



# ECLIPSE



*The Newsletter of the Barnard-Seyfert Astronomical Society*

May 2002

## President's Message

There will be five eclipses in 2002, three of the Moon and two of the Sun. The lunar eclipses are all penumbral. Of the two solar eclipses, both central, one is annular and one is total. These eclipses are grouped in two eclipse seasons, in May-June and November-December respectively.

"Eclipses occur... at nearly opposite seasons of the year, when the Sun is in the vicinity of one of the nodes of the Moon's orbit. These are the *eclipse seasons*. As the nodes regress rapidly westward, the eclipse seasons are more than half a month earlier from year to year. The interval between two successive conjunctions of the Sun with the same node of the Moon's path is in the *eclipse year*, its length is 346-620 days." (Baker's *Astronomy*, 6<sup>th</sup> ed., p.15)

We are about to enter an eclipse season, with eclipses occurring with the May full moon (May 26) and with the June new moon (June 10). The lunar eclipse in May is penumbral what one authority calls "a nonevent". The full moon will not pass close enough to the umbra or dark shadow of the earth for its light to be appreciably diminished. The Moon will be near its descending node, the point at which its path crosses the Sun's path, the ecliptic. (On November 16 there will be another Penumbral eclipse of the Moon when the Sun gets around to the other node, the ascending node.)

On June 10 there will be a central eclipse of the Sun. The Moon will be so far from the Earth, however, that a ring or annulus of sunlight will remain even when the Moon is squarely in front of the Sun. This is an annular eclipse. Annular eclipses are 20% more common than total solar eclipses. (I shall not discuss the June 24 penumbral eclipse of the Moon or the December 3-4 total eclipse of the Sun. Neither will be visible from the USA or Canada.)

Powell Hall

## HAPPENINGS & EVENTS

### May1 - June 2002

- 5/2 BSAS Board Meeting 7:00 P.M.
- 5/4 LAST QUARTER MOON; Mercury at greatest elongation E; Conjunction, Mars & Saturn
- 5/7 Conjunction, Venus & Saturn
- 5/9 Dyer Observatory Public Night 8:00-10:00 P.M.
- 5/10 Conjunction, Venus & Mars
- 5/11 Private Star Party - Natchez Trace Site
- 5/12 NEW MOON
- 5/14 Occultation, Moon & Saturn, Moon & Mars, Moon & Venus
- 5/16 Conjunction, Moon & Jupiter; BSAS Meeting at Dyer Observatory, 7:30 P.M.
- 5/19 FIRST QUARTER MOON
- 5/23 Dyer Observatory Youth Night 8:00-10:00 P.M.
- 5/24 Double shadow transit on Jupiter
- 5/26 FULL MOON; Penumbral Eclipse
- 5/31 Double shadow transit on Jupiter
  
- 6/1 Conjunction, Moon & Uranus
- 6/3 LAST QUARTER MOON; Conjunction, Venus & Jupiter
- 6/6 BSAS Board Meeting 7:00 P.M.
- 6/7 Pluto at opposition
- 6/8 Private Star Party - Natchez Trace Site
- 6/9 Conjunction, Moon & Mercury
- 6/10 NEW MOON; Annular Solar Eclipse
- 6/12 Conjunction, Moon & Mars
- 6/13 Conjunction, Moon & Jupiter, Moon & Venus; Dyer Observatory Public Night 8:00-10:00 P.M.
- 6/18 FIRST QUARTER MOON
- 6/20 BSAS Meeting, Dyer Observatory 7:30 P.M.
- 6/21 Summer Solstice
- 6/24 FULL MOON; Penumbral Eclipse
- 6/27 Conjunction, Moon & Neptune; Dyer Observatory Youth Night 8:00-10:00 P.M.
- 6/29 Conjunction, Moon & Uranus

## MAGAZINE SUBSCRIPTIONS FOR BSAS MEMBERS 2001

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** : \$29.95

**ASTRONOMY** : \$29.95

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

BSAS  
Dyer Observatory  
1000 Oman Drive  
Brentwood, TN 37027

## 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 are \$20.00 per year for Regular and Family membership and \$15.00 per year for Seniors (over 60 years of age), and \$10.00 for Students (under 22 years of age). Please call the Dyer Observatory (373-4897) if you have questions. Dues can be sent to:

BSAS c/o Dyer Observatory  
1000 Oman Drive  
Brentwood, TN 37027

## THE ECLIPSE NEWSLETTER

Editor: Rocky Alvey  
r.alvey@vanderbilt.edu

BSAS Officers:  
Powell Hall, President  
John Bradford, Vice President  
Evelyn Wright, Secretary  
A.G. Kasselberg, Treasurer  
Board of Directors  
Kris McCall, Ch.  
Mike Benson  
Douglas Hall  
Joe Boyd  
Lloyd Watkins  
Logo Photograph:  
Francisco Diego

### Minutes of Regular Monthly Membership Meeting of Barnard-Seyfert Astronomical Society on April 18, 2002

Vice President John Bradford called the meeting to order at 7:30 pm on Thursday, April 18, 2002 in the library of Dyer Observatory. Approximately 34 members and visitors were present, including Ward DeWitt, Jr. and his wife Barbara. Initially, the minutes stood approved as printed in the April Eclipse newsletter, but a correction was noted later in the meeting and is reported below.

Under old business, Kris McCall discussed plans for Astronomy Day, including two lectures debunking bad astronomy by Dr. Philip Plait. Dr. Plait will be repeating one of his lectures on Sunday for the DeWitt Public Lecture in Astronomy at Dyer Observatory. Chuck Schlemm encouraged BSAS members to bring telescopes to the Renaissance Center in Dickson including solar viewing on Astronomy Day and night viewing that night.

Mike Benson discussed the plans for ALCon 2003, noting a correction to the minutes of the previous meeting published in the April issue of the "Eclipse". "ALCon 2002 hotel applications" should be corrected to "ALCon 2003 hotel applications". A decision on the location is expected soon. He needs volunteers to help move this project along, and has not heard from anyone except Tom Murdic and Joe Boyd. Evelyn Wright volunteered to write letters to prospective speakers if given some assistance on content.

Lloyd Watkins reported that he will be renegotiating the contract with Camp Nakanawa to resolve some liability issues.

John Bradford noted that a notice had been published in the March Eclipse that a vote was scheduled for tonight on amending the BSAS bylaws to allow officers of the club to be on the board of directors, and have the right to vote on board decisions. In the past, the officers could participate in the discussion but not actually vote on the decisions. Dr. Doug Hall moved that the club accept the bylaw amendments. Joe Boyd, who authored the rewrite of the bylaws to comply with 501(c)(3) (tax-exempt) status, listed some of the director changes, including increasing the number of board members from 5 to 11. This would include the current 5 directors at large, the current 4 officers, the immediate past president (if not currently an officer or director), and an additional director at large to be elected at the next regular membership meeting following the adoption of the amended bylaws. He also noted that the terms of Secretary and Treasurer had been reduced from 3 years to 1, and that the officers' liability would not change due to these amendments since the club was organized as a corporation. The motion was seconded and the club membership voted unanimously to amend the bylaws.

There was an update on President Powell Hall's most recent heart attack and heart surgery, and hopes for a full recovery. John Bradford read Powell Hall's note of appreciation for the flowers sent by the board.

Treasurer A.G. Kasselberg reported that there was \$1292.84 in the BSAS account, with approximately \$200 in outstanding checks (Science Fair Prizes, flowers), and approximately \$2600 in certificates of deposit. A.G. has a copy of "Observe and Understand the Sun" for \$15.00.

Bill Griswold asked how those who get the "Eclipse" by email know when their membership expiration date is coming up, since it is not listed in the email the way it is in the paper copy address label. A.G. said he will try to send out emails before the expiration occurs. Bill also asked if two months of events could be included in the "Eclipse" because it tends to come out after several if not most events have occurred. Kris McCall noted that Rocky has done an exceptional job as editor for the "Eclipse", but that he would like to turn that job over to someone else since he is also in charge of TNSP 2002 and the ISSATOPS project in addition to his being the superintendent of Dyer Observatory. Bill Griswold expressed interest in helping with the "Eclipse". The board of directors will discuss filling the editor position at the next board meeting.

At 8:16 pm, John Bradford introduced Joe Boyd whose program was about the history of one of the telescopes at Dyer observatory which was built by the DeWitt brothers, Ward and John. Not only did Joe speak about the DeWitt brothers, Ward and John, he asked Ward's son, Ward, Jr. to speak about his father and uncle and what he remembered about growing up with a telescope workshop in the basement. Ward DeWitt, Jr. displayed some of the pictures and

newspaper articles from the scrapbook the DeWitt brothers kept. They ground their own mirrors and made their own eyepieces, finder scopes, tracking mechanism, and observatory.

The meeting adjourned at 9:00 pm, and the DeWitt dome was opened so that the DeWitt telescope could be looked at and through.

Respectfully submitted,  
Evelyn Wright, Secretary

Notice to all members of the Barnard-Seyfert Astronomical Society: There will be an election of an additional director at large at the regular membership meeting on May 16, 2002. This election is required by the amended bylaws unanimously agreed upon at the April regular membership meeting. Section 811 requires that the number of directors at large be increased from five to six, with the term of the additional director at large being such that two directors at large are elected each year.

Evelyn Wright, Secretary

#### The Bergquist C-14 Telescope Steward List

Our club telescope is available for use by club members on a first-come basis. To use the telescope please call the person who is assigned for that night you choose. Please give the stewards as much notice as possible.

Monday - Mike Benson 615-883-6571  
 Tuesday - Lonnie Puterbaugh 615-661-9540  
 Wednesday - A.G. Kasselberg 615-661-0231  
 Thursday - Lloyd Watkins 615-824-3005  
 Friday - John Bradford 615-871-9542  
           & Powell Hall 615-872-0162  
 Saturday - Jim Reid 615-595-6589  
 Sunday - Tom Murdic 615-794-6029  
 Alternate - Dudley Pitts 615-837-2696

**Barnard-Seyfert Astronomical Society Board of Directors Meeting  
on April 1, 2002**

The special meeting of the Board of Directors was called to order by Chairperson Kris McCall at 7:20 pm on April 1, 2002 in the Clubhouse of Jefferson Square. This special meeting was called because some board members would be serving as judges at a science fair on the normal Thursday meeting night. Other board members attending were Mike Benson, Joe Boyd, and Lloyd Watkins. Bill Collins, Powell Hall, Larry Southerland, and Evelyn Wright were also present. Board member Dr. Douglas Hall was absent.

Joe Boyd reported that he needs information from Treasurer A.G. Kasselberg before 501(c)(3) status can be pursued. Kris McCall will nudge A.G. about this.

Kris McCall handed out the latest flyers for Astronomy Day at Cumberland Science Museum. Mike Benson made a motion that the BSAS contribute \$300 to the museum to help defray Astronomy Day costs. Joe Boyd seconded the motion, and the vote was unanimously in favor of the motion by the quorum of board members present.

TNSP 2002 matters were discussed next. Lloyd Watkins asked Joe Boyd to enumerate his concerns about the Camp Nakanawa contract which was incomplete regarding rules/regulations, liability insurance, and pricing. Lloyd and Joe will write a contract more suited to the club and submit it to Camp Nakanawa.

Kris asked for a clarification of prices, a budget based on maximum/likely attendance, and whether there could be a free beginning astronomy session not related to the telescope-making session for those who do not want to pay \$175 for a telescope. Powell Hall volunteered to do at least one session on getting acquainted with the night sky. Kris also asked that the liability insurance through the Astronomical League be verified.

Mike Benson discussed the status of ALCon 2003. Mike and Joe had visited five host candidates earlier in the day, and would be making a decision within the next week so that a renegotiated contract could be approved by AL. The tentative date for the event is July 8-13, 2003.

Bill Collins noted that his email address link is on the bsasnashville.com website if anyone needs to send him event updates.

Kris went through a list of unfinished business.

- Kris will contact Tom Murdic and A.G. Kasselberg about developing a club budget plan and operating budget.
- A.G. Kasselberg has already sent the check for the club's International Dark-Sky Association dues this year and received a "welcome" letter.
- A dark site land grant or lease, and improvements to the recently purchased 12" telescope are waiting on the club achieving 501(c)(3) status.
- Bill Collins is working on extending the event horizon on the BSAS website to past and future months.
- Mike Benson will check on Rocky Alvey's BSAS fold-out display. Kris would like to use it on Astronomy Day.
- Rather than creating a free monthly electronic newsletter to send to Metro schools and anyone else who is interested, Kris suggested giving her a mailing list that she can send the Sudekum Planetarium Star Chart and articles in electronic form to.
- Kris has had some publicity success lately with the "The Tennessean" Classroom Page contact. Jeff Ray (WKRN) is now working with Cumberland Science Museum on weather items, and may be a contact for astronomy activities. Bill Collins' notification to Lisa Spencer (WSMV) successfully got the news out on February's Astronomy Weekend.
- Powell Hall will forward the two Star Fest t-shirts to Kris to be given in a drawing to the Hume-Fogg students volunteering on Astronomy Day.
- Powell Hall will be appointing some people to the Light Pollution Committee. Bill Collins noted that his wife Melissa might be able to help with getting building codes modified on a state level.

Nothing was decided on the Girl Scout Jamboree in August. This would be an opportunity to introduce a young audience to astronomy, but it is questionable how many of the expected 2000 attendees would actually get the chance to look through a telescope without participation by additional astronomy groups.

The minutes of the past board meetings were approved as published in the past "Eclipse" newsletter. The next board meeting will be at the regular date and time at Jefferson Square. A motion to adjourn was approved at 9:21pm.

Upcoming events are:

F-Su	Apr 5-7	Dyer Observatory	ISS-AT planning
Fri	Apr 19 8-10pm	Warner Park	public star party
Sat	Apr 20 11am-3pm	Cumberland Science Museum	Astronomy Day
Sat	Apr 20 12-5pm	Renaissance Center, Dickson	solar viewing
Sat	Apr 20 8-10pm	Renaissance Center, Dickson	public star party
Thu	May 2 7pm	Jefferson Square Clubhouse	board meeting
Sat	Aug 3 8-12pm	Camp Sycamore Hills	public star party
Sat	Aug 10 8-10pm	Warner Park (Perseids)	public star party
F-Su	Oct 4-6	Camp Nakanawa	TNSP 2002
T-Sa	Jul 8-13 2003	Nashville	ALCon 2003

Respectfully submitted,  
Evelyn Wright, Secretary

### Barnard-Seyfert Astronomical Society Board of Directors Meeting on May 2, 2002

Chairperson Kris McCall called the meeting of the Board of Directors to order at 7:09 pm on May 2, 2002 in the Clubhouse of Jefferson Square. Other board members attending were Mike Benson, Joe Boyd, John Bradford, Lloyd Watkins and Evelyn Wright. Rocky Alvey, Bill Collins and Tom Murdic were also present. Board members Powell Hall (recovering from heart surgery), A.G. Kasselberg, and Dr. Douglas Hall were absent.

Kris McCall asked for feedback on Astronomy Day activities. Some comments were that Dr. Philip Plait (The Bad Astronomer) was a good speaker, and there seemed to be fewer people than last year. Tom Murdic noted there were a few people at the Renaissance Center for his talk on the sun, and there were a few appreciative sets of Girl Scouts and others looking through the telescopes that Ken Mayor and Larry Southerland set up in the Renaissance Center parking lot that night. Bill Collins said he would like to put pictures on the BSAS website if anyone has any, and he is now listing events two months out. Kris said the likely date for Astronomy Day next year will be April 26, 2003 to avoid conflicts with the Easter holiday and the Iroquois Steeplechase. The Music City Marathon is also scheduled for April 26.

Joe Boyd reported on 501(c)(3) status, noting that Treasurer A.G. Kasselberg hopes to get a financial report for the last three years to Joe sometime next week. The approximately \$150 to file the application has already been approved by the board. Tom Murdic handed out an operating budget format for discussion and was told about several other ongoing expenses.

Kris McCall expressed concern that major players will not be available for the Girl Scout Jamboree star party on August 3. Kris has contacted the Gallatin group and asked for information on how to contact the Clarksville and MTAS groups before getting back to the Girl Scouts.

Rocky Alvey and Lloyd Watkins discussed difficulties with the contract between BSAS and Camp Nakanawa for TNSP 2002, noting the "hold harmless" clause.

They hope to re-negotiate the contact with Camp Nakanawa next week. If negotiations fall through, plan B is to hold it at Dyer Observatory. Tom Murdic asked about upfront costs. Rocky reported that the deposit is \$50 with an expected expense of \$3700, approximating the breakeven point at 110 people. He also noted that Richard Berry has agreed to come if BSAS pays for his hotel/plane tickets. The club liability insurance policy has not been located.

Rocky will look once more, and will contact the insurance company for a new copy if it is not found.

Regarding ALCon 2003, Mike Benson and Joe Boyd hope to settle some points in the contract item by item with Maxwell House next week. The proposed dates are July 8-13, with June 16 being the cutoff date when rooms that have not been reserved are released. Some amenities are lost if the number of reserved rooms is reduced. Kris asked that we be sure what is included in exhibit space/tables, and whether the lockable area includes the exhibit space, or if valuable equipment should be torn down and secured each night. Vendors should be asked about how much square footage they require very early on in this process. Tom Murdic asked that some deadlines be set. Mike and Joe hope to get the Maxwell House contract settled by May 10, and the AL contract with BSAS signed by June 6. Mike will try to get a list of committee position descriptions drawn up so that volunteers can begin signing up at the regular membership meeting in May. Bill Collins noted the \$1 million liability insurance requirement in the AL contract, and Mike said the insurance situation should change around July, with possibly better rates. He also noted that a convention treasurer and a separate bank account would have to be established.

Mike noted that there is currently a \$6000 food and beverage minimum required by Maxwell House that should not be very difficult to meet. Rocky Alvey suggested that there be a theme that would be an outstanding draw. Rocky volunteered the theme of "Looking Forward: The Next 10 Years". Speakers could predict what they expect to come about in their fields of expertise. He suggested three areas: Space Technology (NASA, ISS-AT), Astronomy and Cosmology (Didier Saumon, Rob Knopp), and Amateur Equipment (Software Bisque, Meade and Celestron, Kodak, SBIG). Day trips suggestions included the Huntsville Space Center, Civil War Sites in the immediate area, The Hermitage, Mammoth Cave, Sudekum Planetarium, and Dyer Observatory.

Due to the hotel negotiations being about a month behind, Lloyd Watkins made a motion to put Mike Benson and Joe Boyd in charge of making the decision with the Maxwell House contract. John Bradford seconded and since the discussion had already occurred, a vote was taken which was unanimously in favor of the motion. Mike Benson noted that any drastic conditions would be resolved by email with the board members before the contract was signed.

Joe Boyd asked for any information anyone has in order to educate the NES residential street lighting engineers on what kind of lighting fixtures to use when the Jefferson Square lighting is moved to the church and school light poles next door.

The next board meeting will be Thursday June 6, 2002 at 7:00 pm at Jefferson Square. The meeting adjourned at 9:15 pm.

Upcoming events are:

2002

Sat	Aug	3	8-12pm	Camp Sycamore Hills	public star party
Sat	Aug	10	8-10pm	Warner Park (Perseids)	public star party
F-Su	Oct	4-6		Camp Nakanawa?	TNSP 2002
Fri	Dec	13	730-930pm	Warner Park(Geminids)	public star party

2003

Fri	Feb	7	8-10pm	Warner Park(Jup,Sat)	public star party
Fri	Apr	25	8-10pm	Warner Park(Astro Day Eve)	public star party
T-Sa	Jul	8-13		Nashville	ALCon 2003
Sa	Aug	23	8-10pm	Warner Park (Mars)	public star party

Respectfully submitted,  
Evelyn Wright, Secretary



**Astronomy Day at the Dickson Renaissance Center** was held Saturday April 20, 2002. The BSAS along with the Middle Tennessee Space Society (MTSS) put on a very good show although the weather did not cooperate. We had three presentations by Chuck Schlemm on "Our Solar System", "America in Space " and a planetarium show of "Tonight's Starry Skies" and one by Tom Murdic on "The Sun". Audiences ranged from 3 to 50, but all were enthusiastic. We had ~150 girl scouts and guests view the early exhibits. One girl scout group asked for a presentation at their troop meeting. Larry Southerland, Evelyn Wright and Ken Mayer brought out their telescopes for some limited viewing of the moon, Jupiter and Saturn. Even though the clouds were stiff competition, I heard some oohs and aah's from the viewers.

The MTSS had displays of America's spacecraft: the International Space Station, Space Shuttle, Apollo Lunar Lander and Mars Sojourner Rover. They also had a 200' scale model of the solar system and posters of the planets and larger constellations. Another unique experience was the three gravity demonstration bricks. All were the same size, but the Moon and Mars bricks were considerably lighter to show the difference to kids in the way gravity feels on these other worlds.

The Renaissance Center had two activities: Kids College on Rocketry where they built and launched model rockets; and Dream Mission, their half scale Space Shuttle where the public could sit at the controls for a shuttle mission. They also showed "The Explorers" in the Cybersphere, a show about how the Polynesians used the stars to navigate the Pacific Ocean.

I'd like to thank all who helped with this event and hope next year can be even better. We'll work on the weather arrangements.

Chuck Schlemm

**Sudekum Planetarium at the Cumberland Science Museum**

**May 1 through 4, 2002**

Wednesday through Friday

3:15 Planet Patrol: Solar System StakeOut

**Saturday, May 4, 2002**

11:30 Planet Patrol: Solar System StakeOut

1:00 Skies Over Nashville

2:30 Planet Patrol: Solar System StakeOut

3:30 Galaxies

**May 5 through 31, 2002**

Tuesday through Friday

3:15 The Explorers

**Saturday**

11:30 The Explorers

1:00 Skies Over Nashville

2:30 The Explorers

3:30 Galaxies

**Sunday**

1:30 The Explorers

3:30 Galaxies

**What on Earth are these shows about ???**

**Skies Over Nashville** Many people are intimidated by astronomy and the night sky. This show highlights those constellations and planets that can be seen from backyards throughout Middle Tennessee and across the United States. If you can "connect the dots", you can draw star pictures. Skies Over Nashville is an excellent way for the entire family to get ready to go out and look at the real sky.

**Galaxies** From our own Milky Way to the edge of observable space, renowned author Timothy Ferris leads the audience on a fascinating exploration of the very building blocks of the universe, Galaxies.

**The Explorers** This program focuses on the human spirit of exploration throughout time and space. By identifying constellations and studying changes in the sky as the observer's latitude changes, visitors discover how to navigate from Tahiti to Hawai'i - just as the Polynesians have done for thousands of years.



This picture shows part of a double halo over Dyer May 15, 2002.

## The Islamic Crescents' Observation Project by Audrey Cermak

Except, perhaps, for the devoted gardener who waits to plant peas under the light of the first full moon of spring, an intimate knowledge of the phases of the moon is not necessary for most people in the world today. Thanks to the accuracy of astronomical calculations, even groups such as Jews or Chinese, who base their holidays on a lunar calendar, have no need to step outside at night to search for the moon themselves. Islam is the exception. Key religious events such as the beginning and end of the month of fasting (Ramadhan) and the days of pilgrimage require moon sightings. An Islamic lunar month is either 29 or 30 days long depending on whether or not the new thin crescent moon was sighted the evening after the astronomical new moon. If the crescent is not sighted on the evening following the astronomical new moon (i.e. the 29<sup>th</sup> of the lunar month) then one more day is added to that month.

This uncertainty creates difficulties for Muslims in our heavily-scheduled, planned-in-advance, give-two-weeks-notice lives. A further complication is added in that Islamic law allows moon sightings to be reported both globally and locally. In the first case, the sighting of the crescent from anywhere on the globe is valid for all Muslims around the world. In local moon sighting, each individual community follows what they have seen. So, for example, if the night was clear over Nashville, but cloudy in Murfreesboro, Ramadhan will begin and end on different days in each city.

Cloudy weather is not the only factor that makes the crescent difficult to spot. The various and rapidly changing motions and positions of the sun, earth, and moon all combine to complicate the process. According to the U.S. Naval Observatory, the earliest recorded sighting of the new crescent by unaided eye was 15.5 hours following the new moon.

Understandably then, groups such as the Jordanian Astronomical Society (JAS) and the Arab Union for Astronomy and Space Sciences (AUASS) are interested in collecting data about and formulating predictions governing the visibility of the new crescent. The Islamic Crescents' Observation Project (ICOP) has been developed by the JAS to encourage all astronomers, amateur astronomers, and astronomy clubs to assist them with their research by completing monthly online reports about the visibility of the crescent in their locales. You do not need to be a Muslim to participate, however the JAS does request that the decision to submit data be an ongoing and regular commitment.

Information about the ICOP can be found at: <http://www.jas.org/jo/icop.html>

A Moon Calculator program and information about an International Lunar Date Line is available at:  
<http://www.ummah.org.uk/ildl/mooncalc.html>

### Sources:

Ahmed, Monzur (<http://www.ummah.net/ildl/>)

Kaplan, G. H. (<http://aa.usno.navy.mil/faq/docs/islamic.html>)

information on Islamic law was taken from: <http://www.quraan.com/Ramadan/EstablishingRamadan.asp>

## HOT FLASH by Jerry Lappin

Dr. Zarkov, the only astronomical genius with an MBA from Cosmos Business School, is always on the lookout for new opportunities to enrich my readers. Two recent scientific developments seem to him to be sure fire winners.

The whole world knows that a railroad is being installed on the space station. This railroad could be easily, if expensively, extended far beyond the confines of the present structure thus opening up new areas of space for enterprising developers. There would be limitless space of housing developments, industrial parks or even soccer fields. Imagine condos with cloudless views of the heavens, or manufacturing plants with infinite free waste and pollution disposal possibilities. Gravity-free sports fields would add new dimensions and greater thrills to soccer, baseball, basketball, football and even tennis. Ice rinks. Properly shielded from the sun, could be kept frozen at no cost. Because these opportunities are so obvious you must hurry if you want to be among the first to invest in what will be an exploding business area.

The second opportunity for great wealth should appeal to the more scientifically inclined. Recently a British computer scientist had implanted in his body a chip, which allows his computer to communicate directly and continuously with him. At present only very rudimentary information can be exchanged but there is no technical reason why the information could not include full audio/visual content. For some time cameras have been available which can transmit to your computer images from your telescope or even from remote telescopes in prime viewing sites. Automatic telescope aiming devices are commercially available now. When this new implant technology is more fully developed it should be possible for you to view any image you want wherever you may be and whatever you may be doing without using any external equipment. Just think, you could be sitting at your desk at work or driving down the Interstate while watching close-ups of remote quasars or the changing multicolored clouds of Jupiter and no one but you would have any idea of what you were enjoying. Dr. Zarkov is already negotiating with Celestron and Meade to commercial this system. When this development is publicly announced, stock in these companies should rise astronomically

## Happy Birthday The First Test of General Relativity

by Robin Byrne

This month we celebrate the confirmation of an interesting idea. In 1916, Albert Einstein published his theory of special relativity. This theory has a number of bizarre effects associated with it, including the idea that mass warps space and time. One result of warped space is that an object that thinks it is moving in a straight line, will actually be following a curved path. This is true even for light.

In 1919, an opportunity arose to test this crazy idea. Arthur Eddington realized that our Sun should be massive enough to cause a noticeable shift in the path of starlight passing near it. However, since the Sun is so bright, it would be impossible to see any other light source near the Sun's disk. However, during a solar eclipse, with the Sun's disk blocked, light from stars appearing in the same direction as the Sun would be visible. The solar eclipse on May 29, 1919 gave Eddington the opportunity to perform an historical experiment, with the Sun passing in front of the Hyades star cluster.

Eddington photographed the Sun during the eclipse with long enough exposures to reveal the background stars (2 to 20 seconds). By comparing this image to ones taken of the same region of the sky without the Sun in front, he could look to see if the apparent position of the stars had changed. The general theory of relativity predicted that the Sun's mass would warp the space near the Sun enough to bend the light from these stars to a new position in the sky. This would give the impression that some of the stars had moved when comparing the two images.

The predicted shift for stars appearing almost in line with the Sun was only about 2 seconds of arc. The farther the star is from being in line, the smaller the shift becomes. In November of 1919, Eddington announced that the eclipse observations confirmed the predictions with star images shifting by a very small amount.

Some modern critics believe that Eddington may have fudged his data by a small amount to give the results he expected. The small amount of shift observed would have been well within his range of error. However, subsequent observations have confirmed general relativity to be correct.

Whether Eddington published what he wanted to get or what he actually observed, his announcement of confirming general relativity was one of the main reasons why it became accepted by the scientific community. Up to this point, most people were very skeptical of the general theory (although the special theory of relativity was accepted). This one announcement made all the difference in people's perception of the theory and of Einstein. So, whether the experiment really worked or not, the eclipse of 1919 will always be remembered as the first experiment that brought the theory of general relativity into the world of accepted ideas.

### References:

Relativity and the 1919 Eclipse Web Page [http://sci.esa.int/content/doc/1b/13851\\_.htm](http://sci.esa.int/content/doc/1b/13851_.htm)

Eddington on 1919 Expeditions Web Page <http://www.bun.kyoto-u.ac.jp/~suchii/Edd.on1919.html>

Theory of Relativity Web Page [http://pratt.edu/~arch543p/help/theory\\_of\\_relativity.html](http://pratt.edu/~arch543p/help/theory_of_relativity.html)