promote it by word of mouth. Mr. Harrington said that he would write a telescope clinic description. Ms McCall stated that the clinic and star party at Edwin Warner Park would be at the Special Events Field and also said that she would ask the park's management to allow BSAS members to stay on after the event was over to watch the Perseid meteor shower.

John Harrington reported that Curt Porter had additional star party directional signs to be handed out to board members and that an assignment list would soon be available. Mr. Harrington also reported that a private star party was scheduled with the Committee for Skeptical Inquiry during their meeting at the Sheraton Music City Inn on October 27. In addition, he reported that he had not received a response from the person who had offered to donate a Coulter 12 inch dobsonian reflector telescope to the club and suggested that perhaps the matter should simply be dropped. Curt Porter moved that the BSAS should accept the telescope if it was offered again. Kris McCall seconded this motion and it was subsequently adopted by a unanimous voice vote without additional discussion.

John Harrington reported that Astronomics, a national amateur astronomy supply store, had contacted the club about promoting the opening of its new expanded showroom. The board discussed this and decided that the BSAS should not pursue this as a club-endorsed effort because doing so might affect its not-for-profit status under state and federal laws. However, they noted that club members were free to do so individually if they wished. Mr. Harrington also reported that he had

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received a communication from Alan Traino expressing an interest in establishing a Midwest Astronomy Fair and told the board that he would reply by encouraging the holding of such an event in Nashville. He further said that he would provide the board with a draft of his communication for their review before contacting Mr. Traino.

Joe Boyd commented that he had recently received a telephone call from someone who wanted information about dark sky efforts – especially about cities that had dark sky ordinances. Mr. Boyd noted that Marge Davis, an area conservation writer and recycling advocate, had also expressed an interest in dark sky activities. Kris McCall stated that a program on this subject had recently aired on the Public Broadcasting System (PBS) and that the club might be able to get a DVD copy of this broadcast to show at a membership meeting. John Harrington suggested that the BSAS invite Ms Davis to a meeting.

Theo Wellington suggested that the BSAS have membership forms available at public star parties. Dr. Spencer Buckner moved that the club acquire inexpensive informational business cards to hand out at star parties. Joe Boyd seconded this motion and it was passed by unanimous voice vote. Theo Wellington volunteered to oversee the acquisition of these cards.

John Harrington thanked Theo Wellington and Curt Porter for their work on the BSAS' Facebook Account. Since there was no further business to discuss President Harrington declared the meeting to be adjourned at 8:37 P.M.

Respectfully submitted,
Bob Rice, Secretary

Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held On Wednesday, July 18, 2012

President John Harrington called the meeting to order at 7:39 P.M. on July 18, 2012 at the Cumberland Valley Girl Scout Council Building in Nashville, Tennessee and welcomed members and visitors. Mr. Harrington announced that the owners of Camp Idyllwild in Duck River, Tennessee had donated $200.00 to the Society in appreciation of BSAS member John Walker's educational activities at the Camp. Treasurer Bob Norling reported that the BSAS had $1,833.23 in its regular account and $1,016.00 in its equipment account.

John Harrington announced these upcoming star parties:

- Jul 20 – Public star party at Bell's Bend Outdoor Center at 8:30 P.M.
- Jul 21 – Private star party at mm 412 (Water Valley Overlook) on the Natchez Trace Parkway.
- Aug 10 – Public star party at Bowie Nature Park (Fairview) at 8:30 P.M.
- Aug 11 – Public star party and telescope clinic at Edwin Warner Park at 7:00 P.M.
- Aug 18 – Private star party at mm 435.5 on the Natchez Trace Parkway.

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- Sep 15 – Private star party at mm 412 (Water Valley Overlook) on the Natchez Trace Parkway.

John Harrington reminded members about the new "Swap And/Or Shop" section in the *Eclipse* newsletter. Mr. Harrington reported that he had received a communication from Alan Traino expressing an interest in establishing a Midwest Astronomy Fair and that, with the board of directors' approval, he will reply by encouraging the holding of this event in Nashville.

John Harrington introduced BSAS members Dr. Terry Reeves and Steve Wheeler who delivered the evening's program on "What's Up in the Summer Sky". Steve Wheeler began the presentation by describing two useful smart phone applications: *Observer Pro* and *Star Walk*. He then used projected finder charts to describe these interesting binocular objects:

- Moon – bright and easy to find,
- Sun – can see sunspots but must use appropriate filters that can be purchased or self-made,
- M6 – Butterfly Cluster in Scorpius,
- M7 – Ptolemy's Cluster in the tail of Scorpius,
- M8 – Lagoon Nebula in Sagittarius,
- M11 – The Wild Duck Cluster in Aquila,
- Brocchi's Cluster – aka the Coat Hanger (because that's what it looks like), and
- M13 – The Globular Cluster in Hercules.

Dr. Terry Reeves next used projected star chats to describe these objects for telescope viewing:

- M57 – The Ring Nebula in Lyra,
- M27 – The Dumbbell Nebula in Vulpecula,
- M71 – Globular Cluster in Sagitta,
- M4 – Globular Cluster in Scorpius,
- M80 – Globular Cluster in Scorpius (only resolved in larger telescopes),
- M17 – The Swan Nebula in Sagittarius,
- NGC 6818 – The Little Gem Planetary Nebula in Sagittarius (**a challenge object**), and
- NGC 4895 – Barnard's Galaxy (barred irregular) in Sagittarius (**a challenge object**).

Lastly, Dr. Reeves suggested these double stars and a lunar crater as being striking, but easy to see even from light polluted urban areas:

- Albireo (Beta Cygni),
- Izar (Epsilon Bootis),
- Akalurops (Mu Bootis),
- Zeta Corona Borealis, and
- The lunar crater Copernicus.

John Harrington reminded members about the two star parties scheduled for this weekend. Since there was no further business to discuss, President Harrington declared the meeting to be adjourned at 9:01 P.M.

Respectfully submitted,
Bob Rice, Secretary

Become a Member of the BSAS!

Download and print the Application for membership from www.bsasnashville.com (Adobe® Acrobat Reader® required).

Then fill it out and bring it to the next monthly meeting or mail it along with your first year's membership dues to:

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

Annual dues, which include membership in the BSAS and Astronomical League, and subscriptions to their newsletters, are:

$20 Individual
$30 Family
$15 Senior (+65)
$25 Senior Family (+65)
$12 Student*

* To qualify, you must be enrolled full time in an accredited institution or home schooled.

All memberships have a vote in BSAS elections and other membership votes.

Also included are subscriptions to the BSAS and Astronomical League newsletters.

IMPORTANT DUES INFORMATION

To find the expiration date for your current membership, visit our web site at http://www.bsasnashville.com and click the Renewals link.

There will be a two month grace period before any member's name is removed from the current distribution list.

About Our Organization

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.
The BSAS meets on the third Wednesday of each month at the Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.
Membership entitles you to subscriptions to Astronomy and Sky & Telescope at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.
In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.
Most information about BSAS and our activities may be found at www.bsasnashville.com. If you need more information, write to us at info@bsasnashville.com or call John Harrington at (615) 739-4500.

BSAS on Facebook

Free Telescope Offer!

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact Lonnie Puterbaugh at 615-661-9540.