Observations

A Monthly Publication Of The CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 24, No. 11 ***Three-Time*** *Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016* *November 2016*

In This Issue

M8: The Lagoon Nebula

Image by CCAS Member Don Knabb. For details, see page 10.

Membership Renewals Due

11/2016	Buczyinski Cavanaugh Holenstein Smith
12/2016	Bogusch Moynihan O'Leary
01/2017	Holmstrom Kellerman Kovacs Linskens McElwee

November 2016 Dates

6th • Daylight Saving Time ends, 2:00 a.m. ET, turn clocks back one hour

7th • First Quarter Moon, 2:51 p.m. EST

16th • Full Moon, 8:52 a.m. EST

17th • Leonid Meteor Shower peaks near 5:00 a.m. EST

21st • Last Quarter Moon, 3:33 a.m. EST

29th • New Moon, 7:18 a.m. EST

CCAS Upcoming Nights Out

CCAS has several special "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.

☼ **Wednesday, November 2, 2016** - CCAS Special Observing Session, Pocopson Elementary School, West Chester, PA, from 6:30 to 8:00 p.m. This event is not open to the general public.

☼ **Sunday, November 6, 2016** - CCAS Special Observing Session, Country Day School of the Sacred Heart, Bryn Mawr, PA, from 5:30 to 7:00 p.m. This event is not open to the general public.

Autumn/Winter 2016 Society Events

November 2016

2nd • 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.

2nd • CCAS Special Observing Session, Pocopson Elementary School. The observing session is scheduled for 6:30 – 8:00 p.m. The event is not open to the general public.

4th • West Chester University Planetarium Show: "Raining Stars" in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length. For more information and reservations, visit the WCU Public Planetarium Shows webpage.

4th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset. LAST REGULAR OBSERVING SESSION for 2016.

6th • CCAS Special Observing Session, Country Day School of the Sacred Heart, Bryn Mawr. The event is not open to the general public.

6th • Daylight Saving Time ends, 2:00 A.M. ET. Turn clocks back one hour.

8th • CCAS Monthly Meeting, Room 113, Merion Science Center (former Boucher Building), West Chester University. Meet & Greet over coffee and refreshments for members and non-members alike from 7:00 to 7:30 p.m. The meeting starts immediately after at 7:30 p.m. CCAS Member Speaker: John Conrad, NASA/JPL Solar System Ambassador.

17th-18th • The von Kármán Lecture Series: The James Webb Space Telescope: Successor to Hubble, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the December 2016 edition of Observations.

26th • Deadline for newsletter submissions for the December 2016 edition of Observations.

December 2016

2nd • West Chester University Planetarium Show: "Dethroning the Earth," in the Schmucker Science Building. The show starts at 7 p.m. and run approximately one hour in length. For more information and reservations, visit the WCU Public Planetarium Shows webpage.

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 • Geminid Meteor Shower Peaks. Considered by many to be the best meteor shower in the heavens, the Geminids are known for producing up to 60 multicolored meteors per hour at their peak. The peak of the shower usually occurs around mid-December, although some meteors should be visible from December 6th through the 19th.

15th-16th • The von Kármán Lecture Series: Spinning Black Holes, Exploding Stars, and Hyperluminous Pulsars: Recent Results from the NuSTAR Satellite, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

17th • CCAS Holiday Party at Barb & Don Knabb's home in West Chester, PA. The party is for CCAS members and their families and starts at 6:00 p.m. See the December 2016 edition of *Observations* for location and directions.

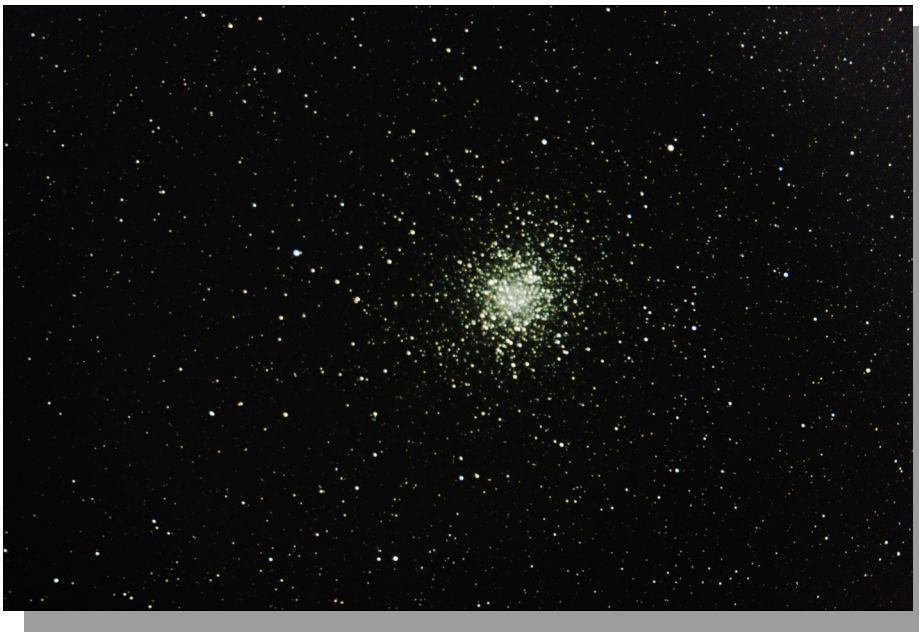
20th • Open call for articles and photographs for the January 2017 edition of Observations.

21st • Winter Solstice (6:00 A.M. EST) - The South Pole of the earth will be tilted toward the Sun, which will have reached its southernmost position in the sky and will be directly over the Tropic of Capricorn at 23.44 degrees south latitude.

26th • Deadline for newsletter submissions for the January 2017 edition of Observations.

CCAS Original Astrophotography

by Steve Leiden, CCAS Member



Messier 22 or NGC 6656 is a globular cluster located in Sagittarius. Discovered in 1665 by Abraham Ihle, it was included in Charles Messier's catalog in 1764. It's low on our horizon, diminishing its true apparent brightness of many hundreds of thousands of stars. Rivals M13 in Hercules as the brightest globular in the northern hemisphere. Photographed through a Celestron Ultima11 on a CGEM-DX mount using 5 unguided 30 second sub-exposures taken with a Canon 450D using BackyardEOS, an inexpensive full function image capture program for Canon DSLRs. The images were calibrated, preprocessed, aligned/stacked and post-processed using Nebulosity V4.1.

Minutes from the October 11, 2016, CCAS Meeting

by Barb Knabb, CCAS Librarian

- Approximately 28 members and guests were in attendance.
- Unfortunately, due to Hurricane Matthew, science fiction author Jack McDevitt and his wife were unable to attend our meeting.
- Don Knabb gave an overview of upcoming observing events for the club and presented the highlights of the night sky.
- Pete Kellerman informed everyone about the upcoming launch from Wallops Island.
- Roger Taylor presented Don Knabb with the Astronomical League Binocular Double Star award.
- Frank Angelini presented his work on Sudden Ionosphere Disturbance Monitoring.

CCAS Original Astrophotography

by Dave Hockenberry, CCAS Program Chair

NGC 1961, or Arp 184. Image acquired with Hyperion 12.5" telescope and QSI 583wsg camera, 25 x 15 minute Lum, 12 X 10 minute Red Green and Blue Astro-Don Gen 2 filter images each. Guiding with Lodestar X2 camera off-axis and SX AO active optics unit. Image capture and observatory control with MaxIm DL. Images calibrated, Lum deconvolution and RGB color combine in CCDStack. Further adjustments in Photoshop CS5. Arp 184 lies about 174 million light years distant, and makes the Arp catalog because of its highly distorted arms. How these distortions came about is unknown, as Arp 184 has no nearby companion galaxies to account for them. Located in the Northern Constellation of Camelopardalis.

November 2016 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on November 8, 2016, starting at 7:30 p.m. The meeting will be held in Room 112, Merion Science Center (former Boucher Building), West Chester University. Our speaker will be CCAS Member Don Knabb. His presentation will be "The Scale of the Universe."

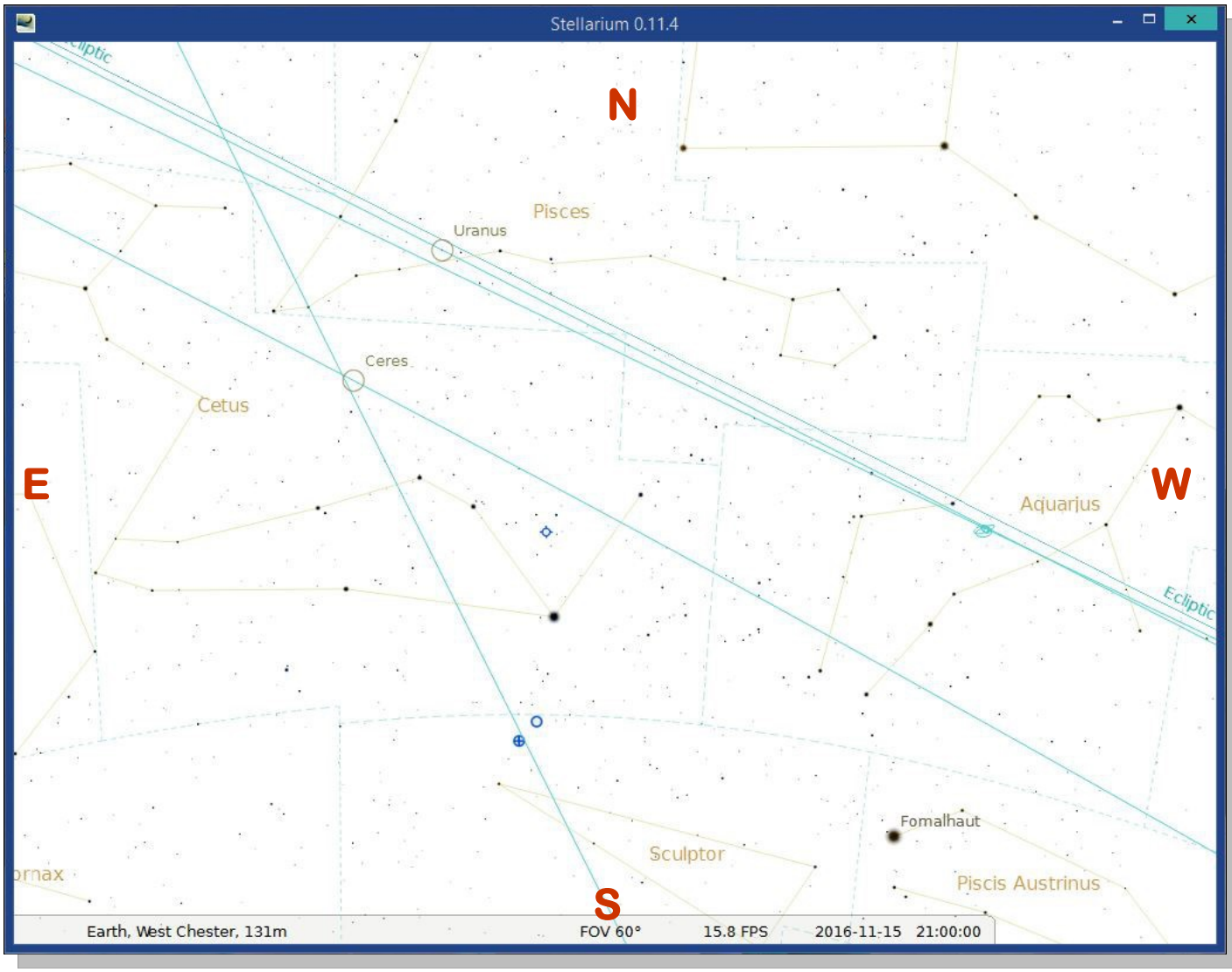
Please note that inclement weather or changes in speakers' schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

As for future meetings, we are looking for presenters for our spring 2017 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, 2016 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
11/01/2016	7:02 a.m. EDT	7:30 a.m. EDT	5:58 p.m. EDT	6:26 p.m. EDT	10h 27m 29s
11/15/2016	6:13 a.m. EST	6:46 a.m. EST	4:44 p.m. EST	5:13 p.m. EST	9h 57m 45s
11/30/2016	6:33 a.m. EST	7:03 a.m. EST	4:36 p.m. EST	5:06 p.m. EST	9h 33m 33s

Moon Phases					
First Quarter	1107/2016	2:51 p.m. EST	Full Moon	11/16/2016	8:52 a.m. EST
Last Quarter	11/21/2016	3:33 a.m. EST	New Moon	11/29/2016	7:18 a.m. EST

November 2016 Observing Highlights
by Don Knabb, CCAS Treasurer & Observing Chair

2	**The Moon is near Saturn and Venus**
5/6	**The crescent Moon is near Mars**
6	**Daylight Saving Time ends, 2:00 AM, turn clocks back one hour**
6	**The Lunar X is visible**
7	**First quarter Moon**
14	**Full Moon, the Beaver Moon, a "super Moon"**
14/15	**The Moon is near Aldebaran and the Hyades**
17	**The Leonid meteor shower peaks near 5:00 a.m.**
21	**Last Quarter Moon**
29	**New Moon**

The best sights this month: It is wonderful to see bright Venus shining in the west just after sunset, once again fulfilling its role as "the evening star". Then on the 6th we have an opportunity to see the elusive Lunar X and on the 14th we have the largest Full Moon of 2016. In fact, it is the largest of any time between 1976 and 2020!

Mercury: Late in the month Mercury sneaks up from the glow of the sunset and on November 23rd Saturn will be to the upper right of Mercury about 20 minutes after sunset. Binoculars will help you find this pairing of planets in the fading glow of the setting Sun.

Venus: Venus has finally gotten high enough to be easily seen after sunset and by the end of November it will be above the horizon a full 3 hours after sunset. And oh is it bright, shining at magnitude -4.1!

Mars: Mars continues to give us a nice show but as if falls behind it grows dimmer and shines at only magnitude +0.5. Nonetheless it still shines with that nice red glow among the stars.

Jupiter: The king of the planets is now in the pre-dawn sky and by the end of the month will rise around 2:30 a.m.

Saturn: The ringed planet is falling further into the sunset as November progresses and by the third week of the month it is all but invisible to the naked eye.

Uranus and Neptune: Uranus was at opposition in mid-October, and it was quite a sight in the eyepiece of a telescope! Both gas giants can be viewed a few hours after sunset. A sky map can be found at the Sky and Telescope magazine website to help you locate these distant planets.

The Moon: Full Moon occurs on November 14th. This full Moon is often referred to as 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. It is sometimes also referred to as the Frosty Moon.

This Full Moon is the closest lunar perigee of 2016 and therefore the largest Full Moon of the year. It truly is a "super Moon".

At the start of the month the thin crescent Moon joins Venus and Saturn in the evening sky, then on the 14th and 15th it passes near the Hyades cluster in the constellation Taurus the Bull.

Constellations: During November the Great Square of Pegasus is 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: My list of deep sky objects for November starts with M31, the Andromeda Galaxy. After gazing at those billions and billions of stars (no, Carl Sagan never did actually say that!) I look high in the sky toward the Double Cluster in Perseus. Then I gaze upon the jewels of the sky, the Pleiades cluster and after that head east to the open

(Continued on page 10)

Through the Eyepiece: Messier 34, the Spiral Cluster

by Don Knabb, CCAS Treasurer & Observing Chair

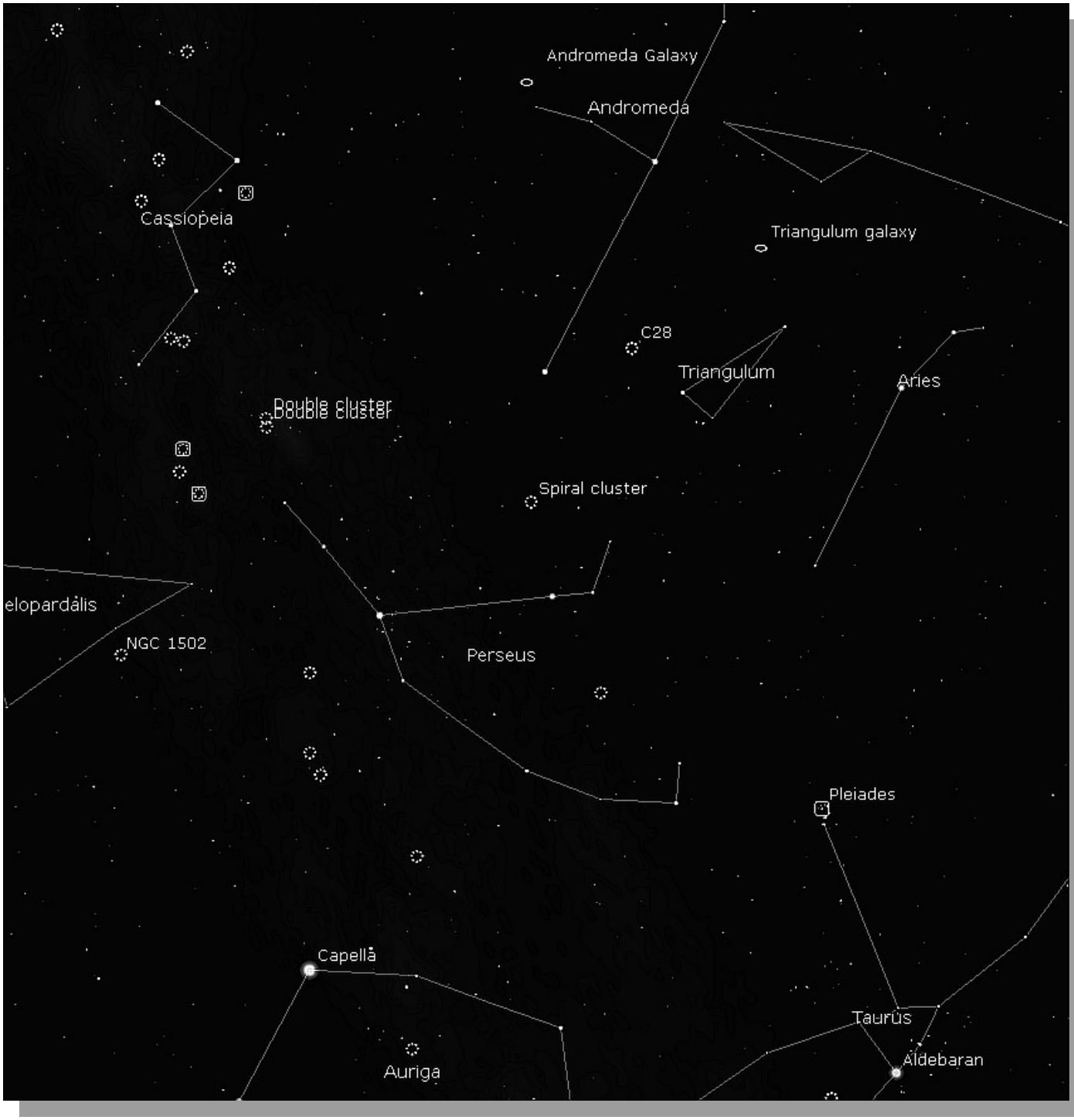


Image made from Stellarium

While you are cruising around the area of the sky that includes the Andromeda Galaxy, the Double Cluster in Perseus and the Pleiades in Taurus, look for Messier 34, often called *The Spiral Cluster*, an open cluster just to the northwest of the famous variable star Algol in Perseus.

An open cluster is a group of up to a few thousand stars that were formed from the same giant molecular cloud and are still loosely gravitationally bound to each other in contrast

(Continued on page 7)

Spiral Cluster (cont'd)

(Continued from page 6)

to globular clusters which are very tightly bound by gravity.

Messier 34 (also known as M 34 or NGC 1039) is an open cluster in the constellation Perseus. It was probably discovered by Giovanni Batista Hodierna before 1654 and was included by Charles Messier in his catalog of comet-like objects in 1764. Messier described it as, "A cluster of small stars a little below the parallel of γ (Andromendae). In an ordinary telescope of 3 feet one can distinguish the stars."

M34 can be found with the naked eye under good conditions as a faint nebulous patch. It is probably beyond perception in Chester County skies without binoculars. But it is resolved into stars even in 10x50 binoculars and is best at low magnifications in telescopes. About 20 brighter stars, filling a 10' area, are surrounded by a larger number of fainter outlying members. Larger amateur instruments show a total of about 80 stars.

There are two stellar arcs visually apparent under low power that gave rise to the name "Spiral Cluster." Many of the stars are arranged in pairs. The most notable is the optical double h 1123 (cataloged by John Herschel) near the cluster's center, and Otto Struve 44 near the southeastern edge. This double was discovered by Otto Struve in 1840 with a 15-inch refractor.

Open clusters are very important objects in the study of stellar evolution. Because the stars are all of very similar age and chemical composition, the effects of other subtler variables on the properties of stars are much more easily studied than they are for isolated stars. A number of open clusters, such as the Pleiades, Hyades or the Alpha Persei Cluster are readily visible to the naked eye. Some others, such as the Double Cluster, are barely perceptible without instruments,

(Continued on page 9)

Image credit: CCAS Member Pete La France

One Incredible Galaxy Cluster Yields Two Types of Gravitational Lenses

by Dr. Ethan Siegel

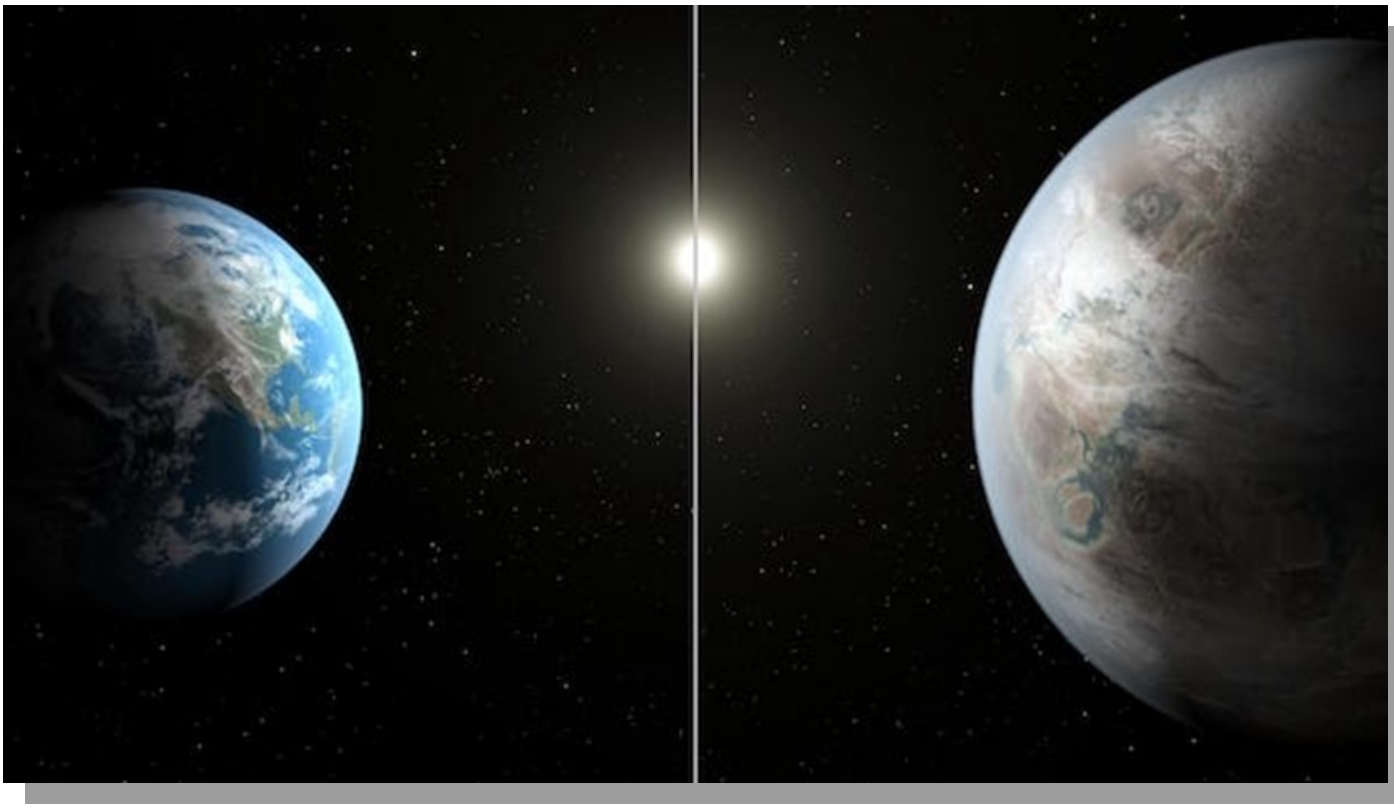
Just 25 years ago, scientists didn't know if any stars—other than our own sun, of course—had planets orbiting around them. Yet they knew with certainty that gravity from massive planets caused the sun to move around our solar system's center of mass. Therefore, they reasoned that other stars would have periodic changes to their motions if they, too, had planets.

This change in motion first led to the detection of planets around pulsars in 1991, thanks to the change in pulsar timing it caused. Then, finally, in 1995 the first exoplanet around a normal star, 51 Pegasi b, was discovered via the "stellar wobble" of its parent star. Since that time, over 3000 exoplanets have been confirmed, most of which were first discovered by NASA's Kepler mission using the transit method. These transits only work if a solar system is fortuitously aligned to our perspective; nevertheless, we now know that planets—even rocky planets at the right distance for liquid water on their surface—are quite common in the Milky Way.

On August 24, 2016, scientists announced that the stellar wobble of Proxima Centauri, the closest star to our sun, indicated the existence of an exoplanet. At just 4.24 light years away, this planet orbits its red dwarf star in just 11 days, with a lower limit to its mass of just 1.3 Earths. If verified, this would bring the number of Earth-like planets found in their star's habitable zones up to 22, with 'Proxima b' being the closest one. Just based on what we've seen so far, if this planet is real and has 130 percent the mass of Earth, we can already infer the following:

- It receives 70 percent of the sunlight incident on Earth, giving it the right temperature for liquid water on its surface, assuming an Earth-like atmosphere.
- It should have a radius approximately 10 percent larger than our own planet's, assuming it is made of similar ele-

(Continued on page 9)



An artist's conception of the exoplanet Kepler-452b (R), a possible candidate for Earth 2.0, as compared with Earth (L). Image credit: NASA/Ames/JPL-Caltech/T. Pyle.

Space Place (Cont'd)

(Continued from page 8)

ments.

- It is plausible that the planet would be tidally locked to its star, implying a permanent 'light side' and a permanent 'dark side'.
- And if so, then seasons on this world are determined by the orbit's ellipticity, not by axial tilt.

Yet the unknowns are tremendous. Proxima Centauri emits considerably less ultraviolet light than a star like the sun; can life begin without that? Solar flares and winds are much greater around this world; have they stripped away the atmosphere entirely? Is the far side permanently frozen, or do winds allow possible life there? Is the near side baked and barren, leaving only the 'ring' at the edge potentially habitable?

Proxima b is a vastly different world from Earth, and could range anywhere from actually inhabited to completely unsuitable for any form of life. As 30m-class telescopes and the next generation of space observatories come online, we just may find out!

Looking to teach kids about exoplanet discovery? NASA Space Place explains stellar wobble and how this phenomenon can help scientists find exoplanets: http://spaceplace.nasa.gov/barycenter/en/

*This article is provided by **NASA Space Place.** With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit **spaceplace.nasa.gov** to explore space and Earth science!*

Spiral Cluster (Cont'd)

(Continued from page 7)

while many more can be seen in binoculars or telescopes.

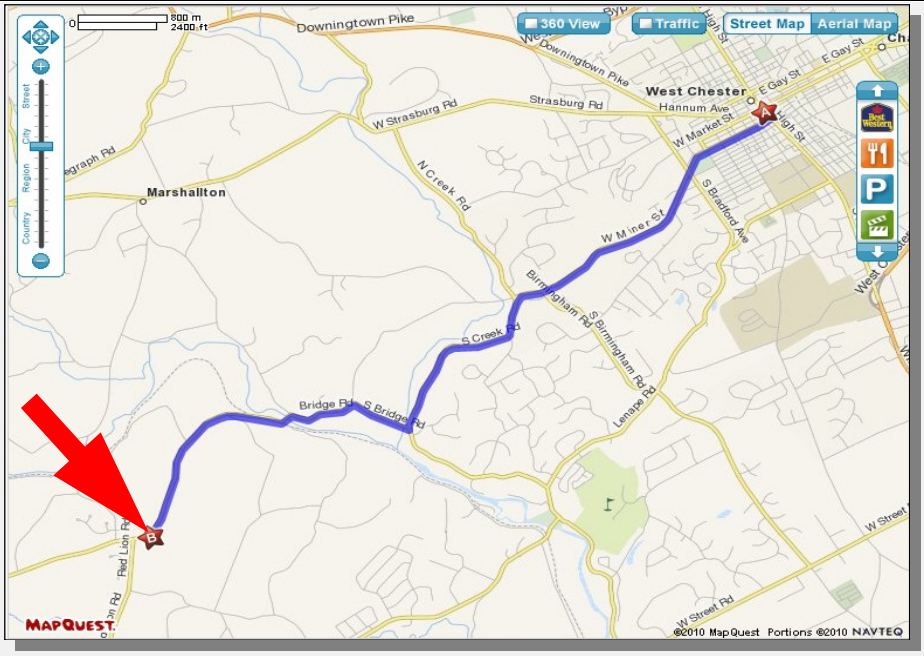
See page 7 for a picture of M 34 taken by CCAS member Pete LaFrance. You can view more of Pete's astrophotography at http://www.plafrance.org/.

So add M 34 to your observing list for November. It is not one of the more famous star clusters but it is a beautiful cluster worthy of your attention.

Information credits:

http://www.seds.org/messier/m/m034.html
http://en.wikipedia.org/wiki/Messier_34
http://en.wikipedia.org/wiki/Open_clusters
http://darkhorseobservatory.org

CCAS Directions



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

BRC 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 Red Clay Alliance

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Red Clay Alliance.

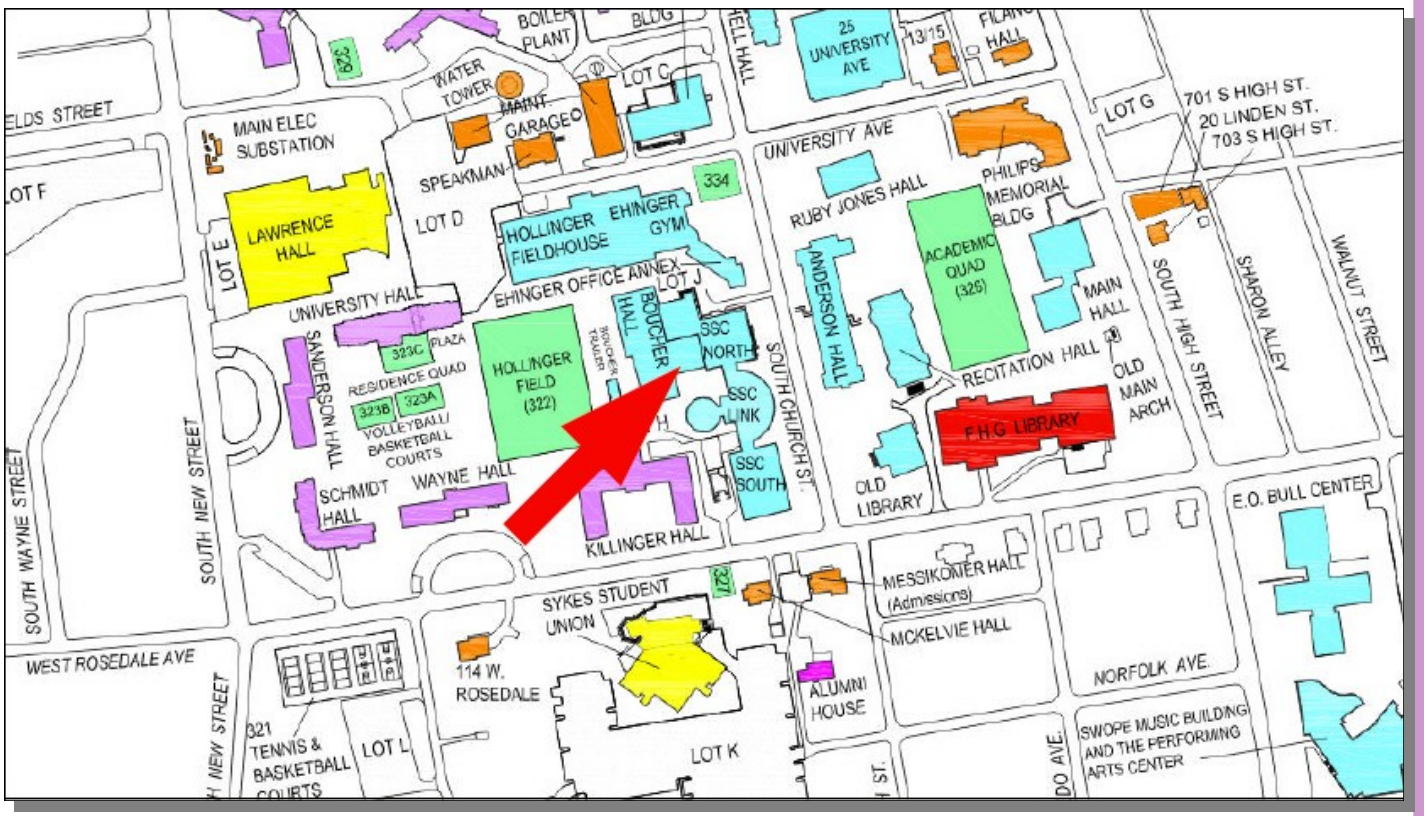
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route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

(Continued from page 5)

clusters of Auriga, M36, M37 and M38. It doesn't get much better than this until Orion is high in the sky this winter.

Comets: There are no bright comets in the sky during November.

Meteor showers: The Leonid meteor shower peaks in the early morning hours of November 17th. But with Full Moon having been only 3 days earlier we will only see the brightest meteors.

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

Oct. 2016 Financial Summary

Beginning Balance	$2,390
Deposits	$79
Disbursements	$460
Ending Balance	$2,009

New Member Welcome!

Welcome new CCAS member Jessica Johanson from Kennett Square, PA. We're glad you decided to join us under the stars! Clear skies to you!

On the cover: M8 imaged by Don Knabb with a Canon 7D DSLR attached to a Televue 127is refractor which was mounted on a Losmandy G-11 equatorial mount guided by a Lodestar guide camera. Approximately 20 images with an exposure time of 1 minute each were captured with Maxim DL 6 Pro directly into a PC. Image processing was done with CCD stack.

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

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"!

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!

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

★ ★ ★ ★ ★

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

Phone: **484-291-1084**

https://www.lighthouse-lights.com/landscape-lighting-design/pa-west-chester/

Local Astronomy-Related Stores

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

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

★ ★ ★ ★ ★

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
21103 Striper Run
Rock Hall, MD 21661

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 (410) 639-4329 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 410-639-4329
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**
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