



# ECLIPSE



The Newsletter of the Barnard-Seyfert Astronomical Society

Organized in 1928

April 2012

**The Membership meeting will be held on April 18, 2012 at the Cumberland Valley Girl Scout Council Building at 7:30 pm.**

Our April program is a presentation on Radio Jove by Dr. Charles Higgins.

The Radio JOVE project is a hands-on inquiry-based educational project that allows students, teachers and the general public to learn about radio astronomy by building their own radio telescope from an inexpensive kit and/or using remote radio telescopes through the internet. Radio JOVE students and amateur scientists observe and analyze natural radio emissions of Jupiter, the Sun, and our galaxy. Participants also collaborate with each other through interactions and sharing of data on the network.

Dr. Charles Higgins, Associate Professor of Astronomy and Physics, joined the faculty of Middle Tennessee State University in 2001, after an NRC post doctoral research associate position at NASA's Goddard Space Flight Center and a teaching position at Penn State University.

## FROM THE PRESIDENT

### Exploiting Technology on the Cheap

Though it may be a cliché to say so, we truly do live in amazing times. We enjoy a wide array of vital technologies, from GPS units that help us find our way around the world, to pocket-sized digital cameras that yield amazingly crisp photos of what we see in our travels and e-mail that lets us easily share those images with family and friends.

Amateur astronomy has benefited hugely from these technological advances. The GPS constellation of 32 satellites that helps guide our voyages on this planet also enables more automated backyard telescopes to navigate the night sky at the push of a button. Ever more sensitive CCD cameras allow the deep sky imagers among us to image fainter and fainter objects (the low-tech plague of light pollution permitting). And highly capable image processing software like Photoshop™ allows amateur images to polish their images in ever more sophisticated ways.

But all of this technology doesn't come cheap, and many amateurs wonder what kind of imaging they can do without making a major investment. Which brings me to my favorite wing of amateur astronomy, and the real subject of this message: webcam imaging of objects in our solar system.

Amateur astronomers like Don Parker, M.D. began experimenting with CCD cameras to image the planets in the early 1990s. They soon produced digital images surpassing the best film-based photographs taken from professional observatories only a few years before.

The real revolution began when amateurs started experimenting with web cameras during the mid-90s. They realized that these cheap little cameras—designed merely for video conferencing—had potential for astro-imaging, despite their tiny, not very sensitive CCD chips. In fact, those tiny chips yielded nice big images of the planets, and they were sensitive enough to produce dozens of images per second of the brighter planets in order to beat poor “seeing.”

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### Upcoming Events

Board of Directors Meeting, April 4, at the Cumberland Valley Girl Scout Building – 7:30 pm

Membership Meeting, April 18, at the Cumberland Valley Girl Scout Building – 7:30 pm

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Observing Highlights

**FREE TELESCOPES!**

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, and A waiting list may be 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.

**OFFICERS**

**John Harrington**  
*President*

**Joe Boyd**  
*Vice-President*

**Bob Rice**  
*Secretary*

**Bob Norling**  
*Treasurer*

*Spencer Buckner*  
*Officio*

*Directors at Large*

**Steve Cobb**  
**Bill Griswold**  
**Melissa Lanz**  
**Kris McCall**  
**Curt Porter**  
**Theo Wellington**

**Bill Griswold**  
*Newsletter Editor*  
*bgriz@comcast.net*

**OBJECTS VISIBLE THIS MONTH**

**Messier Objects:**

**Galaxies:**  
*M81, M82*

**Open Clusters:**  
*M41, M44, M46, M47, M48, M50, M67, M93*

**STAR PARTIES**

April 21, Messier Marathon, Spot observatory.

April 28, BSAS public star party at Edwin Warner Park – 8-10 pm

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**LUNAR PHASES**

**April 2012**

04/06 FULL Moon  
04/13 LAST Quarter  
04/21 NEW Moon  
04/29 FIRST Quarter

**May 2012**

05/06 FULL Moon  
05/13 LAST Quarter  
05/21 NEW Moon  
05/29 FIRST Quarter

Freeware image stacking programs like Registax™ were the icing on the cake, making it easy to align, stack and filter the stream of image frames flowing from webcams. The new technology of the world wide web even allowed inventive amateurs to build an online clearinghouse for webcam imaging tips called QCUAG (the "Quick Cam and Unconventional Imaging Astronomy Group") on Yahoo that still exists.

Today, thousands of amateurs have tried out webcam imaging. The world wide web and its many astronomy sites are rife with high-resolution images of solar system objects (check out alpo-astronomy.org/ for many stunning examples). And webcams continue to be affordable, with even the most capable models selling for around \$100 or less. Although today's very best amateur astroimagers such as Damien Peach, Christopher Go and the redoubtable Dr. Parker have moved on to more sensitive, lightning-quick cameras from companies like The Imaging Source, Lumenera and Point Grey, amateurs using webcams are still producing exquisite planetary images.

For an extremely modest example of what webcams can produce under even adverse circumstances, please see the image of Mars in this issue of The Eclipse. Yes, it's small, and only limited surface details are visible. But consider that this image of Mars' tiny disk was taken on a night of mediocre seeing with a 10-year old webcam, was built from a small stack of less than 200 frames (using a basic 8" reflector on an imperfectly aligned mount), and that I had only a few minutes to process it in Registax. And note that this view at least equaled what I could see visually through the eyepiece—something that film-based photography could never do.

Intrigued? All that's necessary to try out webcam imaging yourself is a driven telescope, a computer, a handy, bright planet, and some patience to get up the Registax learning curve. Give it a try, you may be surprised!

John Harrington  
President

## Happy Birthday Leonhard Euler by Robin Byrne

This month we celebrate the life of a man whose contributions to mathematics and science live on.

Leonhard Euler (pronounced "Oiler") was born April 15, 1707 in Basel, Switzerland. He was instantly surrounded by a strong religious family, since his father, Paul, was a pastor of the Reformed Church, and his mother, Marguerite, was the daughter of a pastor. However, mathematics was also a constant presence. Paul had an interest in the subject due to attending college with Johann Bernoulli, who was considered the foremost mathematician in Europe. Their friendship would have a tremendous influence on Leonhard's life.

Although the family had moved out of Basel when Leonhard was quite young, when it was time to begin school, Euler was sent back to Basel to live with his maternal grandmother. Unfortunately, the school was not very good, and didn't even teach mathematics. But by this time, Paul had already begun teaching Leonhard some math, and Leonhard continued to read mathematics books on his own. At the age of 14, Leonhard entered the University of Basel, where he studied philosophy (his father wanted him to pursue a career in theology). However, while fulfilling his father's wishes, Euler was also receiving mathematical instruction from Bernoulli every weekend. Three years later, Euler had earned his Master of Philosophy degree with a dissertation that compared the philosophies of Descartes and Newton. But, rather than continuing the path to becoming a pastor, Bernoulli convinced his old classmate that Leonhard was too gifted in mathematics to pass up an opportunity to pursue that as his career. Two years later, at the age of 19, Leonhard Euler had earned his Doctorate in mathematics.

Euler had hoped for a position at the University of Basel, but it wasn't meant to be. Meanwhile, he won second place in a Paris Academy Prize Problem to determine the optimal location of masts on a ship. Over his career, Euler would ultimately win the competition a total of 12 times. Meanwhile, both of Bernoulli's sons were working at the Imperial Russian Academy in St. Petersburg. One of his sons, Nicolas, died of appendicitis in 1726. The vacant position at the academy was offered to Euler. Euler was still hoping for the University of Basel position, but when that didn't materialize, he gladly accepted the offer. Euler quickly adjusted to life in Russia, learning the language and living with Daniel Bernoulli, and teaching mathematics. He also took a side job as a medic for the Russian Navy to augment his earnings. When Euler was promoted to a full professor in 1730, he quit the Navy job. The Academy was established as a way to boost science in Russia. As such, the focus was more on research than teaching. In fact, there were very few students and a very light teaching load for the professors, so that they could devote the majority of their time to pursuing their areas of study. Unfortunately, when Peter II rose to power, the atmosphere changed, especially toward foreign scientists, and much of their funding was cut. However, after Peter II died, conditions improved, and Euler was able to advance to a position as professor of physics in 1731. Meanwhile, Daniel Bernoulli was not as happy, and returned to Basel, allowing Euler to be his successor as chair of the mathematics department.

With this new position, and more financial security, Euler felt he could now marry Katharina Gsell, which he did on January 7, 1734. Over the years, they would have 13 children, but only 5 would survive past childhood.

It was during his time at St. Petersburg that Euler would make many of his contributions to the field of mathematics. In 1736, he solved the "Seven Bridges of Konigsberg" problem. The city included two islands, which were connected to the main part of the city, and to each other, with a total of 7 bridges. The question asked was: could you travel across all 7 bridges only once each, and return to the starting point. Euler proved that it was not possible. Such a path is now called a Eulerian circuit and is considered the start of graph theory.

With Daniel Bernoulli, Euler developed what is now known as the Euler-Bernoulli beam equation, which is widely used in engineering. Although much of Euler's applied mathematics was geared toward classical mechanics, he also explored astronomical applications. In particular, Euler developed techniques to more accurately calculate the orbit of the Moon, which was very useful for the calculation of longitude. He also

developed a method for calculating the orbit of a newly discovered comet based upon only a few observations. He even determined the parallax of the Sun.

In the field of optics, Euler did not agree with Newton's description of light as corpuscles, but instead favored the wave nature of light. Euler wrote a paper in 1740 extolling the wave explanation developed by Christian Huygens. This helped to solidify the wave nature of light as the accepted theory until the early 20th century, when the idea of photons grew out of quantum theory.

By 1741, turmoil in Russia was to the point that Euler felt the need to leave. Frederick the Great of Prussia had offered Euler a position at the Berlin Academy. Euler leapt at the chance. For the next 25 years, he flourished at the Academy, writing over 380 articles. It was here that Euler first published his ideas regarding functions, which is now a standard part of mathematics. In particular, he pioneered the use of the notation  $f(x)$  to represent a function that depends on the variable  $x$ , and was the first to think of the trigonometric entities of sine, cosine and tangent as functions. He also published a work on differential calculus that combined the works of Newton and Leibniz into the form of calculus we use today. Many of the symbols used in mathematics also owe their origin to Euler. The base of a natural logarithm is represented by the letter "e," which is also known as Euler's number, the Greek letter sigma for summation, and "i" for the imaginary number equal to the square root of -1 are all examples of Euler's innovations. In spite of all of these accomplishments, Frederick the Great always regarded Euler as unsophisticated and inept, especially in comparison to his favorite philosopher, Voltaire, who frequently belittled Euler in public. As a result of this unfavorable environment, in 1766, Euler returned to Russia.

For many years, Euler had difficulties with his eyes, which may have begun with a fever that almost killed him in 1735. That made him almost blind in his right eye, and it worsened over the years. Shortly after returning to Russia, a cataract in his left eye was discovered, which rendered him almost completely blind. Fortunately, Euler had a nearly photographic memory - it is rumored that he could recite all of Virgil's Aeneid by heart, even knowing which page each passage was on. So, blindness was not nearly as debilitating as it could have been. With the help of his sons and others, Euler was able to dictate his work and continue to publish. Because those helping him were also scientists (his son Johann was a physicist), they played more the role of colleagues than as pure scribes. For example, Euler's work on the motion of the moon he gladly shares credit with those who helped in its development.

Euler was a prolific publisher of his work. In 1775, he averaged one paper per week. Over his lifetime, his work would fill roughly 90 volumes, and most of that was produced after he went blind. In fact, he was so prolific that the printing house of the St. Petersburg Academy was backlogged for 30 years after Euler's death, trying to catch up on printing all of his work.

On September 18, 1783, Euler had a normal day lunching with his family and then conferring with colleagues about the newly discovered planet, Uranus and the calculation of its orbit. Later that day, he suffered a brain hemorrhage and died. In the eulogy written by the French mathematician Marquis de Condorcet, he wrote "... he ceased to calculate and to live."

No matter how much of a background you may have in math, odds are that you have encountered something that can be attributed to Leonhard Euler. From trigonometry to functions to calculus, Euler innovated them all. As Pierre-Simon Laplace is reported to have said, "Read Euler, read Euler, he is the master of us all."

#### References:

Leonhard Euler - Wikipedia

[http://en.wikipedia.org/wiki/Leonhard\\_Euler](http://en.wikipedia.org/wiki/Leonhard_Euler)

Leonhard Euler

<http://www.usna.edu/Users/math/meh/euler.html>

Euler biography by: J J O'Connor and E F Robertson

<http://www-history.mcs.st-and.ac.uk/Biographies/Euler.html>

**Barnard-Seyfert Astronomical Society  
Minutes of a Regular Meeting of the Board of Directors  
Held On Wednesday, March 7, 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 March 7, 2012. A sign-in sheet was passed around in lieu of a roll call. Board members Joe Boyd, Steve Cobb, Bill Griswold, John Harrington, Bob Norling, Curt Porter, Bob Rice, and Theo Wellington were present. Board members Dr. Spencer Buckner, Melissa Lanz, and Kris McCall were absent. A quorum being present, President John Harrington called the meeting to order at 7:42 P.M.

Treasurer Bob Norling reported that the BSAS had \$2,155.03 in its regular checking account and \$1,056.91 in its equipment account. Mr. Harrington asked for corrections to the minutes of the previous board meeting held on February 1, 2012 and, there being none, declared them to be approved as submitted. The board discussed obtaining a current inventory of and finding a permanent storage location for the club's equipment. Reiterating a point that he had made at a previous board meeting, Joe Boyd stated that he had such a list from eight or more years ago that could serve as a starting point for an updated inventory. Mr. Boyd also said that he might contact Warner Parks Environmental Education Specialist Heather Gallagher about storing our equipment there.

John Harrington announced these upcoming star parties:

- Mar 17 – Public star party @ Long Hunter State Park from 8:00 to 10:00 P.M.
- Mar 24 – Private star party @ Spot Observatory (Mark Manner) Messier Marathon.
- Mar 30 – Public star party @ Bowie Nature Park (Fairview) from 8:00 to 19:00 P.M.
- Mar 31 – Public star party @ Adventure Science Center from 8:00 to 10:00 P.M.
- Apr 21 – Private star party @ mm435.5 on the Natchez Trace Parkway.
- Apr 28 – Public star party @ Edwin Warner Park from 8:00 to 10:00 P.M.

John Harrington reported that the BSAS had one remaining copy of Guy Ottewell's 2012 Astronomical Calendar. Curt Porter moved that it be given to Webmaster Drew Gilmore for his service to the club. John Harrington seconded this motion and it was immediately passed by a unanimous voice vote without additional discussion. Mr. Harrington also reported that he had communicated with Jack Stearman, President of the Cumberland Astronomical Society, and that a joint star party with their club was tentatively scheduled for May 19 at Fort Bledsoe State Park. He commented that this location was nearly as good as the BSAS' Water Valley Overlook site and that meeting there would simply replace our private star party previously selected for this date.

The board discussed the possibility of holding a telescope clinic prior to a scheduled star party and, noting the long hours of daylight, selected the June 23 public star party at Long Hunter State Park as a warm-up. The August 11 public star party at the Warner Parks featuring the Perseid meteor shower was selected as a follow-up. The board also discussed the possibility of using handouts at these events to attract new members.

John Harrington commented that the move to a new website host seemed to have worked out well. Mr. Harrington noted that past issues of the *Eclipse* newsletter were available to the general public on the BSAS' website and raised the possibility of also allowing access to the current issue. Curt Porter commented that he preferred the present practice of only allowing access to past issues. Mr. Porter also suggested the possibility of establishing a "swap & sell" feature on the website that only members could use but that all could see. In addition, he suggested sharing this "swap & sell" information with

local astronomy clubs. Joe Boyd suggested sending two or three current issues of the *Eclipse* to prospective new members. John Harrington moved that the current practice of only allowing the general public to have access to past issues of the *Eclipse* on the BSAS' website be continued. Steve Cobb seconded this motion that was passed without additional discussion by a unanimous voice vote. Joe Boyd commented that distributing current issues of the *Eclipse* to the presidents of nearby astronomy clubs would be a good idea. Mr. Boyd moved that, at the BSAS President's discretion, current issues of the *Eclipse* could be sent to interested prospective members. Steve Cobb seconded this motion that was passed by a unanimous voice vote without additional discussion.

Curt Porter suggested that the BSAS acquire a defibrillator to be used if a cardiac emergency should occur during a club activity. The board discussed this issue and determined that the Society already had a defibrillator, but that the control software needed to be updated. All agreed that this should be followed up on and done. John Harrington noted that the BSAS' Facebook account should be used more effectively. Mr. Harrington reported that, due to Steve Wheeler's recent resignation after several years of outstanding service, the BSAS needed a new editor for its *Eclipse* newsletter. Bill Griswold volunteered to assume this duty if he could obtain training to use a Word template compile the newsletter. Mr. Griswold also said that he needed timely input of articles and information so that the *Eclipse* could go out by the end of each month.

Bob Rice suggested that a digital copy of the Certificate of Appreciation recently awarded to the BSAS by NASA's The Space Place be displayed on the Society's website. Noting the potential danger that the improper or malicious use of green laser pointers posed for aircraft – especially by non-astronomers, Curt Porter suggested that the BSAS should consider notifying the Federal Aircraft Administration (FAA) about their possible use at our star parties. Joe Boyd, a former officer of the Civil Air Patrol, said that he would contact members of that organization regarding the viability of this approach. Theo Wellington reminded the board that the date for the Middle Tennessee Science and Engineering Fair at Austin Peay State University (APSU) was rapidly approaching. Noting that the BSAS had previously awarded prizes of \$100, \$50, and \$25 for the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> best astronomy-related projects at prior fairs, John Harrington moved that the Society do so again this year. Curt Porter seconded this motion that was subsequently passed by a unanimous voice vote without additional discussion. The board agreed that judges for these awards would be selected later and that all arrangements would be made through Dr. Spencer Buckner, APSU Associate Professor of Physics and Astronomy and Past-President of the BSAS.

Since there was no further business to discuss, Steve Cobb moved that the meeting be adjourned. John Harrington seconded this motion that was then approved by a unanimous voice vote without additional discussion. President John Harrington declared the meeting to be adjourned at 8:58 P.M.

Respectfully submitted,  
Bob Rice, Secretary

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**Barnard-Seyfert Astronomical Society  
Minutes of a Special Meeting of the Board of Directors  
Held On Wednesday, March 21, 2012**

The board of directors of the Barnard-Seyfert Astronomical Society (BSAS) met in special session at the Cumberland Valley Girl Scout Council Building in Nashville, Tennessee on March 21, 2012. This meeting took place immediately following the conclusion of the monthly membership meeting held at this same location on this same date. All board members were

present; these were Dr. Spencer Buckner, Joe Boyd, Steve Cobb, Bill Griswold, John Harrington, Melissa Lanz, Kris McCall, Bob Norling, Curt Porter, Bob Rice, and Theo Wellington. President John Harrington called the meeting to order at 9:05 P.M.

The purpose of this meeting was to discuss and vote on awarding one year free BSAS memberships to the three astronomy-related project winners at the recent Middle Tennessee Science and Engineering Fair held at Austin Peay State University (APSU). These winners entered projects that demonstrated gravity assist around black holes, explained the solar wind, and calculated the rotation of the sun by using sunspots. BSAS members Dr. Spencer Buckner, Bill Griswold, and Curt Porter served as judges for these projects that are also receiving \$100, \$50.00, and \$25.00 monetary prizes from the Society for being the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> place winners respectively.

Kris McCall moved that the three astronomy-related project winners at the recent Middle Tennessee Science and Engineering Fair held at APSU be awarded free one year BSAS memberships and Dr. Spencer Buckner seconded her motion. Since much discussion regarding this issue had previously taken place among the board members via email with all correspondents having been in favor of adopting it, the motion passed by a unanimous voice vote without additional debate. These free memberships and monetary prizes will be presented at the awards ceremony at APSU on April 2, 2012.

Since the purpose of this meeting was accomplished, President John Harrington declared it be adjourned at 9:08 P.M.

Respectfully submitted,  
Bob Rice, Secretary

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### **Barnard-Seyfert Astronomical Society Minutes of the Monthly Membership Meeting Held on Wednesday, March 21, 2012**

President John Harrington called the meeting to order at 7:38 P.M. in the Cumberland Valley Girl Scout Center and welcomed members and visitors. Treasurer Bob Norling reported that the BSAS had \$2,018.53 in its regular bank account and \$1,056.91 in its equipment account. John Harrington announced these upcoming star parties:

- Mar 24 – Messier Marathon at Mark Manner’s Spot Observatory (back-up date is April 21).
- Mar 30 – Public star party at Bowie Nature Park in Fairview from 8:00 – 10:00 PM.
- Mar 31 – Public star party at the Adventure Science Center (Earth Day) from 7:30 – 9:30 P.M.

Mr. Harrington announced that the BSAS and the Cumberland Astronomical Society (CAS) were planning a joint star party for sometime in May. He also announced that the CAS was holding its annual Tennessee State Star Party at Fall Creek Falls State Park on April 20-22, 2012.

John Harrington reported that BSAS members Dr. Spencer Buckner, Bill Griswold, and Curt Porter served as judges of the astronomy projects entered in the recent Middle Tennessee Science and Engineering Fair at Austin Peay State University (APSU) and had selected three good entries to receive monetary prizes. The \$100.00 1<sup>st</sup> prize was awarded for a project demonstrating gravity assist around black holes; the \$50.00 2<sup>nd</sup> prize was awarded for a project explaining the solar wind; and the \$25.00 3<sup>rd</sup>

prize was awarded for a project about calculating the rotation of the sun by using sunspots. The prizes will be handed out at the awards ceremony at APSU on April 2, 2012. Kris McCall, responding to an inquiry from a science educator at the Giles County Library, queried the attendees about any BSAS members in that area who might be able to make a presentation at the Library for the Transit of Venus on June 5, 2012.

John Harrington introduced BSAS Past-President Mark Manner who delivered the evening's program on Montgomery Bell Academy's (MBA) new Long Mountain Observatory. Located near McMinnville, the observatory was completed just last fall and is equipped with a PlaneWave CDK 24 inch telescope, an SBIG STL 11000M camera, and Astrodon filters to permit RGB (red, green, and blue light) and narrow band imaging as well as photometry and exoplanet light curve research. Mr. Manner showed slides of the vast wooded area before construction began and then displayed the progress of construction including the pouring of concrete down to the bedrock. The observatory features a large classroom with a roll-off roof to permit viewing of the sky at night. Mr. Manner then showed some of the very impressive test photos taken with the telescope including the Firecracker Galaxy, the Dumbbell Nebula, and the M101 supernova from last year. Probably the most amazing feature of the observatory is its ability to be operated remotely via a PC. Mr. Manner demonstrated this by using his laptop to cause the telescope to slew around in real time as the enthused audience observed the action on the large pull-down projection screen at the front of the room. He pointed out that, although the observatory is still very new, its results and features are already being incorporated into MBA's science curriculum. Mr. Manner noted that future plans included allowing the facility to be used by others for stellar spectroscopy and extracting exoplanet light curves. He concluded his presentation by answering quite a few questions from the audience regarding the observatory's equipment set-up and operation.

John Harrington reminded the audience about the Messier Marathon scheduled for Saturday, March 24<sup>th</sup> at Mark Manners' Spot Observatory and invited everyone to attend. He also called for a brief meeting of the board of directors immediately following the current membership meeting. Since was no additional business to discuss, Mr. Harrington declared the membership meeting to be adjourned at 8:58 P.M.

Respectfully submitted,  
Bob Rice, Secretary

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Photograph made by John Harrington using a webcam, in a 11 inch Newtonian telescope and Registax.

See From the President on page 1 and 2.

