Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 22, No. 12 Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009 December 2014

In This Issue

Membership Renewals Due

12/2014	Knabb & Family Lurcott, Linda
01/2015	Catalano-Johnson & Family Lurcott, Edwin
02/2015	Rosenblatt & Family Toth Zandler

Seasons Greetings

Important December 2014 Dates

4th-5h • Geminid Meteor Shower Peaks.

6th • Full Moon, 7:27 a.m.

14th • Last Quarter Moon, 1:32 p.m.

21st • New Moon, 8:36 a.m.

21st • Winter Solstice (6:03 PM EST).

28th • First Quarter Moon, 1:38 am.

CCAS Upcoming Nights Out

CCAS has several "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

☼ **Saturday, March 21, 2015**. Star Party at Bucktoe Creek Preserve, Kennett Square, PA. Preserve members & the general public pay a small fee; CCAS members participate for free. The event is scheduled for 8:00 PM to 9:30 PM.

☼ **Saturday, May 10, 2015**. CCAS special observing session at Hoopes Park, West Chester, PA.

Fall/Winter 2014 Society Events

December 2014

3rd • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the PA Outdoor Lighting Council website.

4th-5th • The von Kármán Lecture Series: Coming Soon to a Dwarf Planet in Your Solar System: NASA's Dawn Mission to the Asteroid Belt, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

4th-5th • Geminid Meteor Shower Peaks.

9th • CCAS Holiday Party at the Four Dogs Tavern in Marshallton, PA. The party is for CCAS members and their families and starts at 7:00 p.m.

12th • West Chester University Planetarium Show: "Ancient Astronomy," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length.

20th • Open call for articles and photographs for the January 2015 edition of Observations.

21st • Winter Solstice (6:03 PM EST).

22nd-23rd • Ursid Meteor Shower Peaks.

26th • Deadline for newsletter submissions for the January 2015 edition of Observations.

January 2015

3rd-4th • **Quadrantids Meteor Shower.** The Quadrantids is an above average shower, with up to 40 meteors per hour at its peak. Unfortunately the nearly full moon will block out all but the brightest meteors this year. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Boötes, but can appear anywhere in the sky.

7th • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the PA Outdoor Lighting Council website.

13th • CCAS monthly meeting in Room 112, Merion Science Center, WCU. Meet & Greet over coffee and refreshments from 7:10 to 7:30 p.m. The meeting starts at 7:30 p.m. Guest Speaker: TBA.

20th • Open call for articles and photographs for the February 2015 edition of Observations.

23rd-24th • Over night Galilean satellites Io, Callisto, and Europa cross face of Jupiter .

26th • Deadline for newsletter submissions for the February 2015 edition of Observations.

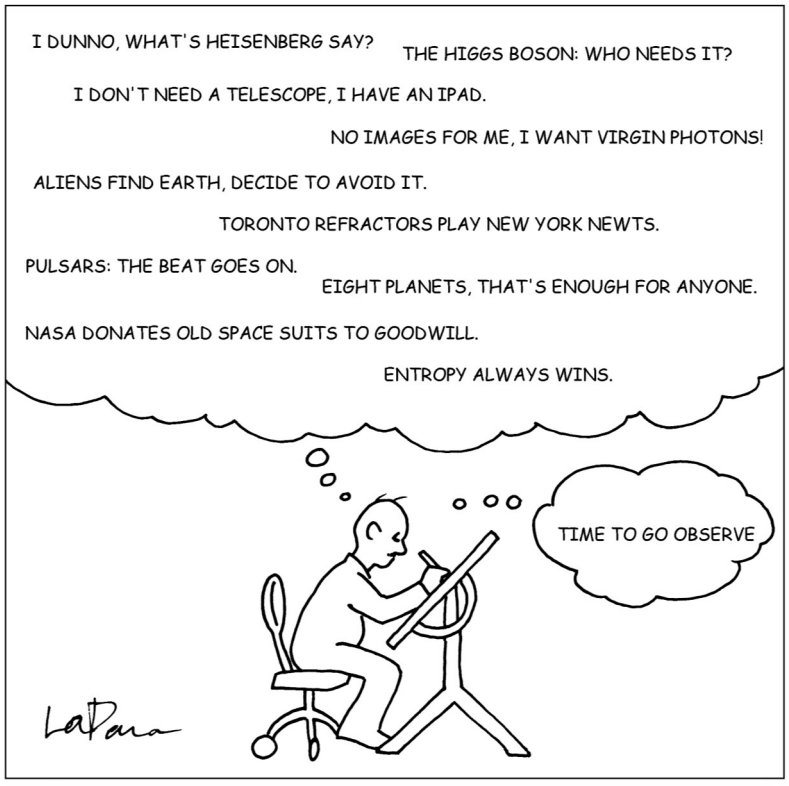
Meeting Minutes from November 11, 2014

by Ann Miller, CCAS Secretary

- Roger Taylor welcomed 40 members, guests, and visitors to our November 11th meeting held in Mather Planetarium at West Chester University.
- Upcoming observing dates are: BVA for club observing on November 21 weather permitting and a public observing star party at Hoopes Park on November 22.
- Frank Angellini gave a presentation on the Sudden Ionospheric Disturbance (SID) Monitor Program offered through Stanford University SOLAR Center. The SID program is a project to build inexpensive ionospheric monitors for amateur astronomers to use to detect solar flares and other ionospheric disturbances. More information at http://solar-center.stanford.edu/SID. Anyone interested in building a SID Monitor, contact Frank Angellini.
- Dr. Karen Schwarz, WCU professor and the director of the Mather Planetarium, welcomed CCAS and extended her thanks for our support in the renovation of the planetarium. Many club members purchased chairs in the initial fund raising drive. All chairs have been sold. In an effort to further raise funds for the completion of the space, the University will be selling stars to be displayed at the planetarium. Dr. Schwarz also encouraged members to go to the WCU Planetarium website to find the schedule of upcoming shows. We then all enjoyed the movie, "Black Holes: The Other Side of Infinity."
- Pete Kellerman shared his photos and home video of the failed Antares Rocket Launch and Explosion he attended on October 28, 2014 at Wallops Island. He encouraged members to visit Wallops Island for future launches.
- Roger Taylor concluded our meeting with a reminder that our December meeting will be held at Four Dogs Tavern located at 1300 West Strasburg Road, West Chester, PA on December 9, 2014. Look for more details in the newsletter.

Nicholas's Humor Corner

by Nicholas La Para



Successful Launch of Orion Heralds First Step on Journey to Mars

by Steven Siceloff

The United Launch Alliance Delta IV Heavy rocket, with NASA's Orion spacecraft mounted atop, lifts off from Cape Canaveral Air Force Station's Space Launch Complex 37 at 7:05 a.m. EST, Friday, Dec. 5, 2014. Image Credit: NASA/Bill Ingalls

NASA marked a major milestone Friday on its journey to Mars as the Orion spacecraft completed its first voyage to space, traveling farther than any spacecraft designed for astronauts has been in more than 40 years.

"Today's flight test of Orion is a huge step for NASA and a really critical part of our work to pioneer deep space on our Journey to Mars," said NASA Administrator Charles Bolden. "The teams did a tremendous job putting Orion through its paces in the real environment it will endure as we push the boundary of human exploration in the coming years."

Orion blazed into the morning sky at 7:05 a.m. EST, lifting off from Space Launch Complex 37 at Cape Canaveral Air Force Station in Florida on a United Launch Alliance Delta IV Heavy rocket. The Orion crew module splashed down approximately 4.5 hours later in the Pacific Ocean, 600 miles southwest of San Diego.

During the uncrewed test, Orion traveled twice through the Van Allen belt where it experienced high periods of radiation, and reached an altitude of 3,600 miles above Earth. Orion also hit speeds of 20,000 mph and weathered temperatures approaching 4,000 degrees Fahrenheit as it entered Earth's atmosphere.

Orion will open the space between Earth and Mars for exploration by astronauts. This proving ground will be invaluable for testing capabilities future human Mars missions will need. The spacecraft was tested in space to allow engineers to collect critical data to evaluate its performance and improve its design. The flight tested Orion's heat shield, avionics, parachutes, computers and key spacecraft separation events, exercising many of the systems critical to the safety of astronauts who will travel in Orion.

On future missions, Orion will launch on NASA's Space Launch System (SLS) heavy-lift rocket currently being developed at the agency's Marshall Space Flight Center in Huntsville, Alabama. A 70 metric-ton (77 ton) SLS will send Orion to a distant retrograde orbit around the moon on Exploration Mission-1 in the first test of the fully integrated Orion and SLS system.
"We really pushed Orion as much as we could to give us real data that we can use to improve Orion's design going forward," said Mark Geyer, Orion Program manager. "In the coming weeks and months we'll be taking a look at that invaluable information and applying lessons learned to the next Orion spacecraft already in production for the first mission atop the Space Launch System rocket."

A team of NASA, U.S. Navy and Lockheed Martin personnel aboard the USS Anchorage are in the process of recovering Orion and will return it to U.S. Naval Base San Diego in the coming days. Orion will then be delivered to NASA's Kennedy Space Center in Florida, where it will be processed. The crew module will be refurbished for use in Ascent Abort-2 in 2018, a test of Orion's launch abort system.

Lockheed Martin, NASA's prime contractor for Orion, began manufacturing the Orion crew module in 2011 and delivered it in July 2012 to the Neil Armstrong Operations & Checkout Facility at Kennedy where final assem-

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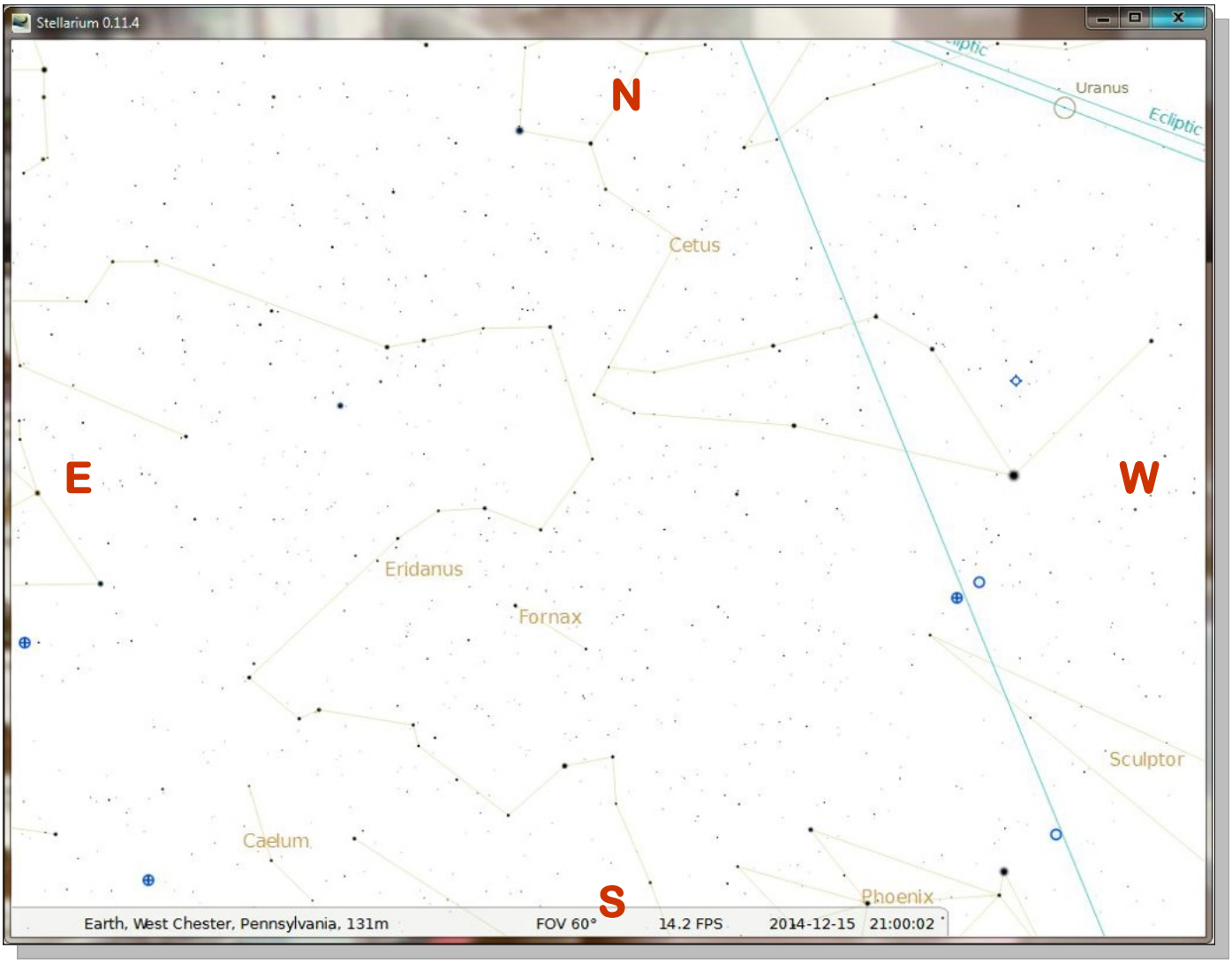
The Sky Over Chester County

December 15, 2014 at 9:00 p.m. ET

Note: This screen capture is taken from Stellarium, the free planetarium software available for download at www.stellarium.org.



Date	Civil Twilight Begins	Sunrise	Sunset	Civil Twilight Ends	Length of Day
12/01/2014	6:33 a.m. EST	7:03 a.m. EST	4:36 p.m. EST	5:06 p.m. EST	9h 36m 56s
12/15/2014	6:45 a.m. EST	7:15 a.m. EST	4:36 p.m. EST	5:07 p.m. EST	9h 21m 14s
12/31/2014	6:52 a.m. EST	7:22 a.m. EST	4:45 p.m. EST	5:16 p.m. EST	9h 23m 04s

Moon Phases					
Full Moon	12/06/2014	7:27 a.m. EST	Last Quarter	12/14/2014	7:52 a.m. EST
New Moon	12/21/2014	8:36 a.m. EST	First Quarter	12/28/2014	1:32 p.m. EST

December 2014 Observing Highlights
by Don Knabb, CCAS Treasurer & Observing Chair

5	The Moon is near Aldebaran
6	Full Moon
8	Two moon shadows visible on Jupiter at 11:20 p.m.
14	Last Quarter Moon and Geminid meteor shower peaks
21	New Moon
21	Winter Solstice
28	First Quarter Moon and the Lunar X is visible
29	Lunar Straight Wall visible

The best sights this month: Lonely Mars gets some company in December, especially late in the month, with Venus appearing in the west just after sunset and Jupiter rising in the east late in the evening. The other highlight is the Geminid meteor shower which peaks during the night of December 13/14, which is a Saturday night so we can sleep in after seeing some shooting stars!

Mercury: Look for Mercury on New Year's Eve below Venus, low in the west, just after sunset as you head out to celebrate another trip around the Sun.

Venus: Our sister planet is now the "evening star" once again! Look for Venus after mid-month, low in the west as the glow of the Sun fades. You can't miss this bright planet!

Mars: The red planet sets about 3 hours behind the Sun for all of December. But it is so far behind us that it shines at only 1.0 magnitude. Look toward the southwest horizon as soon as the sky is fully dark to see Mars before it sets.

Jupiter: The king of the planets is rising around 9:00 at mid-month so the later you look for Jupiter the higher it will be in the sky and you'll have the best telescopic view. On December 8th there will be shadows from two of the Galilean moons visible on Jupiter's disk around 11:20 p.m.

Saturn: The ringed planet is visible during the hour or two before dawn during December.

Uranus and Neptune: Both gas giants continue to be visible during the evening hours throughout December. Finder charts can be found at the website of Sky and Telescope magazine.

The Moon: The Moon is full on December 6th. This is the Full Cold Moon; or the Full Long Night Moon. It is also sometimes called the Moon before Yule. The term Long Night Moon is appropriate because the midwinter night is indeed long, and because the Moon is above the horizon for a long time. The midwinter full Moon has a high trajectory across the sky because it is opposite a low Sun.

Constellations: Ah, December skies! It's cold enough to be quite clear, but not the freezing, bone chilling cold of January and February. It seems odd to go outside after sunset and still see the Summer Triangle, but indeed there it is diving into the west. Look to the east and you will see the constellations that make it worth dressing warmly and spending some time outside during the cold December nights. Bright Capella in Auriga is high in the east to the upper left of the "V" of Taurus the Bull. Just behind Taurus is Orion the Hunter, the most easily recognized constellation of the winter months.

Messier/deep sky: There is so much to see in the December sky you won't be lacking targets if Santa brought you any new astronomy equipment! If it is not too cold there is a long list of beautiful objects in easy reach of even a small telescope or any pair of binoculars. First look for the Andromeda galaxy high in the south, then head east to the three open clusters in Auriga. Use a low power eyepiece in your telescope and zoom in to the Pleiades, although they are better captured in binoculars. Then look nearly straight up and find the Double Cluster in Perseus. And of course don't miss M42, the Orion Nebula, which is a truly awesome telescopic object.

Comets: There are no bright comets in the December skies, but if you simply must see a comet, use the sky map in the December issue of Astronomy magazine to seek out Comet PANSTARRS as it ap-

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Through the Eyepiece: NGC 2169, the "37" Cluster

by Don Knabb, CCAS Treasurer & Observing Chair

Photo credit Noel Carboni, used with permission. http://noel.prodigitalsoftware.com/Astrophotography.html

The constellation Orion the Hunter is a joy to behold on cold December nights. With just a set of binoculars we can see the fuzzy spot that is the Orion Nebula, M42. With a telescope the nebula comes alive with structure and the Trapezium, the 4 stars at the heart of the nebula, are visible. I also enjoy using binoculars to see the "S" curve of stars that are on the right side of Orion's belt.

But that's not all that Orion has to offer stargazers. There are numerous less flashy but interesting deep sky objects scattered about the constellation.

One of my favorites is NGC 2169, an open cluster that was perhaps discovered by Giovanni Batista Hodierna before 1654 (but his description is not sufficient for a confirmed identification) and was independently discovered by William Herschel on October 15, 1784.

NGC 2169 is also called the "37 Cluster" and the reason for this name can be seen in the photo by Noel Carboni, which was featured as NASA's Astronomy Photo of the Day (APOD) on November 18, 2005. The brighter stars of open cluster NGC 2169 seem to form a cosmic 37. Of course, the improbable numerical asterism appears solely by chance and depending on the optics of your telescope it might be an upside down 37 or a backward 73. As far as galactic or open star clusters go, NGC 2169 is a small one, spanning about 7 light-years.

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The 37 Cluster (Cont'd)

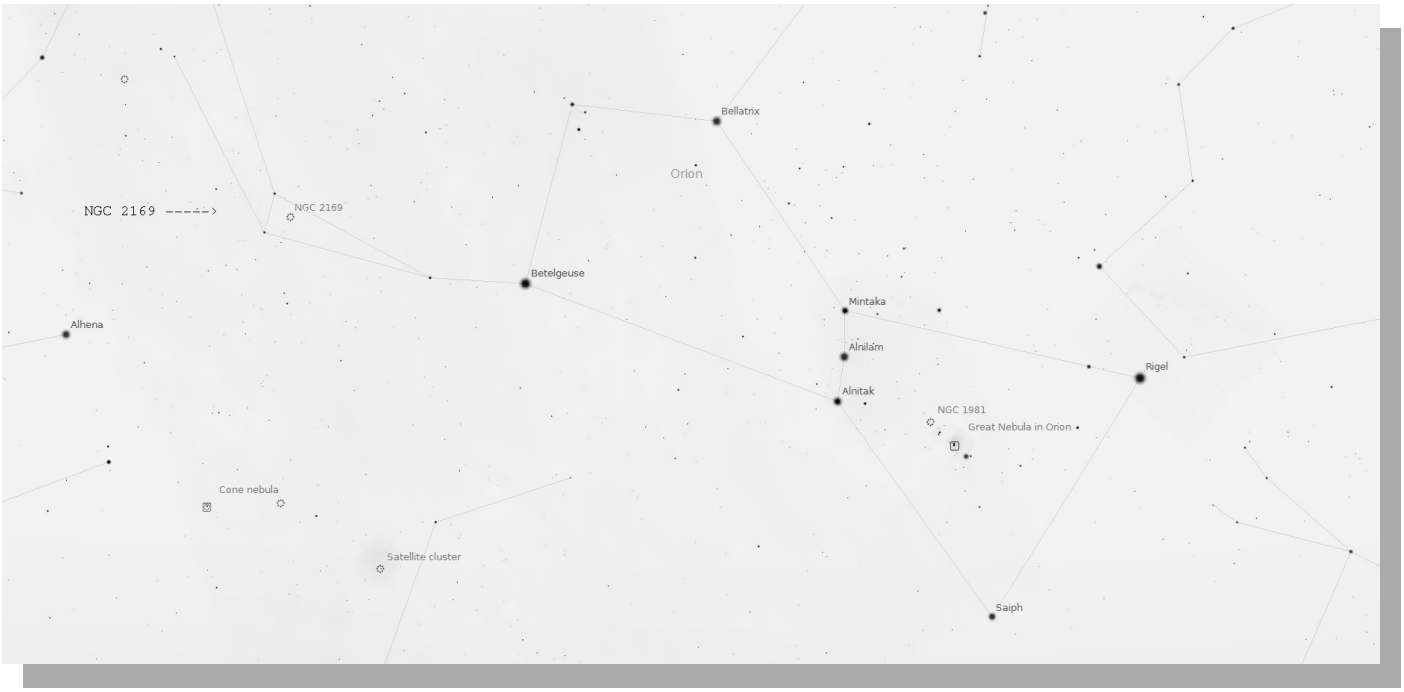


Chart credit: screen print from Stellarium planetarium software (Stellarium.org)

(Continued from page 6)

It is not difficult to find NGC 2169. The 37 Cluster is near the elbow of the arm Orion is using to hold his club overhead and forms a triangle with Nu and Xi Orionis as seen in the screen capture I took from Stellarium planetarium software.

At its distance of about 3600 light-years, open cluster NGC 2169 shines at a total brightness of 5.9 magnitudes. The cluster is made up of approximately 30 stars.

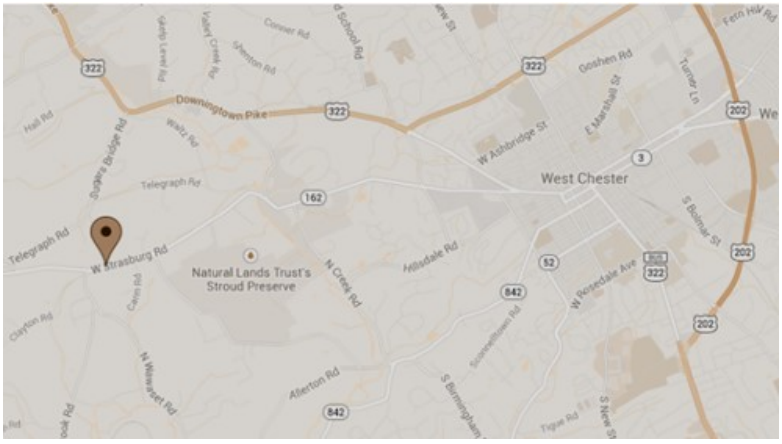
Formed at the same time from the same cloud of dust and gas, the stars of NGC 2169 are only about 8 million years old. Such clusters are expected to disperse over time as they encounter other stars, interstellar clouds, and experience gravitational tides while traveling through the galaxy. Over four billion years ago, our own Sun was likely formed in a similar open cluster of stars.

Information credits:

http://www.seds.org/messier/xtra/ngc/n2169.html
http://en.wikipedia.org/wiki/NGC_2169
http://antwrp.gsfc.nasa.gov/apod/ap051118.html

CCAS Annual Holiday Party

by Roger Taylor, CCAS President



This year our holiday party will be held at the Four Dogs Tavern in Marshallton, PA, on Tuesday December 9th at 7PM. The "Dogs" is located at 1300 W. Strasburg Road. It has a cozy atmosphere and we have a nice loft reserved. The meal Fare is varied and moderately priced. Our club will provide appetizers and individual members may order any other food and drink that they desire. Spouses and significants are also welcome. Please RSVP to president@ccas.us to let us know you will be attending.

Where the Heavenliest of Showers Come From

by Dr. Ethan Siegel

You might think that, so long as Earth can successfully dodge the paths of rogue asteroids and comets that hurtle our way, it's going to be smooth, unimpeded sailing in our annual orbit around the sun. But the meteor showers that illuminate the night sky periodically throughout the year not only put on spectacular shows for us, they're direct evidence that interplanetary space isn't so empty after all!

When comets (or even asteroids) enter the inner solar system, they heat up, develop tails, and experience much larger tidal forces than they usually experience. Small pieces of the original object—often multiple kilometers in diameter—break off with each pass near the sun, continuing in an *almost* identical orbit, either slightly ahead-or-behind the object's main nucleus. While both the dust and ion tails are blown well off of the main orbit, the small pieces that break off are stretched, over time, into a diffuse ellipse following the same orbit as the comet or asteroid it arose from. And each time the Earth crosses the path of that orbit, the potential for a meteor shower is there, *even after* the parent comet or asteroid is completely gone!

This relationship was first uncovered by the British astronomer John Couch Adams, who found that the Leonid dust trail must have an orbital period of 33.25 years, and that the contemporaneously discovered comet Tempel-Tuttle shared its orbit. The most famous meteor showers in the night sky all have parent bodies identified with them, including the Lyrids (comet Thatcher), the Perseids (comet Swift-Tuttle), and what promises to be the best meteor shower of 2014: the Geminids (asteroid 3200 Phaethon). With an orbit of *only* 1.4 years, the Geminids have increased in strength since they first appeared in the mid-1800s, from only 10-to-20 meteors per hour up to *more than 100* per hour at their peak today! Your best bet to catch the most is the night of December 13th, when they ought to be at maximum, before the Moon rises at about midnight.

The cometary (or asteroidal) dust density is always greatest around the parent body itself, so

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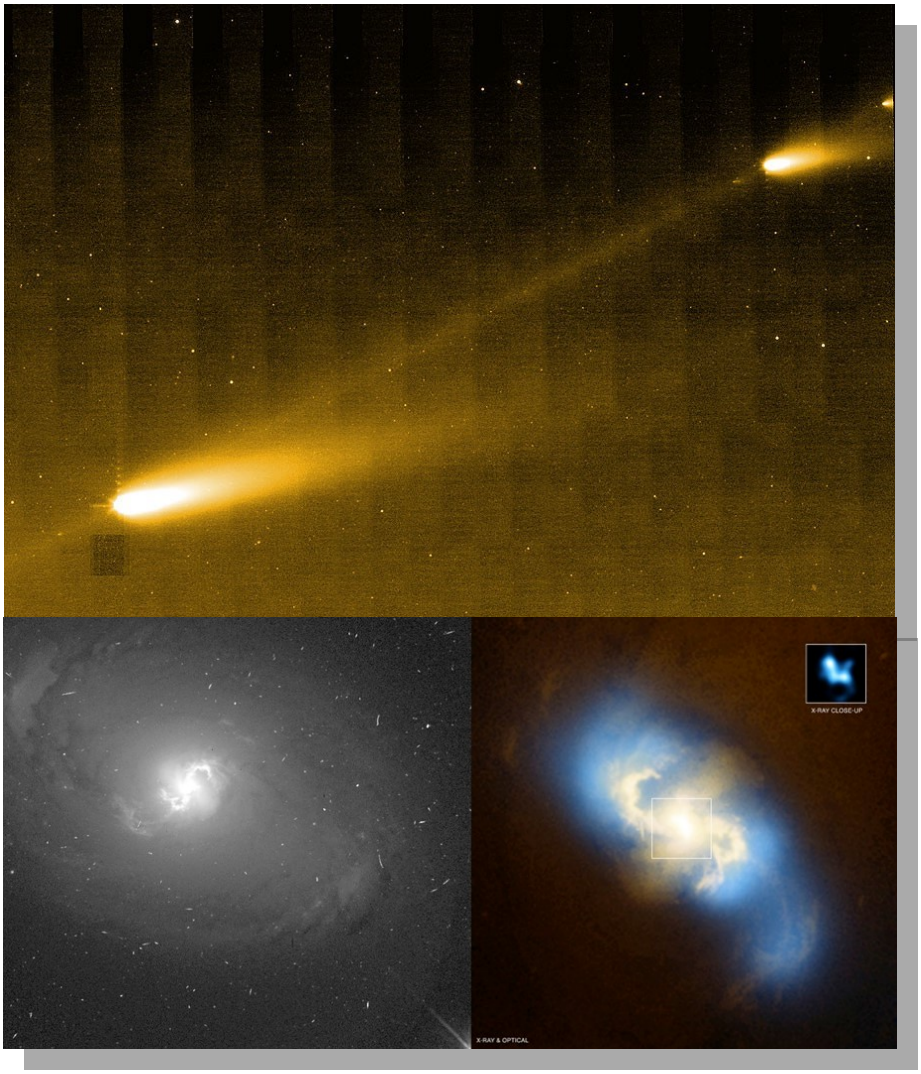

Image credit: NASA / JPL-Caltech / W. Reach (SSC/Caltech), of Comet 73P/Schwassman-Wachmann 3, via NASA's Spitzer Space Telescope, 2006.

Space Place (cont'd)

(Continued from page 8)

whenever it enters the inner solar system and the Earth passes near to it, there's a chance for a **meteor storm**, where observers at dark sky sites might see *thousands* of meteors an hour! The Leonids are well known for this, having presented spectacular shows in 1833, 1866, 1966 and a longer-period storm in the years 1998-2002. No meteor storms are anticipated for the immediate future, but the heavenliest of showers will continue to delight sky watchers for all the foreseeable years to come!

What's the best way to see a meteor shower? Check out this article to find out: http://www.nasa.gov/jpl/asteroids/best-meteor-showers.

Kids can learn all about meteor showers at NASA's Space Place: http://spaceplace.nasa.gov/meteor-shower.

Orion (Cont'd)

Following a perfect launch and more than four hours in Earth's orbit, NASA's Orion spacecraft is seen from an unpiloted aircraft descending under three massive red and white main parachutes and then shortly after its bullseye splashdown in the Pacific Ocean, 600 miles southwest of San Diego.

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bly, integration and testing were completed. More than 1,000 companies across the country manufactured or contributed elements to Orion.

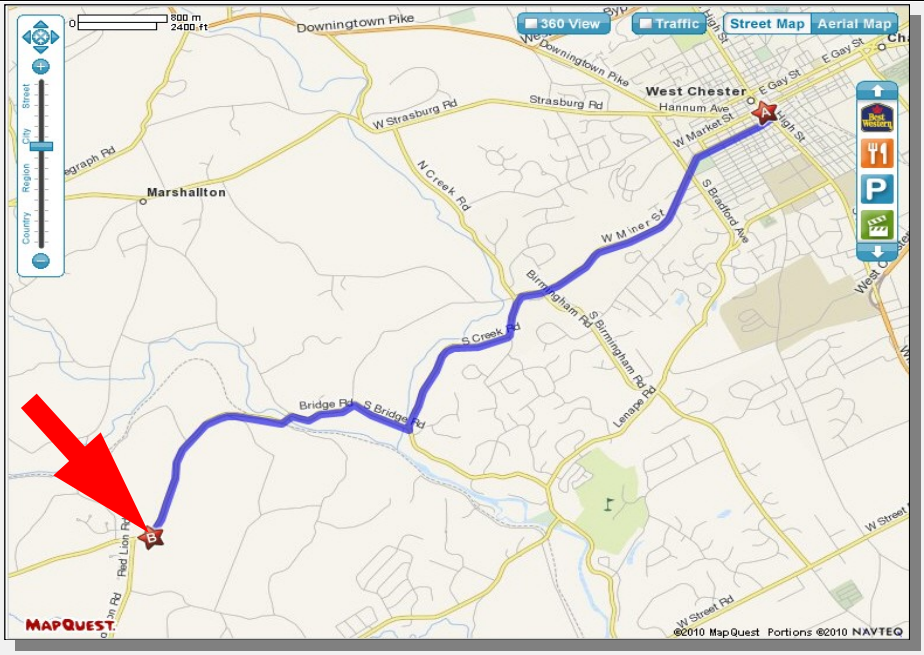
For more information about the Orion Program, visit:

http://www.nasa.gov/orion

For more information about the Ground Systems Development and Operations Program, which is responsible for Orion's recovery, visit:

http://go.nasa.gov/groundsystems

CCAS Directions



Brandywine Valley Association
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090
http://brandywinewatershed.org/

BVA was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

Brandywine Valley Association

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Valley Association.

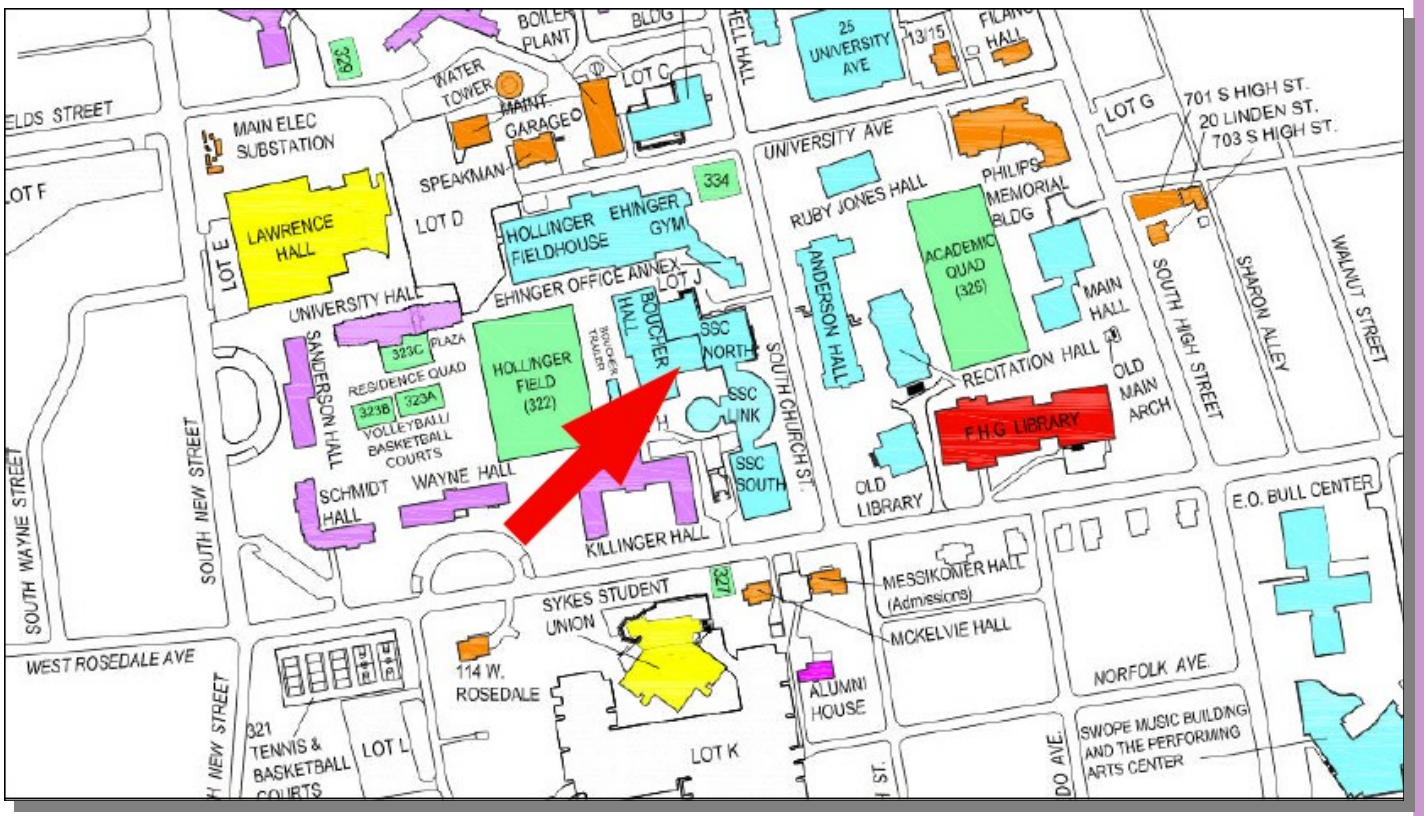
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).

CCAS Directions

West Chester University Campus

The monthly meetings (September through May) are held in Room 112 in Merion Science Center (formerly the Boucher Building), attached to the Schmucker Science Center. The Schmucker Science Center is located at the corner of S. Church St & W. Rosedale Ave. Parking is generally available across Rosedale in the Sykes Student Union parking lot (Lot K).



Observing (Cont'd)

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pears near the spiral galaxy NGC 55 from December 17 to 19.

Meteor showers: This is a great year to see the Geminid meteor shower, one of the most reliable meteor showers of the year. The peak is on the night of December 13/14 which is a Saturday night/Sunday morning. Up to 120 "shooting stars" per hour are possible from this shower.

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

Nov. 2014 Financial Summary

Beginning Balance	$2,186
Deposits	$89
Disbursements	$0
Ending Balance	$2,225

New Member Welcome!

Welcome new CCAS member Warren Chaunce Bogard from Exton. We're glad you decided to join us under the stars! Clear skies to you!

Membership Renewals

You can renew your CCAS membership by writing a check payable to "Chester County Astronomical Society" and sending it to our Treasurer:

Don Knabb
988 Meadowview Lane
West Chester PA 19382

The current dues amounts are listed in the *CCAS Information Directory*. Consult the table of contents for the directory's page number in this month's edition of the newsletter.

CCAS Information Directory

Join the Fight for Dark Skies!

You can help fight light pollution, conserve energy, and save the night sky for everyone to use and enjoy. Join the nonprofit International Dark-Sky Association (IDA) today. Individual memberships start at $30.00 for one year. Send to:

International Dark-Sky Association
3225 North First Avenue
Tucson, AZ 85719

Phone: **520-293-3198**
Fax: **520-293-3192**
E-mail: **ida@darksky.org**

For more information, including links to helpful information sheets, visit the IDA web site at:

http://www.darksky.org

Note that our CCAS Webmaster John Hepler has a link to the IDA home page set up on our Society's home page at **http://www.ccas.us**.

Dark-Sky Website for PA

The Pennsylvania Outdoor Lighting Council has lots of good information on safe, efficient outdoor security lights at their web site:

http://www.POLCouncil.org

Find out about Lyme Disease!

Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

http://www.LymePA.org

Take the time to learn about this health threat and how to protect yourself and your family. It is truly "time well spent"!

CCAS Event Information Phone Number

We've set up a special phone number you can dial to find out if our monthly observing session and other scheduled events will be held or postponed. Call **610-436-0829** after 5 PM ET to hear a recording to find out the latest news.

Good Outdoor Lighting Websites

One of the biggest problems we face in trying to reduce light pollution from poorly designed light fixtures is easy access to good ones. When you convince someone, a neighbor or even yourself, to replace bad fixtures, where do you go for good lighting fixtures? Check out these sites and pass this information on to others. Help reclaim the stars! And save energy at the same time!

Starry Night Lights

Light pollution from poor quality outdoor lighting wastes billions of dollars and vast quantities of valuable natural resources annually. It also robs us of our heritage of star-filled skies. Starry Night Lights is committed to fighting light pollution. The company offers the widest selection of ordinance compliant, night sky friendly and neighbor friendly outdoor lighting for your home or business. Starry Night Lights is located in Park City, Utah.

Phone: **877-604-7377**
Fax: **877-313-2889**

http://www.starrynightlights.com

★ ★ ★ ★ ★

Green Earth Lighting
Formerly
Outdoor Lighting Associates

Green Earth Lighting is a dedicated lifetime corporate member of the International Dark-Sky Association. GEL's products are designed to reduce or eliminate the negative effects outdoor lighting can have while still providing the light you need at night.

Green Earth Lighting LLC
620 Onion Creek Ranch Rd
Driftwood, Texas 78619

Phone: **512-944-7354**

http://www.greenearthlighting.com

Local Astronomy-Related Stores

Listing retail sites in this newsletter does not imply endorsement of any kind by our organization. This information is provided as a service to our members and the public only.

Skies UNLIMITED

Skies Unlimited is a retailer of telescopes, binoculars, eyepieces and telescope accessories from Meade, Celestron, Televue, Orion, Stellarvue, Takahashi, Vixen, Losmandy and more.

Skies Unlimited
Suburbia Shopping Center
52 Glocker Way
Pottstown, PA 19465

Phone: **610-327-3500** or **888-947-2673**
Fax: **610-327-3553**

http://www.skiesunlimited.net

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Spectrum Scientifics
Quality Science Products for All Ages

Located in Manayunk, Spectrum Scientifics educates and entertains customers with an array of telescopes, microscopes, binoculars, science toys, magnets, labware, scales, science instruments, chemistry sets, and much more.

4403 Main Street
Philadelphia, PA 19127

Phone: **215-667-8309**
Fax: **215-965-1524**

Hours:
Tuesday thru Saturday: 10AM to 6PM
Sunday and Monday: 11AM to 5PM

http://www.spectrum-scientifics.com

CCAS Information Directory

CCAS Lending Telescopes

Contact Don Knabb to make arrangements to borrow one of the Society's lending telescopes. CCAS members can borrow a lending telescope for a month at a time; longer if no one else wants to borrow it after you. Don's phone number is 610-436-5702.

CCAS Lending Library

Contact our Librarian, Barb Knabb, to make arrangements to borrow one of the books in the CCAS lending library. Copies of the catalog are available at CCAS meetings, and on the CCAS website. Barb's phone number is 610-436-5702.

Contributing to *Observations*

Contributions of articles relating to astronomy and space exploration are always welcome. If you have a computer, and an Internet connection, you can attach the file to an e-mail message and send it to: **newsletter@ccas.us**

Or mail the contribution, typed or handwritten, to:

John Hepler
313 S. Queen St.
Chestertown, MD 21620

CCAS Newsletters via E-mail

You can receive the monthly newsletter (in full color!) via e-mail. All you need is a PC or Mac with an Internet e-mail connection. To get more information about how this works, send an e-mail request to John Hepler, the newsletter editor, at: **newsletter@ccas.us**.

CCAS Website

John Hepler is the Society's Webmaster. You can check out our Website at:

http://www.ccas.us

John welcomes any additions to the site by Society members. The contributions can be of any astronomy subject or object, or can be related to space exploration. The only requirement is that it is your own work; no copyrighted material! Give your contributions to John Hepler at (443) 282-0619 or e-mail to webmaster@ccas.us

CCAS Purpose

The Chester County Astronomical Society was formed in September 1993, with the cooperation of West Chester University, as a non-profit organization dedicated to the education and enjoyment of astronomy for the general public. The Society holds meetings (with speakers) and observing sessions once a month. Anyone who is interested in astronomy or would like to learn about astronomy is welcome to attend meetings and become a member of the Society. The Society also provides telescopes and expertise for "nights out" for school, scout, and other civic groups.

CCAS Executive Committee

For further information on membership or society activities you may call:

President:	Roger Taylor 610-430-7768
Vice President:	Liz Smith 610-842-1719
ALCor, Observing, and Treasurer:	Don Knabb 610-436-5702
Secretary:	Ann Miller 610-558-4248
Librarian:	Barb Knabb 610-436-5702
Program:	Dave Hockenberry 610-558-4248
Education:	Kathy Buczynski 610-436-0821
Webmaster and Newsletter:	John Hepler 443-282-0619
Public Relations:	Deb Goldader 610-304-5303

CCAS Membership Information

The present membership rates are as follows:

REGULAR MEMBER……$25/year
SENIOR MEMBER…….$10/year
STUDENT MEMBER……..$ 5/year
JUNIOR MEMBER……..$ 5/year
FAMILY MEMBER…….$35/year

Membership Renewals

Check the Membership Renewals on the front of each issue of *Observations* to see if it is time to renew. If you need to renew, you can mail your check, made out to "Chester County Astronomical Society," to:

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178

Phone: **610-436-5702**
e-mail: **treasurer@ccas.us**

Sky & Telescope Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$32.95,** much less than the newsstand price of $66.00, and also cheaper than individual subscriptions ($42.95)! Buying a subscription this way also gets you a 10% discount on other Sky Publishing merchandise.

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