# ECLIPSE

*The Newsletter of the Barnard-Seyfert Astronomical Society*

**Celebrating our 77th Year** **May 2005**

**The Membership meeting will be held on May 19, 2005 at the Adventure Science Center at 7:30 pm. The title of the talk will be "July's Real Fireworks"**

The real fireworks this coming July will be out of this world! On 4 July 2005, the NASA Discovery Mission Deep Impact spacecraft will release an 820-pound (370-kg) "smart impactor" into the path of Comet Tempel 1. The resulting crater should be somewhere between the size of a house and a football stadium and could be up to fourteen stories deep. Learn about the mission and the role that amateur astronomers have had and will have in this exciting endeavor on 19 May 2005 at the regular meeting of the Barnard-Seyfert Astronomical Society. Our speaker will be Elizabeth M. Warner, a Faculty Research Associate and Director of the Observatory for the Department of Astronomy at the University of Maryland. She is the liaison between the Deep Impact mission and amateur astronomers as well as the webmaster for the Amateur Observer Program website for Deep Impact. The program, followed by a time for questions and answers, will start at 7:30 pm.

## FROM THE PRESIDENT

### Some Thoughts on Space Shuttles and the Future of Optical Astronomy in Space

After a two-year hiatus, NASA is finally set to launch a space shuttle again. Sometime on or after May 22nd, shuttle Discovery will rise from Launch Pad 39B at NASA's Kennedy Space Center in Florida. Its mission (STS 114) will be not only to re-supply the International Space Station, but also to evaluate new techniques for inspecting the fragile heat shielding of the shuttle. As part of the repair trials, one of Discovery's crew will conduct a spacewalk (an "extra-vehicular activity" or EVA in NASA-speak) to demonstrate repair techniques for both the shuttle's heat-resistant tiles and for the reinforced carbon-carbon panels on its wing edges, damage to which doomed space shuttle Columbia. Discovery's commander will even put the space shuttle itself through a backflip for the first time, so that the ISS' cameras can check the heat shielding on the underside of the shuttle. And on top of all that, the Discovery will bring needed supplies to the ISS and space-walking Discovery astronauts will replace one of the Space Station's gyroscopes and repair a malfunctioning circuit breaker.

Well, that's great you say, but what does it have to do with astronomy, exactly? The short answer is that the space shuttle is still the nation's premier heavy launch system and is the key resource for maintaining the Hubble Space Telescope. As you know, the Hubble just celebrated its 15th anniversary in orbit. Without doubt, the Hubble has produced a truly massive legacy of excellent, engrossing images at all optical wavelengths of light and into the infrared and ultraviolet wavelengths as well. We've all been treated to incredibly detailed, even iconic, views of many, many celestial objects provided by the Hubble. Who can forget the awesome view of M16 (the Eagle Nebula) and its "pillars of creation," or the immensely distant galaxies visible in the Hubble Deep Field and Ultra Deep Field? Much of the impact of Hubble's images, I think, stems from the fact that the Hubble's sensors and cameras "see" celestial objects in much the same way our eyes do—in visible light.

Of course, the Hubble's importance goes beyond gorgeous imagery—it has also helped to narrow the possible range of the "Hubble Constant" that measures the rate at which the universe is expanding, and its images were recently used to helped confirm that the Very Large Telescope (VLT) in Chile has obtained what are probably the first images of a planet orbiting another star besides our sun. As amazing as the Hubble's images are, they become even more fascinating—and scientifically valuable—when combined with data obtained from other NASA space telescopes, including the Chandra X-Ray observatory and the Spitzer Space Telescope (which observes in the infrared portion of the spectrum). And it's worth noting that while the relatively small Spitzer Space Telescope was carried into orbit by an unmanned Delta rocket, the far larger Chandra (45 feet long and weighing over 10,500 pounds) required space shuttle Columbia to lift it into orbit.

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As you probably know, the Hubble Space Telescope's future life expectancy without a repair mission is probably only 2-3 years. Yet NASA and its political masters have made the decision not to send a space shuttle to conduct that repair mission on the Hubble's aging gyroscopes and batteries. Their argument is that the risk to astronauts' lives isn't justified by the benefits of extending the Hubble's lifetime by 5 years (until perhaps 2012 or so). Attempts to develop a robotic repair mission are underway but seem unlikely to produce a solution in time to save the Hubble.

How much does that matter? Surely NASA has a Hubble replacement ready and waiting, or at least on the drawing board, right? Not so. The James Webb Space Telescope, currently slated for launch in 2011, is often referred to as Hubble's successor. While that telescope will be immensely capable and will have a far larger main mirror than the Hubble (6.5 meters vs. 2.4 meters on the Hubble), it will generally not observe in optical wavelengths but instead in the infrared. And the James Webb scope will orbit so far out (almost one million miles from Earth) that there will be no possibility of astronauts' correcting problems if the mission runs into difficulty early, nor of conducting maintenance missions on the scope as the harsh conditions of space inevitably damage it over time. In other words, the James Webb Space Telescope is guaranteed to have a limited lifetime, due to the impossibility of repair/upgrading.

I think NASA is making a mistake. Funding for space exploration and space-based astronomy depends in large part on the public's retaining its wonder and awe for space and space exploration. By not funding and flying a repair mission to the Hubble, and by choosing not to build a true Hubble successor, NASA risks losing some of that all-important public support and fascination for space. No doubt the James Webb Space Telescope, if successfully launched and placed in its distant orbit, will produce incredible scientific imagery (especially with regard to extremely distant objects whose light is so red-shifted that it's become infrared). And the data in that imagery can doubtless be adjusted to produce colors that will appear captivating to the eye. But they won't truly be optical images, and I think a certain section of the public will recognize that fact and be turned off by it. And ground-based images, as excellent as they have become with the advent of adaptive optics, will probably still not equal the Hubble's resolution in optical wavelengths (though they soon will surpass Hubble's capabilities in the infrared).

The bottom line is that the future of true optical astronomy in space for the near- to mid-term rides on repairing the Hubble's aging systems. And the Hubble repairs depend upon the space shuttle, since the wide range of necessary repairs will probably demand a human's touch and flexibility to complete successfully. So let's all hope that Discovery's mission this month is a complete success, including the various tests to prove the concept of shuttle heat shield repairs in space. That's the only realistic chance that the Hubble (and space-based optical astronomy) have in the next 5-10 years, assuming that NASA realizes its mistake in time.

By John Harrington
President

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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: $29.00
Checks or Money Orders should be made out to the Barnard-Seyfert Astronomical Society (BSAS) and sent to the following address:

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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). Please call President, John Harrington, (615) 269-5078 if you have questions. Dues can be sent to:

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BSAS Logo by Tony Campbell

## Happy Birthday Sir Joseph Norman Lockyer

by Robin Byrne

This month we celebrate the life of a man whose name may not be common knowledge, but whose contributions to astronomy are very well known. James Norman Lockyer was born May 17, 1863 in Rugby, England. After an education in Europe, Lockyer began work at the War Office in 1857, while pursuing astronomy as a hobby.

One of Lockyer's areas of interest was the relatively new field of spectroscopy, which involves dividing the light of an object into a spectrum. By analyzing the spectrum, the composition of the object can be determined. Lockyer was among the first to take spectroscopy from the physics laboratory to the astronomical observatory. In 1867, Lockyer became the first person the observe the Sun's spectrum, and in the following year used a spectroscope to study solar prominences. Lockyer is responsible for naming the region where prominences are located as the "chromosphere." He also studied the Doppler shift of solar flares to measure their speeds, and used the solar spectrum to measure the temperature of sunspots and of the solar surface.

While studying prominences, Lockyer, in cooperation with other astronomers, observed spectral lines that had never before been seen. After unsuccessfully being able to recreate these lines in the laboratory, Lockyer suggested it was an element that was new. In 1870, he named this new element "helium" after Helios, the Greek god of the Sun. It wasn't until 25 years later that helium was found on Earth. In 1897, Lockyer was knighted for his discovery of helium.

In 1869, Lockyer pursued his interest of sharing valuable scientific information by founding the magazine "Nature." He remained the editor of this highly regarded publication until his death 50 years later. Lockyer also was a champion of educating the general public about science. It was largely due to his efforts that chemistry and physics were added to the curriculum in English secondary schools.

In 1875, Lockyer began working at the Royal College of Science. Here, he was responsible for teaching astronomical physics (now known as astrophysics), becoming the world's first professor of astrophysics.

While visiting Greece, in 1890, Lockyer noticed that many ancient temples were aligned east-west. He suggested that this was so that the temples were aligned with sunrise and sunset. Traveling to Egypt, Lockyer studied the temple of Karnac, and published his results in 1894 in the book "The Dawn of Astronomy." In 1901, he expanded his studies to include Stonehenge. By studying the various stone alignments, Lockyer proposed that by taking into account precession, he could determine the date that Stonehenge was built. He derived a year of 1848 BC, which was within a few hundred years of the age determined, in 1952, using radioactive dating. Even though many of his ideas have since been abandoned, Lockyer is still considered the founder of archaeoastronomy.

On August 16, 1920, James Norman Lockyer died in Salcombe Regis, Devonshire, England. The father of solar spectroscopy, the discoverer of helium, the founder of "Nature," and the father of archaeoastronomy: Sir James Norman Lockyer made so many amazing contributions to the world of astronomy and science, yet his name is not nearly as well known as his accomplishments warrant. Whether you are observing the Sun, reading a science magazine, visiting an ancient astronomical site, or even buying a helium balloon, pause for a moment to thank Sir Lockyer for helping to make your pursuits more understandable and enjoyable.

References:

J. Norman Lockyer Web Page http://www.hao.ucar.edu/public/education/sp/images/lockyer.html

Norman http://www-solar.mcs.st-andrews.ac.uk/~clare/Lockyer/norman.html

## Barnard-Seyfert Astronomical Society
## Minutes of a Regular Meeting of the Board of Directors
## Held On Thursday, April 7, 2005

The board of Directors of the Barnard-Seyfert Astronomical Society met in regular session at the Jefferson Square Club House in Nashville, Tennessee on April 7, 2005. A sign-in sheet was circulated in lieu of a roll call. President John Harrington declared a quorum to be present and called the meeting to order at 7:43 P.M. Board members Joe Boyd, Tony Campbell, Bill Griswold, John Harrington, Kris McCall, Bob Rice, Randy Smith, and Pam Thomas were present. Board members Mike Benson, JanaRuth Ford, and Gary Wilkerson were absent. In addition to members of the board, BSAS Equipment Committee member Keith Burneson and Equipment Committee Chair Lonnie Puterbaugh were also present. The minutes of the previous regular board meeting held on March 3, 2005 were approved as published in the 2005 issue of the *Eclipse* newsletter.

John Harrington reported that the National Park Service had not yet responded to his letter requesting permission for the BSAS to use the Water Valley Overlook site on the Natchez Trace Parkway for star parties during the remainder of the year. Mr. Harrington announced that he would personally discuss the matter with Chief Ranger Jane Winston in Tupelo, Mississippi on Friday, April 8, 2005. He noted that, should this discussion fail, the BSAS should consider appealing to its national legislators.

John Harrington reported that Dark Sky Committee Chair Powell Hall was on the mend from surgery and wished him a speedy recovery. Mr. Harrington noted that Glenn Johnson from the International Dark-Sky Association was scheduled to speak on Astronomy Day at the Adventure Science Center (ASC) on April 16.

Equipment Committee Chair Lonnie Puterbaugh reported that the BSAS' traveling display would be ready for Astronomy Day at the ASC. Mr. Puterbaugh noted that pictures of BSAS member activities would still be welcomed for the traveling display. He also reported that the committee continued to seek a mount for the Society's new Personal Solar Telescope. He

BSAS Treasurer Randy Smith gave a written financial report showing the Society's checking account balance at $6,255.75 for the end of March. Mr. Smith reported that he still had several 2005 astronomy calendars and Observers Handbooks on hand and suggested using these for door prizes since they would not likely be sold. He also recommended taking orders for these items next time – perhaps in August – to avoid similar overages. The board briefly discussed the matter and unanimously decided to donate the remaining calendars and Handbooks as door prizes for the upcoming Astronomy Day event at ASC.

Joe Boyd reported that the Long Range Planning Committee would meet next Tuesday, April 12, 2005. John Harrington announced that BSAS board member Mike Benson would present the April 21 membership meeting program on features of the Society's membership in the Astronomical league and on highlights of his recent trip to the American Museum of Natural History's Rose Center for Earth and Space in New York City. John Harrington asked Vice-President Pam Thomas to contact Dr. David Fields regarding a much-discussed BSAS field trip to Tamke-Allan Observatory. Lonnie Puterbaugh reported that he had not yet contacted REI about being a vendor at the Tennessee Star Party (TNSP) 2005 in October. Tony Campbell stated that he might be able to investigate Pickett State Park as a potential future TNSP site. Bob Rice asked that the BSAS' post office box be checked for receipt of a federal income tax form.

Kris McCall made these announcements regarding the BSAS' participation in Astronomy Day at the ASC on Saturday, April 16: BSAS members could set up telescopes in front of the Science Center; participants should have a rain plan; and the event would start at 10:00 AM and end at 3:00 PM. Ms McCall announced that NASA's Paul Johnson would speak at 11:00 AM and again at 1:00 PM. She also stated that the evening star party might have to be relocated to another site, but promised to notify the board if that occurred.

Quoting an email from Mike Benson who served as a judge, John Harrington announced that Jessica Lee Ange and Samuel Joseph Thompson were awarded 1st and 2nd place prizes respectively at the Middle Tennessee Science & Engineering Fair on March 17. The BSAS provided $100 for the 1st place prize and $50 for the 2nd place prize. Mr. Harrington noted that, although not pre-approved by the board, Mr. Benson followed the precedent of offering both winners a free one year membership in the BSAS. The board immediately and unanimously approved awarding these two free memberships.

There being no further business to discuss, President Harrington declared the meeting adjourned at 8:40 P.M.

Respectfully submitted,
Bob Rice, Secretary

## Barnard-Seyfert Astronomical Society
## Minutes of the Monthly Membership Meeting
## Held on Thursday, April 21, 2005

President John Harrington called the meeting to order at 7:45 P.M. at the Adventure Science Center (ASC) and welcomed new members, returning members, and visitors. The minutes of the previous membership meeting held on March 17, 2005 were approved without objection as published in the April 2005 issue of the *Eclipse* newsletter.

John Harrington announced his meeting with National Park Service (NPS) Chief Ranger Jane Winston in Tupelo, Mississippi on Friday, April 8, 2005 to seek permission for the BSAS to use the Water Valley Overlook site on the Natchez Trace Parkway for star parties. Mr. Harrington relayed Ranger Winston's verbal representation that the BSAS' permit was approved through the end of 2005 and that the usual fee would be waived. He additionally reported that, per Ranger Winston, the NPS "seeks and wants" the Society's presence in the parks and further noted that she understood the importance of dark skies. The audience enthusiastically applauded Mr. Harrington's dedication and persistence in pursuing this matter.

John Harrington announced these upcoming events:

- April 25 - Hubble images unveiling at the ASC @ 10:00 AM
- May 7 - Private star party at Natchez Trace mile 433.5 parking lot @ 7:30 PM
- May 21 - BSAS field trip to Tamke-Allan Observatory @ Roane State Community College
- May 22 - Earliest date for NASA resumption of space shuttle flights
- May 24 - Public lecture & panel discussion at the ASC @ 7:30 PM on NASA's return to flight

Kris McCall announced that the ASC was one of 100 science centers around the country selected to host the April 25 unveiling of two new high-resolution images from the Hubble Space Telescope. This event is in conjunction with Hubble's 15th anniversary. Ms McCall noted that staff from the Belle Meade Plantation would also participate by appearing in period costumes and enacting conversations about 19th century astronomical topics.

Vice-President Pam Thomas announced that motel rooms were available in nearby Harriman at approximately $53 per night for those members going on the May 21 field trip to Tamke-Allan Observatory at Roane State Community College. Ms Thomas thanked Dr. David Fields at Tamke-Allan for graciously inviting the BSAS to visit.

John Harrington commented that May 22 was a tentative date for NASA's resuming space shuttle flights following the Columbia disaster. Kris McCall announced that Vanderbilt University faculty would participate in the public lecture and panel discussion scheduled for May 24 at the ASC to commemorate this resumption of flight. She noted that BSAS member Chuck Schlemm would also participate in this event.

John Harrington, reporting for Treasurer Randy Smith, announced that the BSAS' checking account balance was $6,053.00. Mr. Harrington also asked for Tennessee Star Party (TNSP) volunteers, noting that those interested could contact him or any other BSAS officer. Webmaster Tony Campbell asked to be informed as things firmed up for the TNSP so he could update our website.

Equipment Committee Chair Lonnie Puterbaugh asked for old Orion and Harding Optical catalogs to supplement the "Welcome to Astronomy" brochures currently used as public handouts in the BSAS' foldout display. Mr. Puterbaugh also asked for copies of members' pictures to be used on the display – especially those showing people looking through telescopes.

Program Committee Chair Jana Ruth Ford announced that Elizabeth Warner from the University of Maryland would present the May program on NASA's Deep Impact Mission. Ms Ford also announced that Timothy Ferris would present the June program on a topic yet to be determined.

Mike Benson reported that he had initiated a discussion with the Nashville Symphony about BSAS members providing telescopes during the presentation of Gustav Holst's "The Planets" in early September. Mr. Benson noted that actor Patrick Stewart of Star Trek fame was scheduled to narrate this production and announced that he would follow up on this possible development.

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Minutes Monthly Membership Meeting, continued from Page 5

Kris McCall thanked the BSAS for its participation in Astronomy Day at the ASC on April 16 and for its anticipated participation in future events.

At 8:42 PM John Harrington introduced Mike Benson who gave a dual presentation on Benefits of Belonging to the Astronomical League (AL) and on his recent trip to the American Museum of Natural History's Rose Center for Earth and Space in New York City. Mr. Benson, the BSAS' AL Correspondent, pointed out that the Society has held a club membership in the AL since 1996, a relationship that also grants AL membership to each individual BSAS member. He further cited these benefits of belonging to the AL:

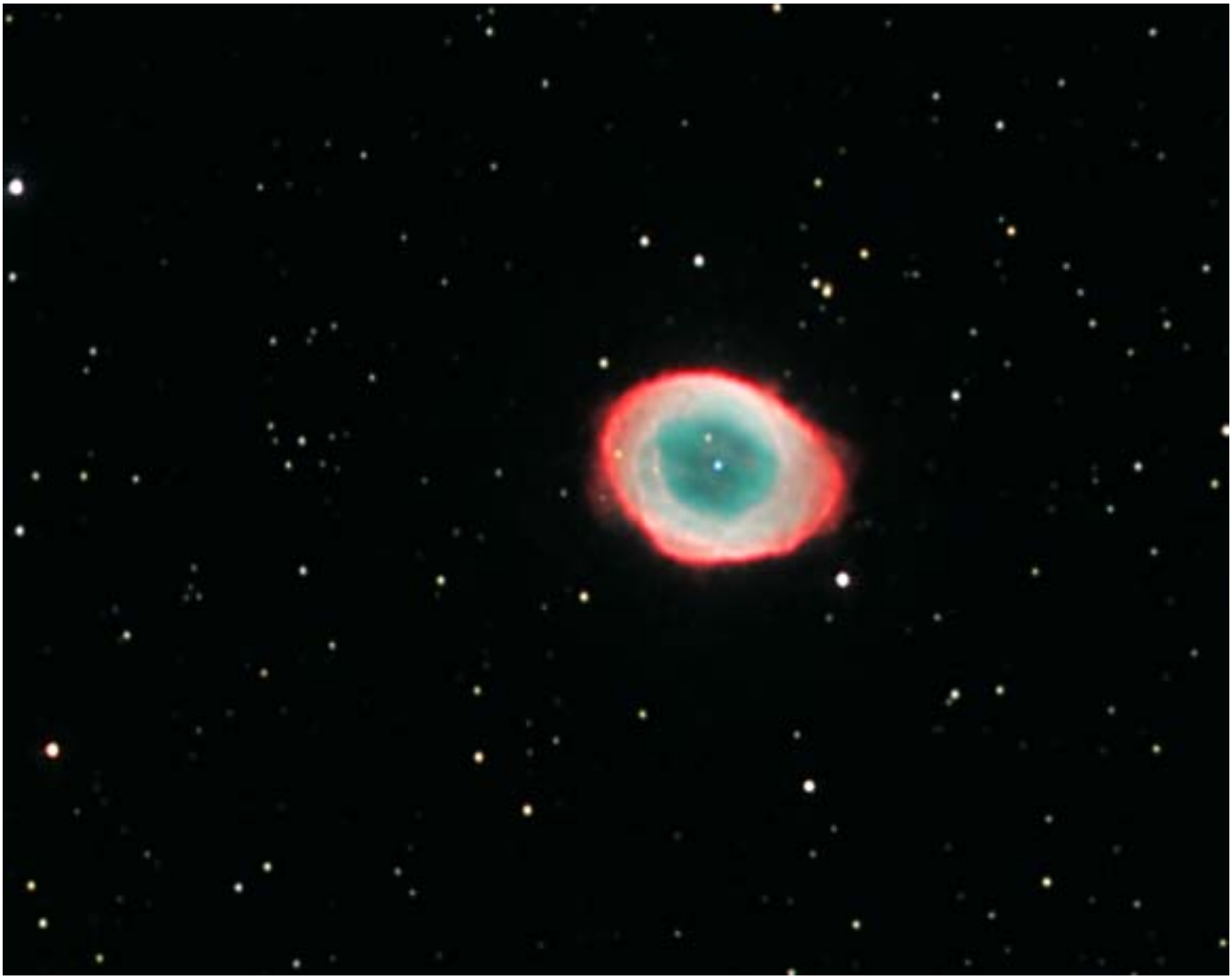
- The AL is the premier amateur astronomy organization in the country, representing over 200 clubs and 20,000 individuals.
- These numbers put astronomy before the public while giving amateur astronomers political clout and lobbying power.
- The AL provides Observing Clubs with awards for a variety of naked eye, binocular, and telescope accomplishments.
- Members pay nothing for these award pins and certificates; these are covered by their club's $5 per capita assessment.
- The AL provides the Jack Horkheimer Award and the National Young Astronomer Award to promote youth astronomy.
- The AL bookstore allows members to purchase astronomical books at 10% off with free postage.
- The AL publishes the informative *Reflector* newsletter for its members.
- The AL is a sponsor and member of the International Dark-Sky Association.
- The AL provides both regional and a national (ALCON) convention.
- The AL supports the International Space Station Amateur Telescope (ISSAT) initiative.
- The AL provides access to very reasonable liability insurance to member clubs.
- The BSAS has used this coverage for star parties and other events for five years.

Mr. Benson next described his February trip to the American Museum of Natural History's Rose Center for Earth and Space in New York City with an emphasis on the Hayden Planetarium that is part of the Rose Center. A colorful digital slide presentation accompanied his narrative of the 87-foot planetarium dome and other features including a huge nickel-iron meteorite. Mr. Benson's pictures and description of the long descending spiral walkway that portrayed all of time since the Big Bang captured everyone's interest – especially the very last portion that allotted all of human history in the width of a human hair.

Kris McCall announced that she had a demonstration of features under consideration for the Sudekum Planetarium. Respecting Ms. McCall's request for confidentiality, President Harrington adjourned the meeting at 9:48 PM for members and guests to gather in the planetarium for this presentation.

Respectfully submitted,

Bob Rice
Secretary



**M57, Ring Nebula**

Mark Manner says, "I took the image on April 15 (actually, beginning at 4:05am on April 16th). It was taken with an SBIG ST-10XE camera at the F9 focus of my RCOS 16 scope. It consists of 48 minutes total exposure. The subexposures were eight 3 minute luminance images, and four 2 minute images each of red, green and blue. The luminance was binned 2x2 and the RGB was binned 3x3. I used the SBIG AO7 unit, and processed it with CCDSoft, Registar, Sigma Clip, CCDSharp and Photoshop CS. To bring out more detail, I would need to double or triple the number of subexposures, and if seeing were better, bin the luminance 1x1 and RGB 2x2".

## Activities and Events

May 1 — 31, 2005

5/1 LAST QUARTER
5/4 η-Aquarid meteors peak
5/5 BSAS Board of Directors meeting., 7:30 p. m
5/7 Private star party (Natchez Trace Mile 433.5 parking lot)
5/8 NEW MOON; Ceres at opposition
5/11 Vesta in conjunction with the Sun
5/14 Mars 1.2˚ S of Uranus (75˚ W)
5/15 FIRST QUARTER
5/16 Double shadow transit on Jupiter
5/19 BSAS monthly meeting., 7:30 p. m., at Adventure Science Center
5/19 Jupiter 0.4˚ N of Moon, occultation; double shadow transit on Jupiter
5/23 Double shadow transit on Jupiter
5/24 Antares 0.8˚ S of Moon, occultation
5/26 Double shadow transit on Jupiter
5/30 LAST QUARTER; double shadow transit on Jupiter
5/31 Mars 0.5˚ N of Moon, occultation

June 1 — 30, 2005

6/2 Double shadow transit on Jupiter
6/6 NEW MOON; Double shadow transit on Jupiter
6/6 Private star party (Natchez Trace Mile 433.5 parking lot)
6/7 BSAS Board of Directors meeting., 7:30 p. m
6/13 Pluto at opposition
6/14 FIRST QUARTER
6/16 Jupiter 0.4˚ N of Moon, occultation
6/20 Antares 0.7˚ S of Moon, occultation
6/21 Solstice at 1:46 CDT
6/21 FULL MOON; BSAS monthly meeting., 7:30 p. m., at Adventure Science Center
6/25 Venus 1.3˚ N of Saturn (22˚ E)
6/26 Mercury 1.4˚ N of Saturn (22˚ E)
6/28 LAST QUARTER; Mars 2˚ S of Moon
6/29 Solar viewing for children, Edwin Warner Park

Note: all dates & hours according to Central Time

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