Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 22, No. 11 Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009 November 2014

In This Issue

Membership Renewals Due

11/2014	Buczynski Cavanaugh Hepler Holenstein Sigler Smith
12/2014	Kurtis
01/2015	Golub Linskens Loeliger Lurcott, Stan McElweee

NGC 6543: Cat's Eye Nebula

Image Credit: *NASA, ESA, HEIC, and The Hubble Heritage Team (STScI/AURA)*

Important November 2014 Dates

2nd • Daylight Savings Time Ends,

6th • Full Moon, 5:23 p.m.

14th • Last Quarter Moon, 10:16 a.m.

17th-18th • Leonid Meteor Shower Peaks

22nd • New Moon, 7:23 a.m.

29th • New Moon, 5:07 a.m.

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, November 22, 2014**. CCAS star party at Hoopes Park, West Chester. The observing session is from 7:00 to 9:00 PM.

Autumn 2014 Society Events

October 2014

1st • 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 • Autumn Astronomy Day. Learn more about Astronomy Day events by checking the web site of the Astronomical League.

9th-10th • The von Kármán Lecture Series: Rosetta—A Lesson on Comets, the Solar System and Mysteries of Earth, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

10th • West Chester University Planetarium Show: "Our Milky Way Galaxy," in the Schmucker Science Building. The show starts at 7 p.m. and run approximately one hour. For more information, visit the WCU Public Planetarium Shows webpage.

14th • 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: Dr. Rob Thornton, professor of Physics at West Chester University.

18th • CCAS Special Observing Session at Anson Nixon Park, Kennett Square. The observing session is from 8:00 to 9:30 PM.

20th • Open call for articles and photographs for the November 2014 edition of Observations.

26th • Deadline for newsletter submissions for the November 2014 edition of Observations.

November 2014

5th • 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.

6th-7th • The von Kármán Lecture Series: Asteroid Redirect Mission: Rearranging the Solar System, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

11th • 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: Dr. Karen Schwarz, "Demonstration of the New WCU Planetarium."

14th • West Chester University Planetarium Show: "Men are from Mars," in the Schmucker Science Building. The show starts at 7 p.m. and run approximately one hour. For more information, visit the WCU Public Planetarium Shows webpage.

20th • Open call for articles and photographs for the December 2014 edition of Observations.

26th • Deadline for newsletter submissions for the December 2014 edition of Observations.

27th • CCAS star party at Nottingham County Park. The event is scheduled for 7:30 PM to 8:30 PM.

Minutes from the October 14, 2014, Monthly Meeting

by Ann Miller, CCAS Secretary

- Roger Taylor welcomed 28 guests and members to the October 2014 meeting. With many new guests and members in attendance, Roger asked the newcomers to introduce themselves to our group.
- David Hockenberry gave an update on the program schedule. Next months program will be held in the Mather Planetarium at WCU. Dr. Karen Schwartz will show the film "Black Holes Don't Suck" to the group.
- Roger Taylor also announced that a CCAS member will give a presentation on radioastronomy.
- Dennis O'Leary NASA ambassador and CCAS member will give a presentation to the club in 2015.

(Continued on page 11)

Nicholas's Humor Corner

by Nicholas La Para

LL Bean Trailblazer XR Headlamp Review

by Don Knabb, CCAS Treasurer & Observing Chair

Photo courtesy of Don Knabb

One essential piece of equipment in every observer's collection should be a headlamp that shines white and red light. A flashlight of this type is a tremendous help when assembling and disassembling a telescope or just finding your way around an observing site or viewing a sky map.

Since it takes about a half hour for our eyes to become "dark adapted" we need to restrict ourselves to using red light if we want to avoid flooding our eyes with white light that resets the clock for another half hour of waiting for dark adaption.

I had been using my good old red LED/flashlight bulb/white LED headlamp for many years and decided to see if the technology has improved. And has it ever! I bought a Trailblazer XR headlamp from LL Bean and tried it during several recent observing sessions.

The headlamp is a little tricky to operate at first because one button controls 4 modes, but is worth the time required to master its operation. It has three red LED and one large white LED bulb and has a high and a low setting for each color. The high power white light is 100 lumens, which is quite bright. The lumens are not listed for the three red LED bulbs but on high pow-

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November 2014 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on November 11 2014, starting at 7:30 p.m. The meeting will be held in the Mather Planetarium, West Chester University. Our guest speaker will be Dr. Karen Schwarz, professor of Physics at West Chester University. She will present the film, "Black Holes: To Infinity and Beyond." Many thanks to Dave Hockenberry & Ann Miller for purchasing the film.

Dr. Rob Thornton

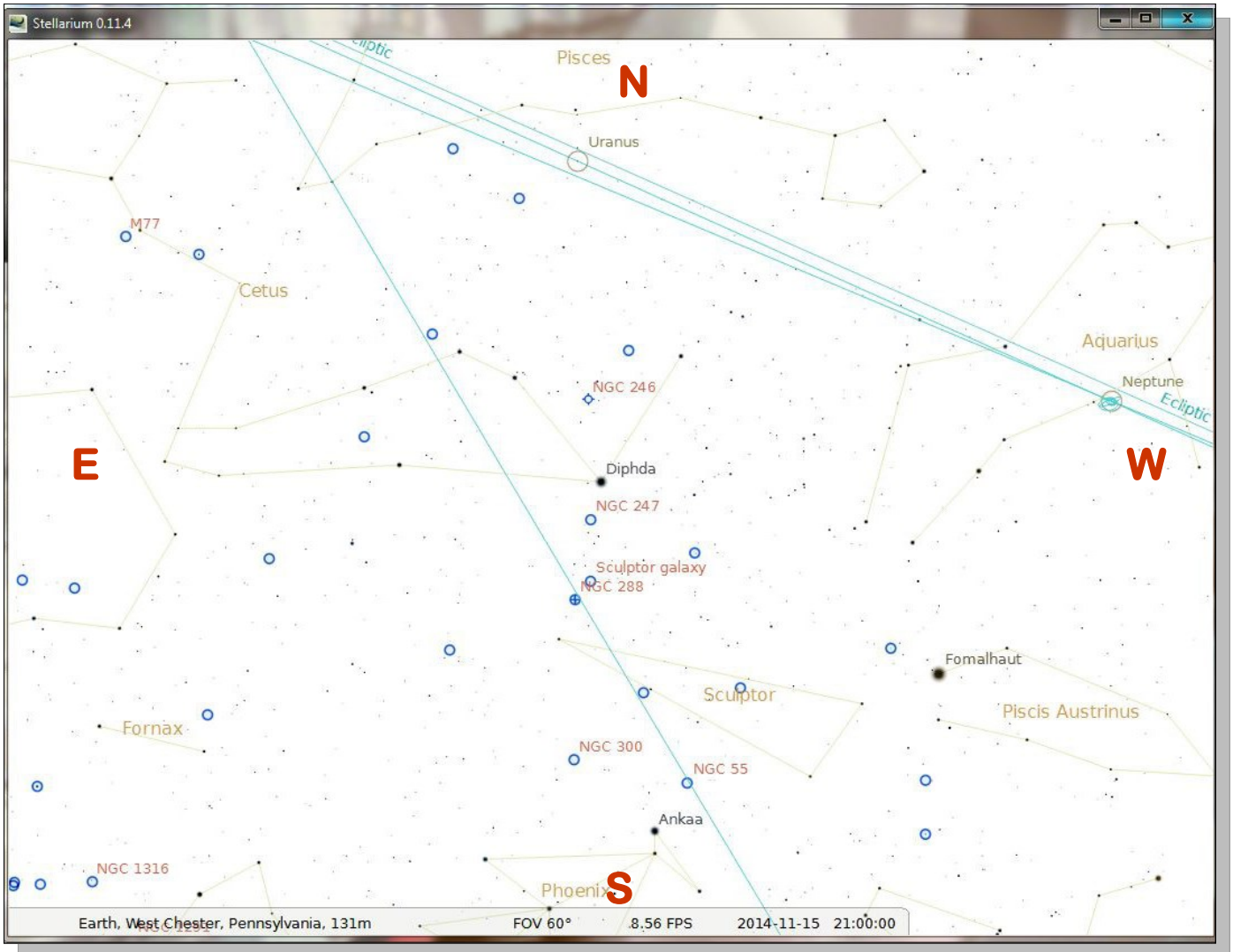
Please note that inclement weather or changes in speakers' schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

We are looking for presenters for future meetings in our 2015 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

The Sky Over Chester County

November 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
11/01/2014	7:02 a.m. EDT	7:30 a.m. EDT	5:58 p.m. EDT	6:26 p.m. EDT	10h 28m 39s
11/15/2014	6:17 a.m. EST	6:46 a.m. EST	4:44 p.m. EST	5:13 p.m. EST	9h 58 m 44s
11/30/2014	6:32 a.m. EST	7:02 a.m. EST	4:36 p.m. EST	5:36 p.m. EST	9h 34m 12s

Moon Phases					
			Full Moon	11/06/2014	5:23 p.m. EST
Last Quarter	11/14/2014	10:16 a.m. EST	New Moon	11/22/2014	7:33 a.m. EST
First Quarter	11/29/2014	5:07 a.m. EST			

November 2014 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

1-7	**Mercury is visible before dawn**
2	**Daylight Saving time ends**
6	**Full Moon**
9	**Carl Sagan's birthday!**
14	**Last Quarter Moon with Jupiter nearby**
17-18	**The Leonid meteor shower peaks before dawn**
22	**New Moon**
29	**First Quarter Moon and the Lunar Straight Wall is visible**

The best sights this month: The only planet to view this month is Mars, but take a look on November 3rd when it is near the globular cluster M22 in Sagittarius. And then we have the Leonid meteor shower which presents good viewing on the nights of November 17th and 18th.

Mercury: November mornings are the best opportunity of 2014 to see elusive Mercury. Look to the east from November 1st to November 7th and you will find Mercury about 10 degrees above the horizon 45 minutes before sunrise.

Venus: Our sister planet is coming around from behind the Sun, so at the end of November you might catch the evening star very low in the west just after the Sun has set.

Mars: Mars is the only bright planet that is visible during the evening hours for most of November. The red planet is spending the fall with the constellation Sagittarius, which presents some excellent observing events. On November 2nd Mars is near the globular cluster M28 and on November 3rd it is near one of my favorite globular clusters, M22!

Jupiter: By mid-month the king of the planets rises before midnight. I enjoy looking out our bedroom door in the early morning and seeing bright Jupiter high in the southeastern sky. That fellow is going to give us a good reason to brave the cold during the coming winter months!

Saturn: Saturn goes behind the Sun on November 18th and is therefore not visible during November.

Uranus and Neptune: We had a great view of Uranus and Neptune at BVA in October, in everything from a 60mm refractor to a 14 inch Dobsonian! Both were beautiful, but Uranus takes the prize due to its larger size. Both gas giants continue to be visible during the evening hours throughout November. Finder charts can be found at the website of Sky and Telescope magazine.

The Moon: The Moon is full on November 6th. The Full Moon of November is called the Full Beaver Moon. For Native Americans, the time of this Full Moon was the time to set beaver traps before the swamps froze, to ensure a supply of warm winter furs. Another interpretation suggests that the name Full Beaver Moon comes from the fact that the beavers are now actively preparing for winter. It is sometimes also referred to as the Frosty Moon.

Constellations: During November the Great Square of Pegasus is now at "center stage". To the left of the Great Square, sweeping up to the left is the constellation Andromeda. Use your binoculars to find our neighbor galaxy, which is also named Andromeda. It is a large fuzzy spot located between the constellation Andromeda and Cassiopeia. And by 9 p.m. the beautiful Pleiades, that really little dipper is rising in the east ahead of Taurus the Bull.

Messier/deep sky: There are many deep sky treats in the autumn and winter sky. My favorite this time of year is the trio of star clusters in Auriga, M36, M37 and M38. Compare the structure of these open clusters and log them as a great start in pursuit of the binocular or telescopic Messier club of the Astronomical League.

Comets: Comet Siding Spring glows at 9th magni-

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NASA's Wallops Flight Facility Completes Initial Assessment after Orbital Launch Mishap

Submitted by *Stephanie Schierholz & Keith Koehler, NASA*

On October 29th, the Wallops Incident Response Team completed an initial assessment of Wallops Island, Virginia, following the catastrophic failure of Orbital Science Corp.'s Antares rocket shortly after liftoff at 6:22 p.m. EDT Tuesday, Oct. 28, from Pad 0A of the Mid-Atlantic Regional Spaceport at NASA's Wallops Flight Facility in Virginia.

"I want to praise the launch team, range safety, all of our emergency responders and those who provided mutual aid and support on a highly-professional response that ensured the safety of our most important resource -- our people," said Bill Wrobel, Wallops director. "In the coming days and weeks ahead, we'll continue to assess the damage on the island and begin the process of moving forward to restore our space launch capabilities. There's no doubt in my mind that we will rebound stronger than ever."

The initial assessment is a cursory look; it will take many more weeks to further understand and analyze the full extent of the effects of the event. A number of support buildings in the immediate area have broken windows and imploded doors. A sounding rocket launcher adjacent to the pad, and buildings nearest the pad, suffered the most severe damage.

At Pad 0A the initial assessment showed damage to the transporter erector launcher and lightning suppression rods, as well as debris around the pad.

Figure 2. Tub Carts for transport

The Wallops team also met with a group of state and local officials, including the Virginia Department of Environmental Quality, the Virginia Department of Emergency Management, the Virginia Marine Police, and the U.S. Coast Guard.

The Wallops environmental team also is conducting assessments at the site. Preliminary observations are that the environmental effects of the launch failure were largely contained within the southern third of Wallops Island, in the area immediately adjacent to the pad. Immediately after the incident, the Wallops' industrial hygienist collected air samples at the Wallops mainland area, the Highway 175 causeway, and on Chincoteague Island. No hazardous substances were detected at the sampled locations.

Additional air, soil and water samples will be collected from the incident area as well as at control sites for comparative analysis.

The Coast Guard and Virginia Marine Resources Commission reported today they have not observed any obvious signs of water pollution, such as oil sheens. Furthermore, initial assessments have not revealed any obvious impacts to fish or wildlife resources. The Incident Response Team continues to monitor and assess.

Following the initial assessment,

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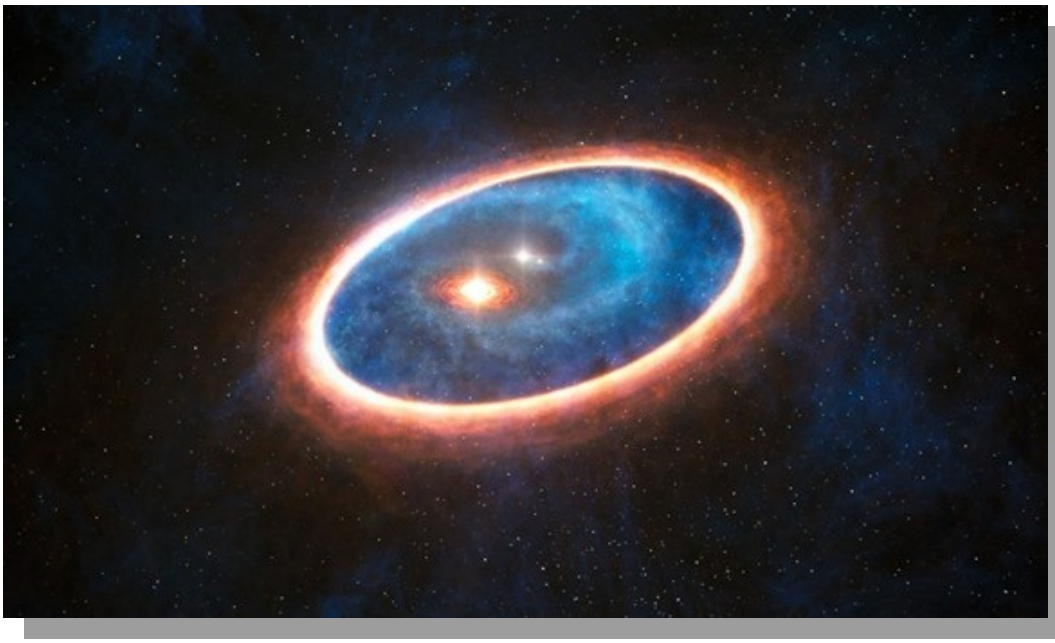
Planet-Forming Lifeline Discovered in a Binary System

Submitted by ESO, Garching, Germany



Artist's impression of the double-star system GG Tauri-A. Image courtesy of ESO.

For the first time, researchers using ALMA have detected a streamer of gas flowing from a massive outer disk toward the inner reaches of a binary star system. This never-before-seen feature may be responsible for sustaining a second, smaller disk of planet-forming material that otherwise would have disappeared long ago. Half of Sun-like stars are born in binary systems, meaning that these findings will have major consequences for the hunt for exoplanets.

A research group led by Anne Dutrey from the Laboratory of Astrophysics of Bordeaux, France, used the Atacama Large Millimeter/submillimeter Array (ALMA) to observe the distribution of dust and gas in a multiple-star system called GG Tau-A. This object is only a few million years old and lies about 450 light-years from Earth in the constellation Taurus the Bull.

Like a wheel in a wheel, GG Tau-A contains a large, outer disk encircling the entire system as well as an inner disk around the main central star. This second inner disk has a mass roughly equivalent to that of Jupiter. Its presence has been an intriguing mystery for astronomers since it is losing material to its central star at a rate that should have depleted it long ago.

While observing these structures with ALMA, the team made the exciting discovery of gas clumps in the region between the two disks. The new observations suggest that material is being transferred from the outer to the inner disk, creating a sustaining lifeline between the two.

"Material flowing through the cavity was predicted by computer simulations but has not been imaged before. Detecting these clumps indicates that material is moving between the disks, allowing one to feed off the other," said Dutrey. "These observations demonstrate that material from the outer disk can sustain the inner disk for a long time. This has major consequences for potential planet formation."

Planets are born from the material left over from star birth. This is a slow process, meaning that an enduring disk is a prerequisite for planet formation. If the feeding process into the inner disk now seen with ALMA occurs in other multiple-star systems, the findings introduce a vast number of new potential locations to find exoplanets in the future.

The first phase of exoplanet searches was directed at single-host stars like the Sun. More recently, it has been shown that a large fraction of giant planets orbit binary-star systems. Now, researchers have begun to take an even closer look and investigate the possibility of planets orbiting the individual stars of multiple-star systems. The new discovery supports the possible existence of such planets, giving exoplanet discoverers new hap-

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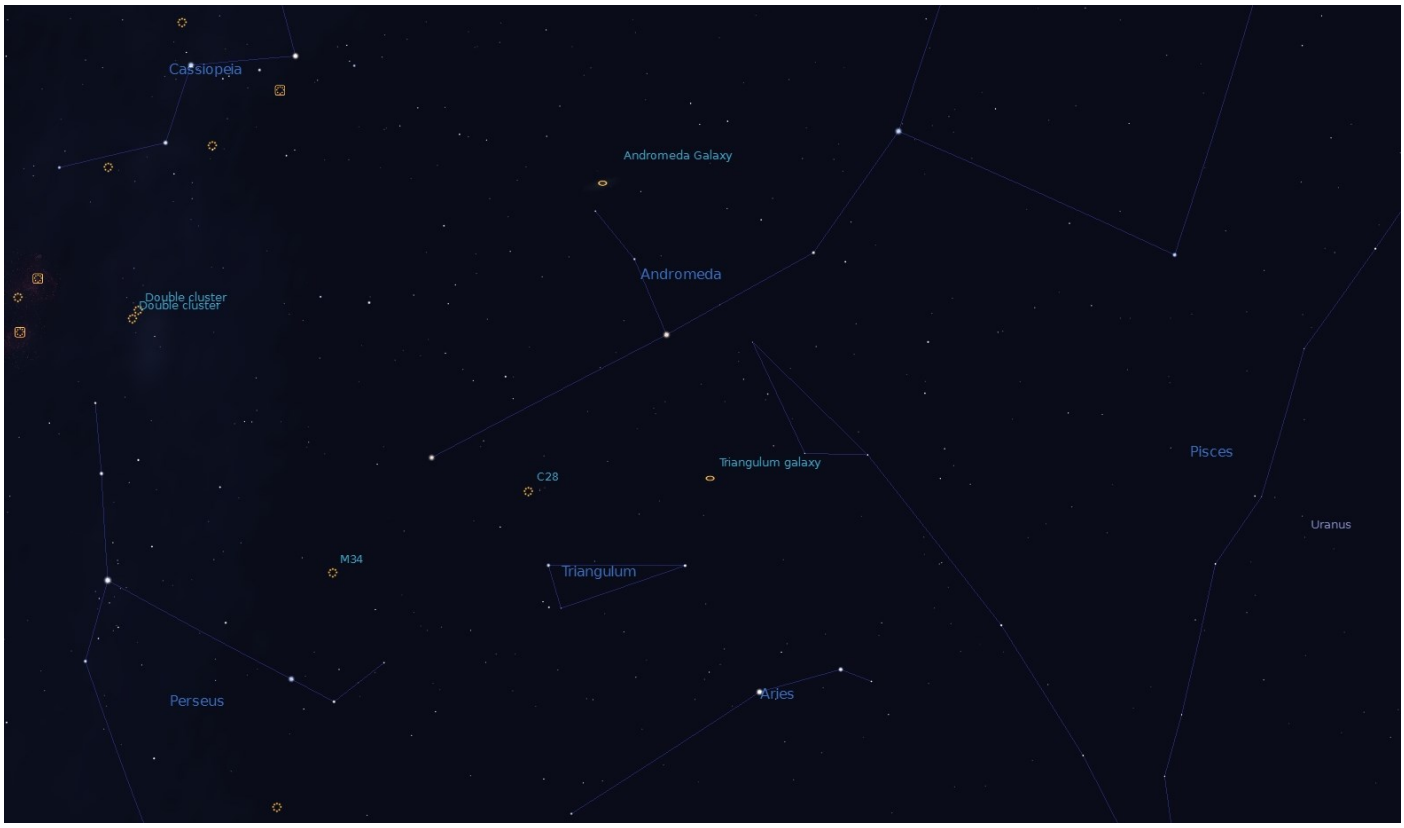
Through the Eyepiece: The Triangulum Galaxy, Messier 33

by Don Knabb, CCAS Treasurer & Observing Chair



Picture source: stellarium.org

During November the skies are clear but it is not too cold yet, so this is a great time of year to seek out some of the faint fuzzies that would leave you with chattering teeth and frozen toes if you try to find them when winter settles in. One such object on my list for this time of year is The Triangulum Galaxy, M33.

The constellation Triangulum is easy find using some of the fall constellations as guides. If you first find the Great Square of Pegasus and then find the Pleiades, just look between them for a small constellation in the shape of a triangle (I suppose you could have guessed its shape). Then use the sky map to star hop to the area of M33.

Don't expect M33 to stand out in the sky. Although it is considered to be a naked eye object under dark skies, those will need to be very dark skies indeed! M33 is a very large object in the night sky and it has low surface brightness. The galaxy covers approximately a full degree of sky which is about 1/3 of the field of view of average binoculars and is typically too large for an average telescope eyepiece. So grab your binoculars and lie back, let your eyes adjust for about a half an hour and stare into the abyss to seek out this faint fuzzy!

If you use a telescope to find M33 be sure to select your lowest power (highest number) eyepiece, such as a 32 or 40mm eyepiece. Any light pollution or moonlight will make finding the Triangulum Galaxy very difficult.

Some sources refer to M33 as the Pinwheel Galaxy, but that name is more generally given to Messier 101. The Triangulum Galaxy is the third-largest member of the Local Group of galaxies, which includes the Milky Way Galaxy, the Andromeda Galaxy and about 30 other smaller galaxies. It is one of the most distant permanent objects that can be viewed with the naked eye under ideal conditions. The picture on the next page taken by CCAS member Pete LaFrance shows the pinwheel

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Eyepiece (Cont'd)

Photo courtesy of Pete LaFrance

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structure of this galaxy.

While the Triangulum Galaxy was probably first observed by Hodierna before 1654 (back when skies were dark), it was independently rediscovered by Charles Messier, and cataloged by him on August 25, 1764. Messier writes: "I have discovered a nebula between the head of the northern Fish and the large Triangle."

Sir William Herschel was an astronomically curious soul and studied M33 intently on his own, writing: "There is a suspicion that the nebula consists of exceedingly small stars. With this low power it has a nebulous appearance." He would continue to observe this grand galaxy again and again over the years, cataloging its various regions with their own separate numbers and keeping track of his findings: "The stars of the cluster are the smallest points imaginable."

Herschel also cataloged The Triangulum Galaxy's brightest and largest nebula separately from the galaxy itself, which eventually obtained NGC number 604. As seen from Earth NGC 604 is located northeast of the galaxy's central core.

So before temperatures drop below freezing and the winds of winter howl try to find this faint fuzzy and add it to your Messier list!

Credits:

http://en.wikipedia.org/wiki/Triangulum_Galaxy
http://www.skyandtelescope.com/community/skyblog/stargazing/69562222.html?pageSize=0
http://www.universetoday.com/34008/messier-33/

Observing (Cont'd)

(Continued from page 5)

tude in the constellations Serpens and Ophiuchus in mid-November. There is a sky map in the November issue of Astronomy to help you locate this dim fuzz-ball

Meteor showers: The Leonid meteor shower peaks in the on the afternoon of November 17th so we can look for shooting stars in the early morning hours of November 17th and 18th. It is very hard to predict meteor shower activity but with the Moon being a thin waning crescent we might have a good show. And because the Leonid meteors travel at high speed they produce a greater percentage of fireballs, which can be bright enough to cast shadows!

Headlamp (Cont'd)

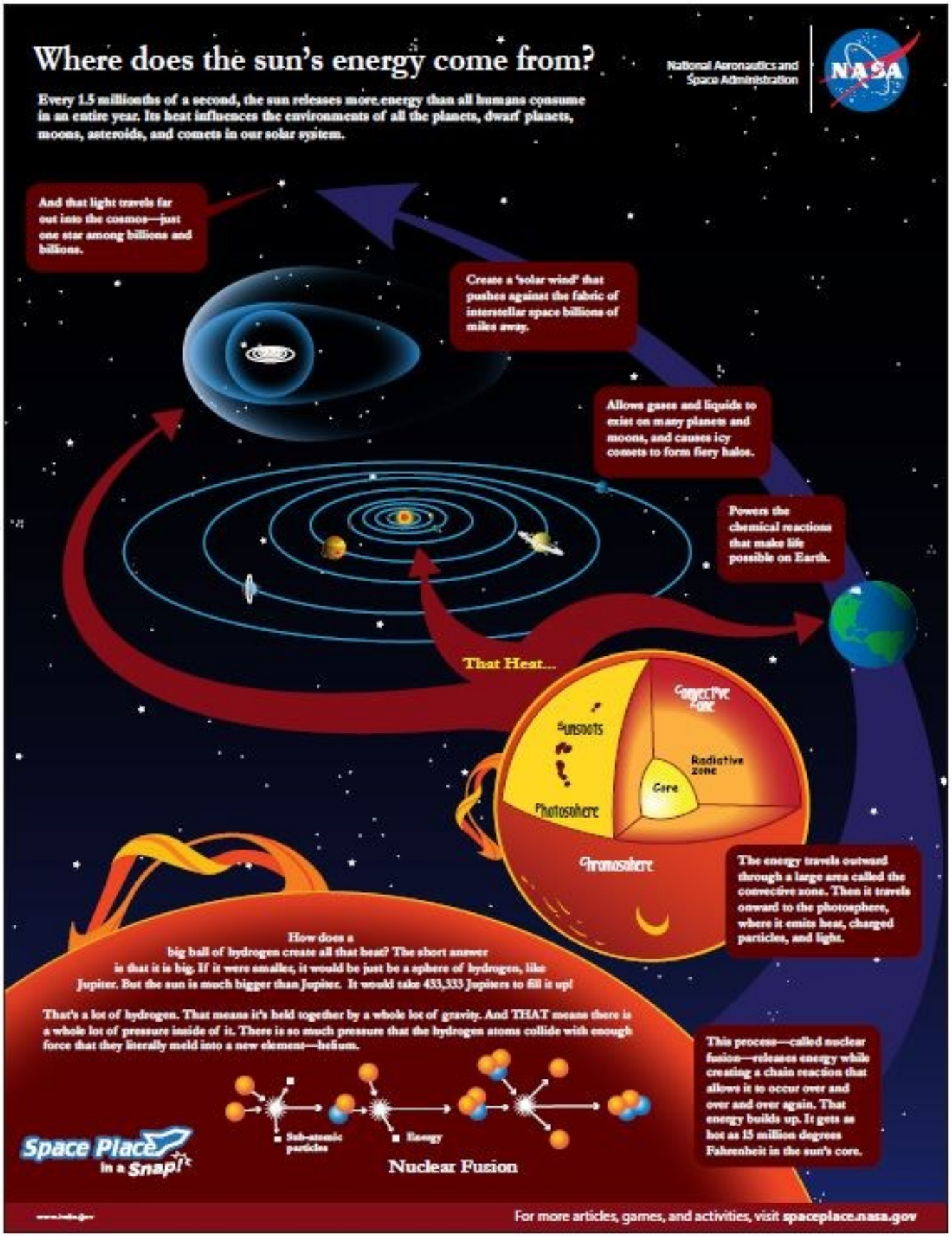
(Continued from page 3)

er it is quite bright. The low power red LED is best once you are set up and observing since it will have almost no effect on your night vison.

Like all good headlamps, this one has adjustable tilt. The button is fairly large and can be worked while wearing light duty gloves.

The headlamp is $40, not cheap, but when you use if for the first time on the observing field you will be happy you made the investment.

Where Does the Sun's Energy Come From?
by NASA Space Place



Minutes (cont'd)

(Continued from page 2)

- Kathy B, education chair, encouraged members to communicate observations and interesting astronomical information via members@ccas.us.

- Don Knabb, observing chair, presented Stellarium for October. Watch for Pleides, Fomalhaut-17th brightest star in the night sky, Algol the Demon Star-a variable star, and Capella. Don also announced 2 upcoming observing sessions. BVA CCAS group observing is on Friday, October 17 and Anson Nixon Park Star Party on October 18 in Kennett Square, PA.

- David Hockenberry introduced our guest speaker, Dr. Robert Thornton, Associate Professor of Physics. Dr. Thornton presented "Probing the Last 13.8 billion Years in the Universe" : Atacama Cosmology Telescope- Experiment, Results, and Future Plans. Dr. Thornton designs and builds the cameras for the ACT telescope on Cerro Toco in Chile.

Observing (Cont'd)

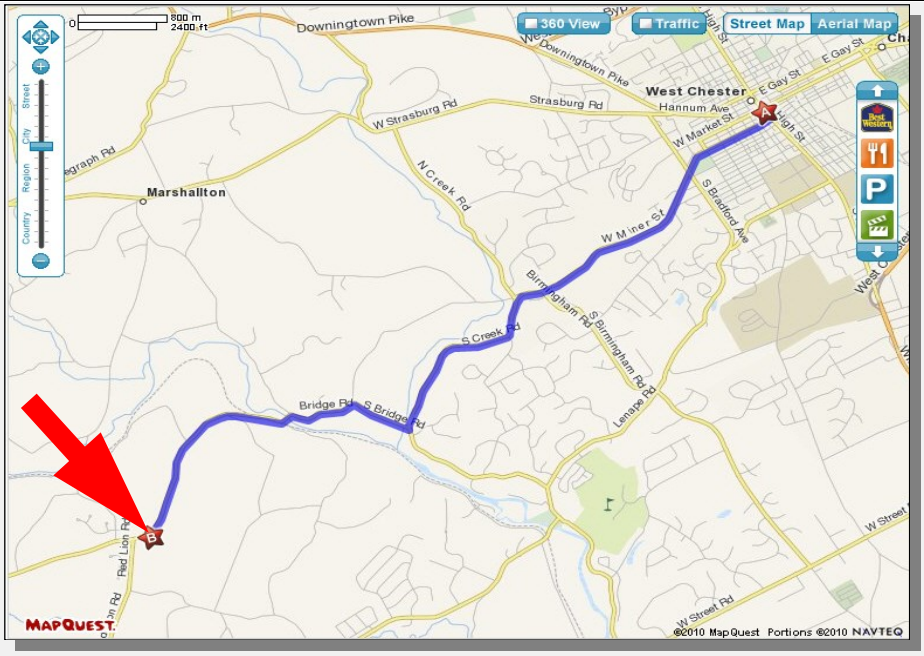
(Continued from page 6)

the response team will open the area of Wallops Island, north of the island flagpole opposite of the launch pad location, to allow the U.S. Navy to return back to work.

Anyone who finds debris or damage to their property in the vicinity of the launch mishap is cautioned to stay away from it and call the Incident Response Team at 757-824-1295.

Further updates on the situation and the progress of the ongoing investigation will be available at: **http://www.orbital.com** and **http://www.nasa.gov/orbital**

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.

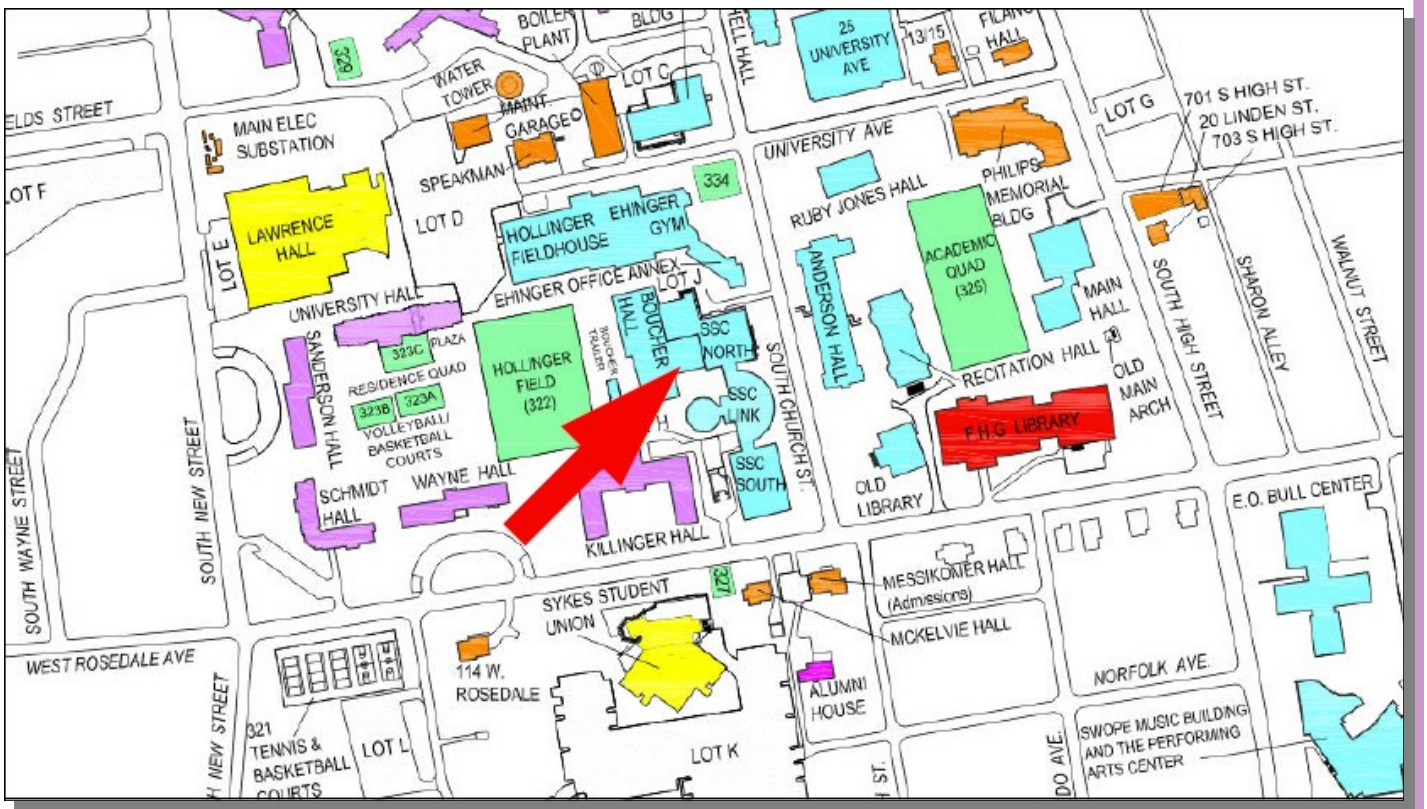
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route 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).



Lifeline (cont'd)

(Continued from page 7)

py hunting grounds.

"Almost half the Sun-like stars were born in binary systems," said Emmanuel Di Folco from the Laboratory of Astrophysics of Bordeaux, France. "This means that we have found a mechanism to sustain planet formation that applies to a significant number of stars in the Milky Way. Our observations are a big step forward in truly understanding planet formation."

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

Oct. 2014 Financial Summary

Beginning Balance	$2,006
Deposits	$130
Disbursements	$0
Ending Balance	$2,136

New Member Welcome!

Welcome new CCAS members Rosti Grinberg, Wilmington, Delaware; Jacqueline Pollard and Steve Luttrell, Downingtown, & Jack and Randy Giles, Downingtown. 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

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

★ ★ ★ ★ ★

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 South 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 & Tele*scope 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.

To **start** a **new** subscription, make **sure** you make out the check to the **Chester County Astronomical Society**, note that it's for *Sky & Telescope*, and mail it to Don Knabb.

To **renew** your "club subscription" contact Sky Publishing directly. Their phone number and address are in the magazine and on their renewal reminders. If you have **any** questions call Don first at 610-436-5702.

Astronomy Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$34.00** which is much less than the individual subscription price of $42.95 (or $60.00 for two years). If you want to participate in this special Society discount offer, **contact our Treasurer Don Knabb.**