



ECLIPSE



The Newsletter of the Barnard-Seyfert Astronomical Society

Celebrating our 76th Year

November 2005

**The Membership meeting will be held on November 17, 2005
at the Adventure Science Center at 7:30 pm.
The speaker will be Dr. Jeffrey Moersch**

In summer, 2003, the United States launched two unmanned roving robotic explorers, "Spirit" and "Opportunity," to explore the surface of Mars. Each rover carried an international payload of instruments that enabled it to act as a robotic field geologist, under the command of a science team back on Earth. Both rovers landed successfully in January, 2004, and began their primary tasks of trying to unravel the geologic histories of their landing sites, specifically in regard to the role liquid water may have played. To date, Spirit has found no overt evidence for a lake there, but more subtle manifestations of liquid water have been found, such as physical and chemical alteration of the volcanic rocks that dominate the landscape. Fortuitously, Opportunity landed in a small impact crater with exposed rock outcrop laid out just a few meters away. Crossbedded and festooned layering, high sulfate abundances, and small spherules of specular hematite (dubbed "blueberries") at this outcrop and another in a much larger crater investigated by Opportunity all point to a rich history of flowing liquid water interacting with the surface at this site. Dr. Jeffrey Moersch will speak on Martian geology and the rovers at our November membership meeting. He holds a bachelor's degree in Physics, and Master's and Ph.D. degrees in Astronomy from Cornell University, as well as a Master's degree in Geology from Arizona State University. Prior to his current position, he was a Resident Research Associate of the National Research Council in the Exobiology Branch of NASA Ames Research Center in California. Dr. Moersch is now an Assistant Professor in the Department of Earth and Planetary Sciences at the University of Tennessee. Dr. Moersch's research focuses on the exploration of Mars, using its present-day geology as the key to its past environment and potential for harboring life. He has been deeply involved in many of NASA's robotic planetary exploration missions over the past 20 years, and is currently serving on the science teams for the Mars Exploration Rover mission (Spirit and Opportunity) and the Mars Odyssey orbiter mission. He also has experience in telescopic work, having used the 200" Hale telescope at Palomar Observatory, and the Infrared Telescopic Facility (IRTF) on Mauna Kea, among others, to observe Mars in the infrared over the past 12 years. Dr. Moersch has authored or co-authored over 100 scientific publications and has served on numerous advisory panels for NASA.

See Page 7 for invitation to eat with Dr. Jeffrey Moersch prior to the meeting

President's Message

By Pam Thomas, President

I'd like to begin this report by personally thanking John Harrington for all the hard work and countless hours he dedicated to making the Barnard Seyfert Astronomical Society a great organization to belong to. He was a wonderful president and we will miss him very much. We wish him the best of luck in his new position with Bridgestone-Firestone in Indianapolis. He just better come back to visit us!

We have had a great year. Our frequent star parties, both public and private, have gained us several fabulous new members, as well as educating the public on the marvels of our heavens. We have been quite fortunate to join forces with our neighbor societies including Cumberland Astronomical Society near Gallatin, and the Von Braun Astronomical Society in Huntsville, AL by participating in joint star parties with these groups.

We also just wrapped up another successful Tennessee Star Party at Camp Nakanawa, October 7-9. We were pleased to welcome approximately 115 fellow amateur astronomers, and although the skies did not cooperate at all, it was an awesome weekend. Our phenomenal speakers included Dr. Bob O'Dell from Vanderbilt, Dr. Richard Schmude from Gordon College, Dr. Chuck Higgins from MTSU, and our own Dr. Spencer Buckner from Austin-

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Guy Ottwell Astronomical Calendar

Again this year, Mike Benson will be ordering the Guy Ottwell Astronomical Calendars for those who want to purchase a calendar. This year, however, you must order your calendar from Mike and pay in advance. The price will be between \$21 and \$22, depending on the cost of the shipping and the number that are ordered. The request should be in writing and should be accompanied by \$20. The final cost will be settled later.

Mike's address is as follows:

2308 Dundee Lane
Nashville, TN 37214-1520
Phone: 883-6571

The calendars will be ordered on the 15th of November and only those who have reserved theirs from Mike will receive a calendar.

President's Message, continued from Page 1

Peay, Mark Manner and Lonnie Puterbaugh. Everyone in attendance had a fantastic time and it was so great to catch up with old friends and make some new ones. I want to thank everyone who gave up so much of their time and energy to make this weekend great: Bob Rice, Bill Griswold, Joe and Mary Boyd, Keith Burneson, Lonnie and Karen Puterbaugh, Gary Wilkerson, Heinrich Tischler, John Harrington, Terry Reeves and Glenn Whelan. You all are a tremendous asset to this organization. TNSP '05 could not have happened without you!

We are in the midst of planning our annual holiday party that is set for December 15 at Adventure Science Center. As we have in the past, BSAS will be providing the main course, and we are asking our members to bring their favorite pass-around dish. At this month's meeting, there will be a sign-up sheet so start thinking of what you would like to bring. We will most likely have a brief presentation on the star of Bethlehem as well as a surprise planetarium show. We were so successful last year with our astronomy silent auction, raising over \$200, that we are doing it again this year. Start looking through your stuff and if you have anything astronomy related that is just collecting dust, please consider donating it to our auction. All proceeds benefit the BSAS. There will be more information on the holiday party as the November meeting.

In closing, I'd just like to say thank you to everyone for bearing with me during this transition. I'll only be at the helm for a brief time and I'm trying to pick up where John left off. We will be welcoming our new officers in the coming months, so if you are interested in a board position, please let me know.

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:

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

BSAS
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THE ECLIPSE NEWSLETTER

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Randy Smith, Treasurer

Joe Boyd, Immediate Past President

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Mike Benson

Tony Campbell

JanaRuth Ford

Bill Griswold

Kris McCall

Gary Wilkerson

BSAS website: www.bsasnashville.com

BSAS information line: 615 252-4091

BSAS Logo by Tony Campbell

Happy Birthday Fred Whipple

by Robin Byrne

This month we celebrate the life of a man whose contributions to astronomy and society have been invaluable. Fred Lawrence Whipple was born in Red Oak, Iowa on November 5, 1906. Whipple majored in Mathematics at the University of California at Los Angeles. His original plans included a career as a tennis player, but that dream was ended by polio. So, instead, Whipple decided on graduate school at UC Berkeley. While at Berkeley, Whipple was one of the first people to compute the orbit of the newly discovered planet Pluto. Whipple obtained his Ph.D. in Astronomy in 1931.

Upon graduation, Whipple accepted a position at the Harvard College Observatory, where he stayed until 1977. From 1955 to 1973, Whipple served as director of the Smithsonian Astrophysical Observatory (SAO), and helped with the merger of that facility with the Harvard College Observatory to form the Harvard-Smithsonian Center for Astrophysics in 1973.

One of Whipple's first research projects involved meteors. By taking photographs of meteors from two different locations, he was able to triangulate their trajectories. He also found that most meteors were composed of material from comets, disproving the idea that meteors were from beyond our solar system. Whipple would later use a similar technique to track artificial satellites.

Whipple's contributions were not limited to astronomy, though. During World War II, he co-invented a technique for cutting tin foil into small pieces. Those pieces, called chaff, would then be ejected by an aircraft to fool enemy radar into thinking there were several planes present. For his work, the US Air Force dubbed Whipple the "Chief of Chaff", and President Truman awarded him a Certificate of Merit.

In 1946, Whipple married his second wife, Babette F. Samelson. They had two daughters, Sandra and Laura. He also had a son, Earle, from his first marriage.

In 1950, Whipple made a proposal for which he is probably best remembered. Up to this time, the common thought was that comets were a conglomerate of sand held together by gravity, known as the "sandbag" theory. Whipple discarded this theory and suggested that, instead, comets were a mixture of rock, dirt and ice. A journalist came up with the description that is still used today: "dirty snowballs." Whipple also proposed that the tail of a comet is material from the nucleus that has been vaporized by heat from the Sun. In 1986, when the Giotto spacecraft flew close to Comet Halley, Whipple's model was proven to be correct.

Whipple's love of comets was a constant in his life. He is credited with the discovery of six comets. To proclaim his achievements to the world, for many years he had on his car a license plate that read COMETS.

In the 1950's, well before any satellites had been launched, Whipple had already been thinking about them. He and Werner von Braun wrote several articles about space, helping to begin America's interest in space exploration. Realizing the potential damage a spacecraft or satellite could experience due to an impact from a meteor, Whipple invented the Meteor Bumper. This device is a thin, metal, outer layer of a spacecraft or satellite. When a meteor hits, it vaporizes before causing any damage to the vehicle. This device is still used today.

Aware of the coming age of satellites, Whipple set up a network of amateur astronomers around the globe prepared to track satellites. Well before any satellites had been launched, this team had run practice drills in preparation. When Sputnik was launched in 1957, only Whipple's group were prepared and capable of following the world's first satellite across the night sky. This garnered him and some of the group members a picture on the cover of Life magazine. For this work, President Kennedy awarded Whipple the Distinguished Federal Civilian Service award in 1963. Whipple would later remember this honor as a high point in his life.

In the late 1960's, Whipple helped to find the location for a new Smithsonian Astrophysical Observatory. Mount Hopkins, in Arizona was selected. In 1981, Mt Hopkins Observatory was renamed the Fred Lawrence Whipple Observatory.

Although Whipple officially retired from Harvard in 1977, he never stopped working. Until the age of 90, Whipple could be seen riding his bicycle to SAO every day except Sunday. In 1999 he was asked to participate in the CONTOUR mission to a comet. Being in his 90's, Whipple became the oldest person to accept such a position. Although the mission failed, Whipple's contributions to the development of the mission were significant.

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Happy Birthday, continued from Page 3

Fred Whipple passed away after a prolonged illness in Cambridge, Massachusetts on August 30, 2004 at the age of 97. Although he will always be associated with comets, Fred Whipple's contributions cover a wide range. From his work in setting up major observatories to tracking satellites to his inventions, Fred Whipple made his mark on this world. But it is his understanding of comets that revolutionized the astronomical world. November is the month of the Leonid meteor shower, occurring when Earth passes through the debris left behind by comet Tempel-Tuttle. If you get a chance to watch the shower, remember Fred Whipple, who would have delighted in telling you all about those little streaks across the sky and the object from which they originated.

References:

The Bruce Medalists: Fred Whipple

<http://www.phys-astro.sonoma.edu/BruceMedalists/Whipple/>

TPS: Fred L. Whipple, World-Renowned Comet Pioneer, Dies at 97 by
A.J.S. Rayl, Aug. 31, 2004

http://www.planetary.org/news/2004/whipple-fred_0831.html

**Barnard-Seyfert Astronomical Society
Minutes of a Regular Meeting of the Board of Directors
Held On Thursday, October 13, 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 October 13, 2005. A sign-in sheet was circulated in lieu of a roll call. Vice-President Pam Thomas declared a quorum to be present and called the meeting to order at 7:48 P.M. Board members Mike Benson, Joe Boyd, Tony Campbell, Bill Griswold, Bob Rice, Randy Smith, Pam Thomas, and Gary Wilkerson were present. Board members Kris McCall and JanaRuth Ford were absent. In addition to members of the board, BSAS Equipment Committee Member Keith Burneson and Committee Chair Lonnie Puterbaugh were also present.

Pam Thomas thanked the board for their work at the Tennessee Star Party (TNSP) that concluded on October 9, 2005. BSAS Treasurer Randy Smith reported that, following payment of \$1757.95 for newly acquired equipment, the Society's checking account balance was \$3, 957.33. This equipment included an Automated External Defibrillator (AED) and various accessories for club loaner telescopes.

TNSP Treasurer Bob Rice reported an estimated net gain on operations of \$827.72 for the TNSP that ran from October 7, 2005 through October 9, 2005. Mr. Rice also reported that 113 persons registered to attend the TNSP and complemented Bill Griswold for developing the automated system that was used during registration. The board noted that these results were particularly good considering that the star party was clouded out on both nights and attributed much of this outcome to the outstanding programs that were presented. Mr. Rice said that he would prepare a final financial report as soon as he received and paid all outstanding expenses. The board authorized Mr. Rice to refund Middle Tennessee State University Professor Chuck Higgins' \$20.00 registration fee because he was also a speaker at the TNSP.

Joe Boyd announced that Glen Whealan had offered to chair the TNSP 2006 Committee and moved that he be so appointed; Bill Griswold seconded this motion. Tony Campbell commented that the Chairman should have guidelines and Pam Thomas noted that these should be set by the board. Mike Benson commented that the Chairman should report monthly to the board. Joe Boyd stated that Mr. Whealan had previously indicated that he expected to attend board meetings and make such reports. Tony Campbell suggested the possibility of holding the next TNSP in the spring. Randy Smith called for the question and the motion passed by a unanimous voice vote.

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Board of Directors, continued from Page 4

Pam Thomas stated that a group of board members would visit the TAG church camp near Lynchburg on October 25 to evaluate this facility as a potential site for the TNSP 2006. She noted that the group would take pictures and suggested surveying Knoxville residents who attended TNSP 2005 about their willingness to drive to this location. Bill Griswold suggested establishing a committee to review the upcoming events calendar for moon dates and potential conflicts. Mr. Griswold, Lonnie Puterbaugh, Tony Campbell, and Pam Thomas volunteered to serve on this committee.

Tony Campbell moved that the previously scheduled private star party at Water Valley Overlook on October 29 be cancelled so that BSAS members could attend the Von Braun Astronomical Society's (VBAS) public session in Huntsville, Alabama on the same date. Pam Thomas seconded this motion. Lonnie Puterbaugh noted that BSAS could remain after this session closed at around 9:30 P.M. to observe Mars with VBAS members. The motion then passed by a unanimous voice vote.

Joe Boyd and Lonnie Puterbaugh invited others to participate in a public outreach presentation for the Brentwood Home School Association at the Hillview Baptist Church on October 28. Mr. Boyd noted that this event was mainly for children and would probably begin around 7:30 P.M. Mr. Boyd also announced a student star party to be held at the New Castle Heights Middle School near Lebanon on October 24. Pam Thomas announced on behalf of Kris McCall that a star party would be held for Hurricane Katrina evacuees at the Adventure Science Center (ASC) on October 22.

Pam Thomas announced two BSAS supported public Mars parties at Warner Park on November 4 and at the ASC on November 5. Ms Thomas noted that boy scouts would likely be present at one or both events and announced that she would solicit additional participation at the next Membership meeting. Mike Benson announced that he would participate.

Pam Thomas announced that Astronomical League President Bob Gent had been contacted regarding the BSAS' renewing its membership and that Treasurer Randy Smith would mail a check as soon as he received the Society's membership count. Ms Thomas announced that the BSAS would again have an annual potluck dinner in December and that she would discuss this at the next membership meeting. She also announced that she would appoint a committee to nominate candidates for officers and the board to be voted upon by the general BSAS membership in November.

Joe Boyd informed the board that the BSAS was not contacted about the Carl Seyfert Lecture in Astronomy held on October 6 at Vanderbilt University. Mr. Boyd also announced that the new U.S. commemorative postage stamps depicting constellations were released on October 3.

Lonnie Puterbaugh asked the board to consider purchasing new BSAS business-sized general information cards because the Society's telephone number had changed. After determining that the cards contained the Society's website address, the board approved lining through the old telephone number and using the remaining stock. Mr. Puterbaugh also asked the board to consider authorizing the Equipment Committee's purchase of a portable hard drive to facilitate the storage and transfer of Society related information. Randy Smith suggested that using an offsite online storage site might serve the same purpose. The board decided to defer this issue until a later date. Lastly, Mr. Puterbaugh invited board members to purchase TNSP 2005 t-shirts from the remaining supply.

Tony Campbell commented that several people had expressed fear about driving at night in the neighborhood around the ASC. Mr. Campbell suggested that the board might wish to poll members regarding this concern. He also suggested reviewing the possibility of meeting at Dyer Observatory.

There being no further business to discuss, Vice-President Thomas declared the meeting adjourned at 9:23 P.M.

Respectfully submitted,
Bob Rice, Secretary

**Barnard-Seyfert Astronomical Society
Minutes of the Monthly Membership Meeting
Held on Thursday, October 20, 2005**

Vice-President Pam Thomas called the meeting to order at 7:38 P.M. in the Adventure Science Center (ASC) and welcomed new members and visitors. The minutes of the previous membership meeting held on September 15, 2005 were approved without exception as published in the October 2005 issue of the *Eclipse* newsletter.

Pam Thomas introduced Dr. William Keel, Professor of Astronomy at the University of Alabama, who delivered the evening's presentation on Einstein's Theory of Relativity and Its Effect on Modern Astronomy. Noting that the year 2005 marked the centenary of Einstein's "miracle year", when relativity entered our experience, Dr. Keel briefly described these astronomical aspects of relativity: light travel times; high speed motion; bending of space-time; the stars shining; black holes; and the expanding, accelerating universe. Dr. Keel then graciously answered questions from the audience following his presentation.

Pam Thomas recalled the meeting to order at 9:17 P.M. BSAS Treasurer Randy Smith reported that the Society's bank balance was \$3,463.48 which reflected recent equipment purchases and money advanced to start up the Tennessee Star Party (TNSP). Mr. Smith announced that he was taking orders for the 2006 Royal Astronomical Society of Canada's *Observers Handbook* and Kalmbach's 2006 *Deep Space Mysteries Calendar*. He also announced that club subscriptions to *Astronomy Magazine* had increased from \$29.00 to \$36.00 per year.

Pam Thomas thanked all participants for their work during the recently concluded TNSP 2005. Ms Thomas announced that Keith Burneson and Glen Whelan had volunteered to oversee the steering committee for TNSP 2006. TNSP Treasurer Bob Rice reported that, despite overcast skies on both nights, the TNSP held on October 7-9, 2005 still produced a net gain on operations of \$827.72. Mr. Rice attributed this favorable outcome to the excellent programs presented during the star party and pointed out that 113 people registered for TNSP 2005 including three from Georgia, two from Mississippi, and one from Pennsylvania.

Pam Thomas reported that a group of BSAS members would soon visit and evaluate a potential new TNSP site at the Tennessee-Alabama-Georgia (TAG) church camp near Lynchburg. Lonnie Puterbaugh asked the audience to recommend other suitable sites that could accommodate 100 to 200 people. Mr. Puterbaugh also announced that TNSP 2005 T-Shirts in all sizes would be available for sale after the meeting.

Kris McCall announced that the ASC would host Hurricane Katrina evacuees on Saturday, October 22 with food, programs, and entertainment. Ms McCall asked for BSAS volunteers to provide telescopes for a star party that evening. Joe Boyd also asked for BSAS volunteers to bring telescopes and assist with a star party for the Brentwood Home School Organization on Friday, October 28 at the Hillview Baptist Church in Franklin.

Lonnie Puterbaugh announced that all BSAS members were invited to attend the Von Braun Astronomical Society's (VBAS) public Mars presentation in Huntsville, Alabama on Saturday, October 29 from 7:30 to 9:30 P.M. Mr. Puterbaugh noted that the VBAS had a planetarium and observatory equipped with a C-16 and a 21 inch telescope located in a state park. He pointed out that when the public session concluded, BSAS attendees could join VBAS members for an all night session of observing Mars at opposition. Mr. Puterbaugh also reported that a regional dust storm had developed on Mars on Saturday, October 15 and continued through Tuesday, October 18.

Chuck Schlemm announced that the Renaissance Center in Dickson would conduct a Mars encounter presentation open to the public on Saturday, October 29. Mr. Schlemm stated that the Center expected a large turnout and that BSAS members were welcome to bring telescopes for nighttime viewing.

Kris McCall explained that the Warner Park public event, originally thought to take place on Friday night, November 4, would instead occur on Saturday, November 5 with scout activities scheduled during the afternoon and a star party planned for the evening. Ms McCall noted that a star party was also scheduled at the ASC for the same Saturday evening from 8:00 to 10:00 P.M.

Pam Thomas announced that the annual BSAS Christmas Dinner would again be held at the ASC in December with members bringing pot-luck side dishes and the Society providing the main course. Ms Thomas noted that last year's very successful silent auction would be repeated with the possible addition of an equipment table. Joe Boyd asked for a head count of those planning to attend the Brentwood Home School event on October 28.

Pam Thomas suggested that members concerned about outdoor safety when meeting at the ASC should leave the building in groups and avoid wandering about the unlighted area at night. Ms Thomas announced that Mike Benson would only order copies of the 2006 *Guy Ottewell Astronomical Calendar* for those who communicated their

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Membership Meeting, continued from Page 6

interest in advance. Lonnie Puterbaugh reminded members that the best Mars image submitted to the Equipment Committee by December 1 would be added to the BSAS' traveling display.

Pam Thomas announced that the annual election of officers and board members would be held during the November membership meeting. Ms Thomas invited contacts from any BSAS members interested in seeking an office or wishing to suggest someone. JanaRuth Ford announced that NASA had recognized the BSAS as being fifth in the nation among all Night Sky Network (NSN) participating clubs for hosting 19 NSN related public events during the past six months.

There being no further business to discuss, Vice-President Thomas declared the meeting adjourned at 9:47 P.M.

Respectfully submitted,
Bob Rice, Secretary

THE TENNESSEE STAR PARTY
Statement of Operations
October 7-9, 2005

INCOME

Dining Fees	\$2,352.00	
Registration Fees	2,052.00	
T-Shirt Sales	930.00	
Cabin Fees	755.00	
Camping Fees	359.00	
Snack Bar Sales	154.50	
Donations	10.00	
Other	<u>5.00</u>	
Total Income		\$6,617.50

EXPENSES

Camp & Facilities	\$2,000.00	
Dining Cost	1,944.00	
T-Shirt Cost	1,052.13	
Portable Toilets	300.00	
Snack Bar Cost	287.62	
Signage & Materials	157.43	
Registration Materials	36.75	
Printed Checks	<u>11.85</u>	
Total Expenses		<u>5,789.78</u>
Net Gain on Operations		\$827.72

All BSAS members are invited to have dinner with our speaker, Dr. Jeff Moersch, at the Piccadilly Cafeteria (367-4640) located at 874 Murfreesboro Road in Nashville. Take the Murfreesboro Road exit off of I-24 and then head away from downtown Nashville. Piccadilly is to the left of the second traffic light after the exit and easily seen from Murfreesboro Road. We will get together to talk and eat dinner at 6:00 p.m. just prior to the Membership Meeting on November 17.

Activities and Events

November 1 — 30, 2005

11/1 NEW MOON
 11/3 Mercury greatest elongation E (24°); Venus greatest elongation E (47°); Mercury 1.3° N of Moon
 11/3 BSAS Board of Directors mtg., 7:30 p.m.
 11/4 Antares 0.2° S of Moon; Public Star Party, Adventure Science Center
 11/5 Mars viewing. Public night, airplane field, Warner Park
 11/5 Venus 1.4° N of Moon
 11/6 Venus 3° S of Lagoon (M8) (46° E)
 11/7 Mars at opposition
 11/8 FIRST QUARTER
 11/9 Mercury 1.9° N of Antares (22° E)
 11/15 FULL MOON
 11/16 Moon 0.3° S of Pleiades (M45)
 11/17 BSAS monthly mtg., 7:30 p.m., at Adventure Science Center
 11/17 Leonids meteor shower peaks
 11/23 LAST QUARTER
 11/24 Thanksgiving Day
 11/28 Spica 1.1° S of Moon

December 1 — 31, 2005

12/1 NEW MOON; BSAS Board of Directors mtg., 7:30 p.m.
 12/3 Venus 2° N of Moon
 12/7 Uranus 2° N of Moon
 12/8 FIRST QUARTER
 12/9 Juno at opposition
 12/11 Mars 1.3° S of Moon
 12/12 Mercury greatest elongation W (21°)
 12/13 Moon 0.3° S of Pleiades (M45)
 12/15 BSAS monthly mtg. (Christmas Party), 7:30 p.m., at Adventure Science Center
 12/15 FULL MOON
 12/21 Solstice
 12/23 LAST QUARTER
 12/25 Christmas
 12/25 Spica 0.9° S of Moon
 12/28 Antares 0.2° S of Moon
 12/30 NEW MOON

Note: all dates & hours according to Central Time

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