Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 23, No. 8 *Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009* *August 2015*

In This Issue

Membership Renewals Due

08/2015	Buki Knabb Family Lurcott, L.
09/2015	Catalano-Johnson & Family Lurcott, E.
10/2015	Baran Conrad Rosenblatt, Harriert Rosenblatt, Herb

Once in a Blue Moon

Full Moon, by Don Knabb. See pg. 7 for more details about photograph.

Important August 2015 Dates

6th • Last Quarter Moon, 10:02 p.m.

12th-13th • Perseid Meteor Shower peaks.

14th • New Moon, 10:53 a.m.

22nd • First Quarter Moon, 3:31 p.m.

29th • Full Moon, 2:35 p.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, August 8, 2015**. CCAS Special Observing Session at Bucktoe Creek Preserve, near Kennett Square, PA. The observing session is scheduled for 8:30 to 10:00 PM.

☼ **Friday, September 11, 2015**. CCAS Special Observing Session at Nottingham County Park, Nottingham, PA.

☼ **Saturday, September 19, 2015**. CCAS Special Observing Session at Hoopes Park, West Chester, PA.

Summer 2015 Society Events

August 2015

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.

7th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA. The observing session starts at sunset.

8th • CCAS Special Observing Session at Bucktoe Creek Preserve. The observing session is scheduled for 8:30 to 10:00 PM.

13th • Perseid Meteor Shower Peaks.

13th-14th • The von Kármán Lecture Series: Drought, Are We In or Out?, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

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

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

29th • Full Moon; Super Moon.

September 2015

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.

8th • CCAS Monthly Meeting, Merion Science Center, Rm 112, West Chester University. The meeting starts at 7:30 p.m.

10th-11th • The von Kármán Lecture Series: The Birth of Planets Around the Sun and Other Stars, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

11th • CCAS Special Observing Session at Nottingham County Park, Nottingham, PA.

18th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA. The observing session starts at sunset.

19th • CCAS Special Observing Session at Hoopes Park, West Chester, PA.

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

23rd • Autumnal Equinox, 4: 21 AM EDT: First day of fall.

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

CCAS Summer Picnic

by Don Knabb, CCAS Observing Chair & Treasurer

Many thanks to all the members and families who attended the annual picnic on Saturday, July 25th. The weather cooperated and we were able to set up founder Ed Lurcott's home-made scope for some evening viewing of Saturn and the moon.

September 2015 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on September 8, 2015, starting at 7:30 p.m. The meeting will be held in Room 112, Merion Science Center (former Boucher Building), West Chester University. CCAS President Roger Taylor will welcome members and the general public to the first meeting in our 2015-2016 season.

At this time we have not finalized the speaker for the meeting, but will notify members and the general public with updated information on the CCAS website and in future editions of the Observations newsletter.

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 2015-2016 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Nightscape: A Light and Sound Experience by Klip Collective at Longwood Gardens

by Don Knabb, CCAS Observing Chair & Treasurer

One of Don's original photographs taken at the Nightscape exhibition at Longwood Gardens

Let me jump right to the main thought I want to share about the Nightscape exhibition at Longwood Gardens: GO SEE THIS EXHIBIT! Barb and I experienced Nightscape recently and I found it to be a truly magical experience.

Here is how Longwood describes the exhibit: *Nightscape: A Light and Sound Experience by Klip Collective* transforms our Gardens into a living canvas where light dances with shadow, music fills the air, and your imagination soars. When the sun sets, your journey begins. Experience a new kind of beauty as you immerse yourself in the sights, sounds, and spectacle of Longwood after dark. *Wednesdays through Saturdays, Now–October 31, 2015.*

When we went recently the switch was not thrown until 9 p.m. because it needs to be dark, or nearly so, to enjoy the exhibit. If you get there early you can wander the world-class gardens, or grab a Victory beer at the beer garden just outside the café. I imagine as sunset becomes later they will start the lights and sounds earlier.

I suggest you start in the Conservatory as we did. You can really start anywhere, and the entire exhibit is wonderful, but the several displays in the Conservatory are not on the same scale as the outdoor exhibits. Then head back toward the entrance past the topiary and prepare to be amazed.

From there take the long path toward the lake. Walking down

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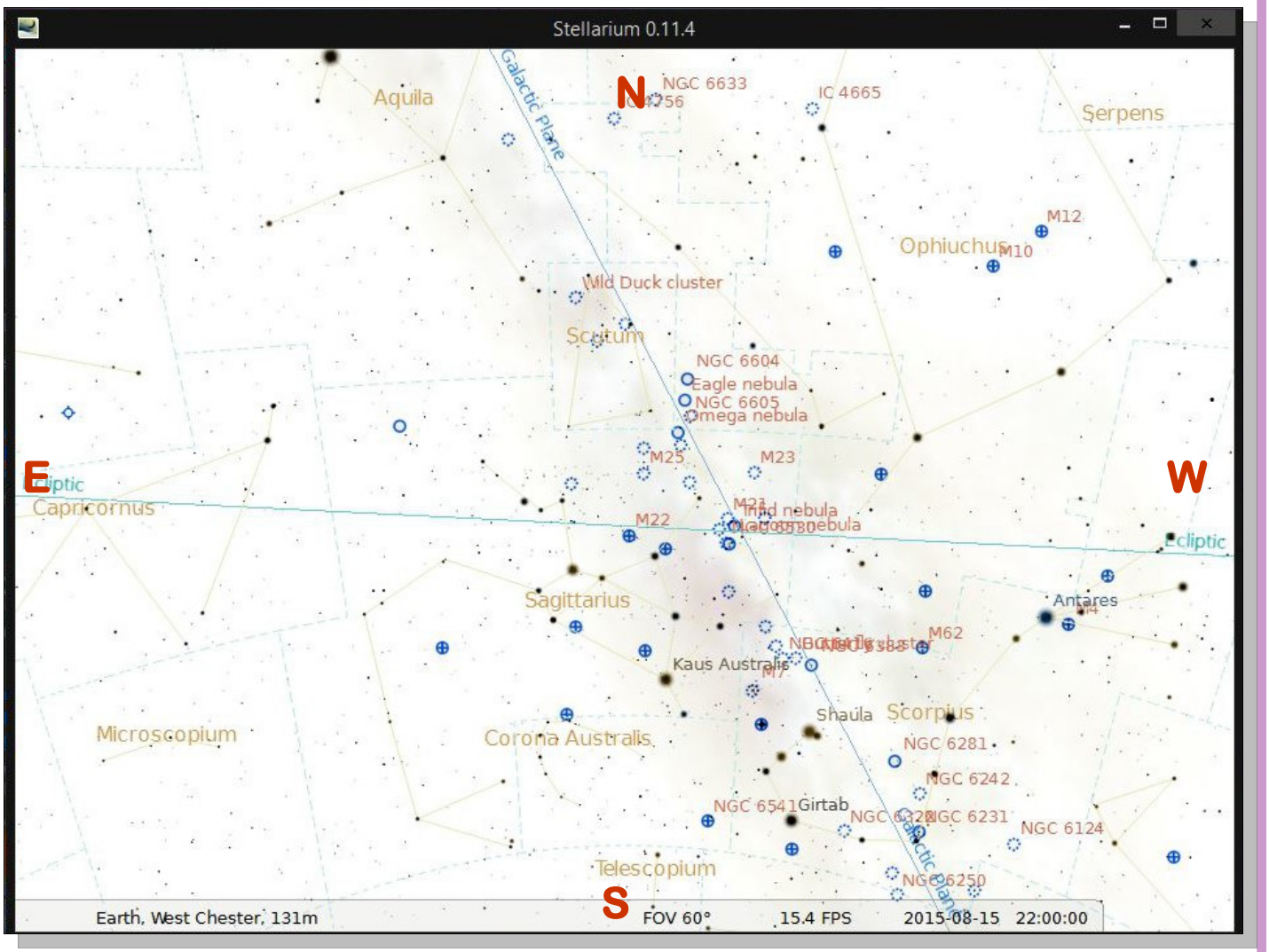
The Sky Over Chester County

August 15, 2015 at 10:00 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
8/01/2015	5:29 a.m. EDT	5:59 a.m. EDT	8:14 p.m. EDT	8:45 p.m. EDT	14h 15m 33s
8/15/2015	5:43 a.m. EDT	6:12 a.m. EDT	7:58 p.m. EDT	8:26 p.m. EDT	13h 45m 25s
8/31/2015	5:59 a.m. EDT	6:27 a.m. EDT	7:34 p.m. EDT	8:02 p.m. EDT	13h 06m 44s

Moon Phases					
Last Quarter	8/06/2015	10:02 p.m. EDT	New Moon	8/14/2015	10:53 a.m. EDT
First Quarter	8/22/2015	3:31 p.m. EDT	Full Moon	8/29/2015	2:35 p.m. EDT

August 2015 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

6	**Last Quarter Moon**
12/13	**The Perseid meteor shower peaks**
14	**New Moon**
16	**Mercury is near the thin crescent Moon**
21	**The Lunar X is visible around 10 p.m.**
22	**First Quarter Moon, it is near Saturn**
22	**The Lunar Straight Wall is visible**
24	**The Moon occults star cluster M23 just before midnight**
29	**Full Moon, the Sturgeon Moon**

The best sights this month: Saturn rules the sky during August. But the Moon has a lot to offer this month when the Lunar X is visible on August 21st and then the Moon occults the open star cluster M23 just before midnight on August 24th. But the most exciting event is the annual Perseid Meteor Shower on August 12/13. The conditions are excellent this year with no Moon to wash away the shooting stars.

Mercury: Mercury can be seen close to departing Jupiter as the glow of the sunset fades on August 6th and 7th.

Venus: The "evening star" dives into the sunset at mid-month, then jumps into the pre-dawn sky for many months to come.

Mars: To see the red planet one needs to get up before dawn when Mars rises about 2 hours before the Sun by month's end.

Jupiter: Jupiter is hard to find early in August as it falls into the humid summer air just as the sky darkens after sunset. Then we will miss the king of the planets as it slips behind the Sun on August 26th to become a pre-dawn object in September.

Saturn: The ringed planet rules the night sky during August as the only bright planet visible when the sky becomes fully dark. With the rings tilted 24 degrees it is a wonderful sight to behold!

Uranus and Neptune: Neptune reaches opposition on August 31st so it is best observed a few hours after midnight. Uranus is highest in the sky in the hours just before dawn. I think I'll wait until these gas giants are visible at a more civilized hour to find them in the inky blackness!

The Moon: Full moon occurs on August 29th. This Full Moon is called the Full Sturgeon Moon by Native Americans. The fishing tribes are given credit for the naming of this Moon, since sturgeon, a large fish of the Great Lakes were most readily caught during this month. A few tribes knew it as the Full Red Moon because as the Moon rises it appears reddish through the sultry haze of summer.

We have an excellent opportunity to see the elusive Lunar X on August 21st around 10 p.m. Do not miss this brief apparition formed by the Sun illuminating the peaks of several mountains during sunrise on the Moon.

Another fun event to observe occurs on August 24th when the Moon occults the open star cluster M23 around midnight.

Constellations: The warm nights and bright stars of August make for some great observing opportunities. The Summer Triangle and all its treasures are shining overhead and if we get a good clear night the Milky Way arches overhead like the backbone of the sky. The Dipper is holding water and Cassiopeia is climbing up the other side of the sky. As the night gets late the Great Square of Pegasus is easily visible so grab your binoculars and look for our neighbor galaxy Andromeda.

Messier/deep sky: M13 and M92, bright globular clusters in Hercules are nearly overhead so they are in a great position for viewing with binoculars or a telescope. Not far away is M57, the Ring Nebula in Lyra. This is a fairly faint object that is best viewed with averted vision. Do not miss the southern Messier objects in Scorpius and Sagittarius while we have the chance to see them. That part of the sky is filled with incredible objects that are visible for only a short time from Chester County.

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Through the Eyepiece: Open Cluster M23 Occultation by the Moon

by Don Knabb, CCAS Treasurer & Observing Chair

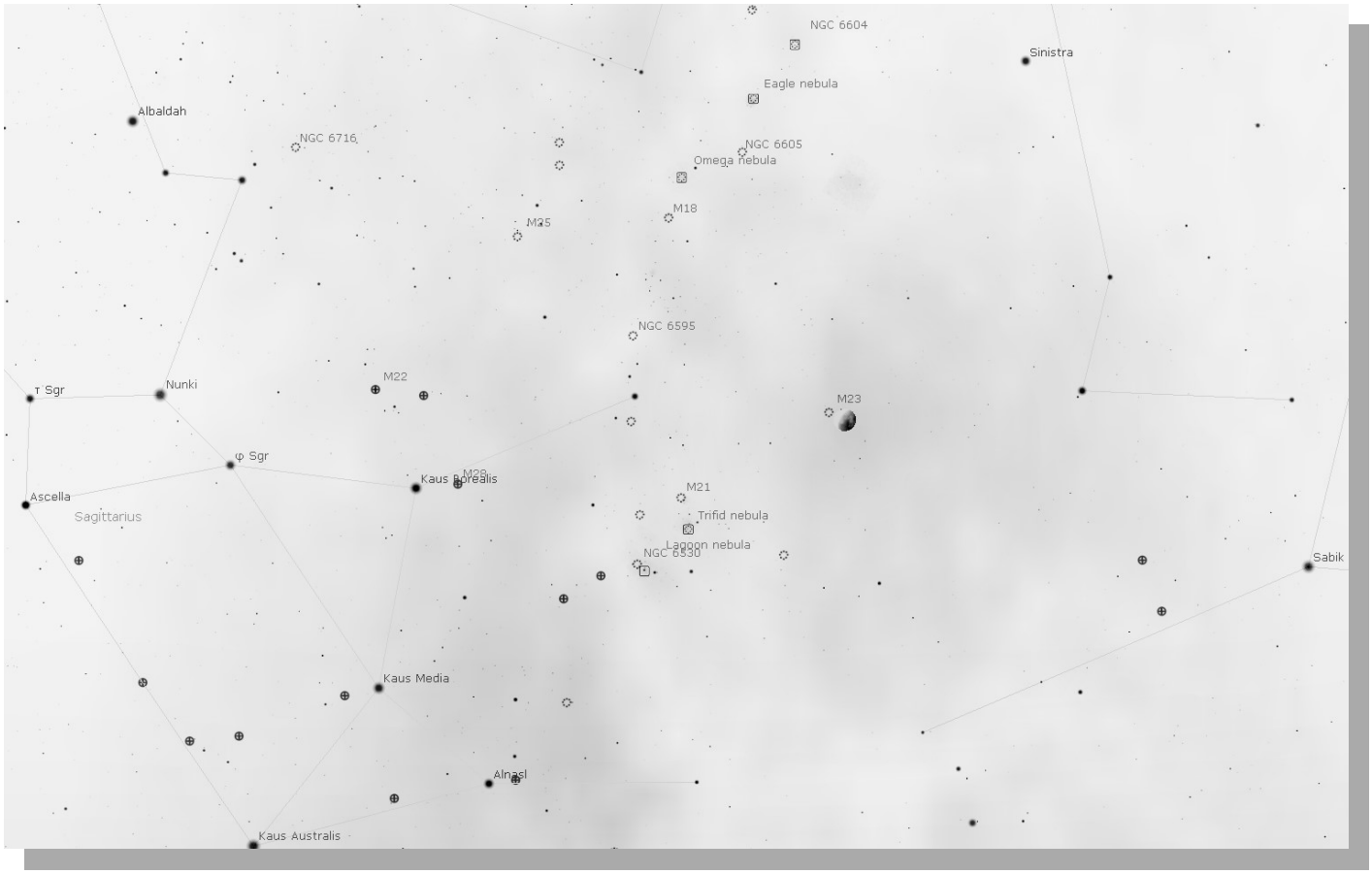

Image credit: Stellarium.org

Messier 23, also known as NGC 6494, is an open cluster in the constellation Sagittarius. It is not a flashy object like so many of the deep sky objects in the southern constellations, but is more of a stellar scattering of freckles across the face of the sky. It takes a position at the center of the stage on August 24th when it is occulted (covered) by the Moon.

An open cluster is a group of up to a few thousand stars that were formed from the same giant molecular cloud and have roughly the same age. More than 1,100 open clusters have been discovered within the Milky Way galaxy, and many more are thought to exist. They are loosely bound to each other by mutual gravitational attraction and become disrupted by close encounters with other clusters and clouds of gas as they orbit the galactic center. Open clusters generally survive for a few hundred million years. In contrast, the more massive globular clusters of stars exert a stronger gravitational attraction on their members, and can survive for many billions of years.

An occultation is tremendously fun to watch. As the night progresses the entire sky is slowly rotating around the North Star as the Earth rotates in the opposite direction. And although the Moon shares this motion, it has a motion of its own around our planet so it travels eastward against the background of stars. As an object approaches the dark western edge of the Moon stars "wink out" as the Moon comes between us and them. The excitement is incredible!

M23 is not difficult to find using the chart that I created using Stellarium planetarium software. There are numerous other deep sky objects that you can use to "star hop" to M23. But an even easier way to find M23 is to wait until around 11:00 p.m. on August 24th when M23 will be just a bit above and to the left of the waxing gibbous Moon.

The occultation begins around 11:30 p.m. according to a simu-

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Eyepiece (Cont'd)

M23 Credit: N.A.Sharp, REU program/AURA/NOAO/NSF

(Continued from page 6)

lation of the event using Stellarium. And if you have a low western horizon you can see M23 come out from behind the Moon around 1:00 a.m.

Use a telescope with a low power eyepiece (a high number) or a pair of binoculars mounted on a tripod to see this event. At too high a magnification you will see only a part of the Moon and M23 will become lost among the many background stars of the Milky Way.

The true-color picture above was created from six images taken with the Burrell Schmidt telescope of Case Western Reserve University's Warner and Swasey Observatory. The images were taken in July 1995 during the Research Experiences for Undergraduates (REU) program.

This neat and tidy galactic star cluster was one of the original discoveries of Charles Messier. Here are some of his notes: "In the night of June 20 to 21, 1764, I determined the position of a cluster of small stars which is situated between the northern extremity of the bow of Sagittarius and the right foot of Ophiuchus, very close to the star of sixth magnitude, the sixty-fifth of the latter constellation [Oph], after the catalog of Flamsteed: These stars are very close to each other."

While William Herschel did not publish his observations of Messier's objects, he was still an avid observer, so of course, he had to look! Here is what is found in his personal notes: "A cluster of beautiful scattered, large stars, nearly of equal magnitudes (visible in my finder), it extends much farther than the field of the telescope will take in, and in the finder seems to be a nebula of a lengthened form extending to about half a degree."

So if you can stay up a bit late on August 24th, grab your telescope or binoculars and watch the show. I guarantee it will be better entertainment than anything on the television!

Information credits:

Dickinson, Terence 1996. Summer Stargazing. Firefly Books
Stellarium planetarium software
SkySafari Pro iPad app
http://www.universetoday.com/32649/messier-23/
http://www.noao.edu/image_gallery/html/im0634.html

On the Cover

Blue Moon, taken by Don Knabb on July 30, 2015. The actual date of Full Moon was the morning of the 31st, so the fullest moon was the night of the 30th. The photo was taken with a Canon 7D DSLR set to ISO 100 and 1/1000 of a second, through a Televue 127is on a Losmandy G-11 mount.

On the Brightness of Venus

by Dr. Ethan Siegel

Throughout the past few months, Venus and Jupiter have been consistently the brightest two objects visible in the night sky (besides the moon) appearing in the west shortly after sunset. Jupiter is the largest and most massive planet in the solar system, yet Venus is the planet that comes closest to our world. On June 30th, Venus and Jupiter made their closest approach to one another as seen from Earth—a conjunction—coming within just 0.4° of one another, making this the closest conjunction of these two worlds in over 2,000 years.

And yet throughout all this time, and especially notable near its closest approach, Venus far outshines Jupiter by 2.7 astronomical magnitudes, or a factor of 12 in apparent brightness. You might initially think that Venus's proximity to Earth would explain this, as a cursory check would seem to show. On June 30th Venus was 0.5 astronomical units (AU) away from Earth, while Jupiter was six AU away. This appears to be exactly the factor of 12 that you need.

Only this doesn't explain things at all! Brightness falls off as the inverse square of the distance, meaning that if all things were equal, Venus ought to seem not 12 but 144 times brighter than Jupiter. There are three factors in play that set things back on the right path: size, albedo, and illumination. Jupiter is 11.6 times the diameter of Venus, meaning that despite the great difference in distance, the two worlds spanned almost exactly the same angular diameter in the sky on the date of the conjunction. Moreover, while Venus is covered in thick, sulfuric acid clouds, Jupiter is a reflective, cloudy world, too. All told, Ve-

(Continued on page 9)

Image credit: E. Siegel, using the free software Stellarium (L); Wikimedia Commons user TimothyBoocock, under a c.c.-share alike 3.0 license (R). The June 30th conjunction (L) saw Venus and Jupiter pass within 0.4° of one another, yet Venus always appears much brighter (R), as it did in this image from an earlier conjunction.

Space Place (Cont'd)

(Continued from page 8)

nus possesses only a somewhat greater visual geometric albedo (or amount of reflected visible light) than Jupiter: 67 percent and 52 percent, respectively. Finally, while Venus and Jupiter both reflect sunlight toward Earth, Jupiter is always in the full (or almost full) phase, while Venus (on June 30th) appeared as a thick crescent.

All told, it's a combination of these four factors—distance, size, albedo, and the phase-determined illuminated area—that determine how bright a planet appears to us, and all four

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Observing (Cont'd)

(Continued from page 5)

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

Meteor showers: It is again time for the most popular meteor shower of the year, the Perseid meteor shower! This year is a great viewing opportunity because the Moon is new the day after the shower so it will not interfere with the fireballs. My favorite part of this shower is earlier in the evening when you will see fewer shooting stars but you have a good chance of seeing an "Earth grazer" that travels nearly all the way across the sky. Don't miss this shower! When you see a fireball fly cross the sky you will never forget it.

Nightscape (cont'd)

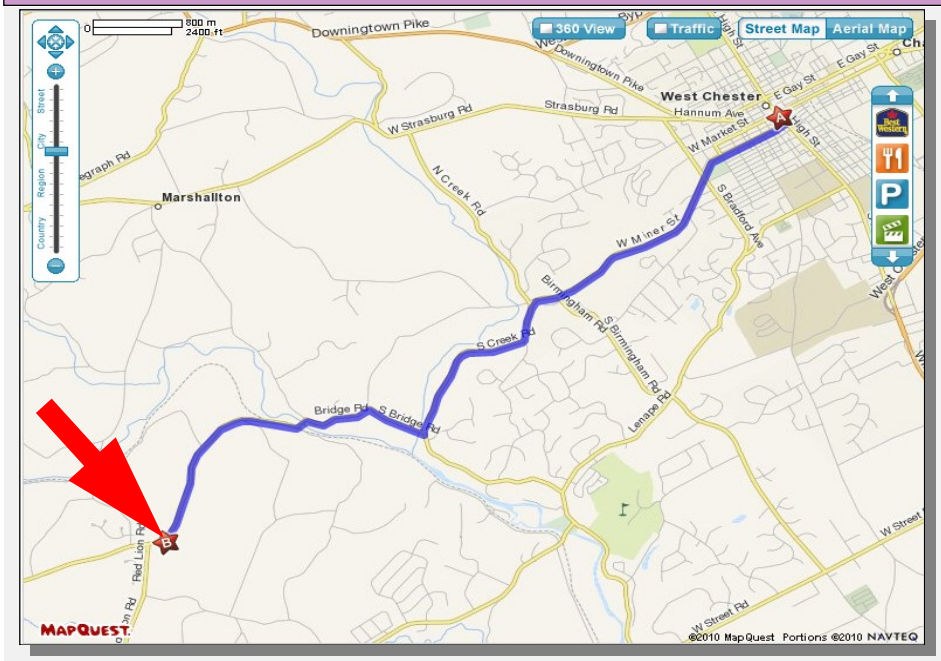
(Continued from page 3)

the path reminded me of the old TV show "Time Tunnel"! At the end of that portion is a nicely illuminated tree, but then continue on to the lake where the trees are filled with about a 10 minute long mind-bending sequence that topped off the evening. As you make your way back there is one more small display.

Pictures do not capture the magic, but I included one anyway.

So don't miss this incredible experience, and let me know if you enjoy it as much as I did.

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.

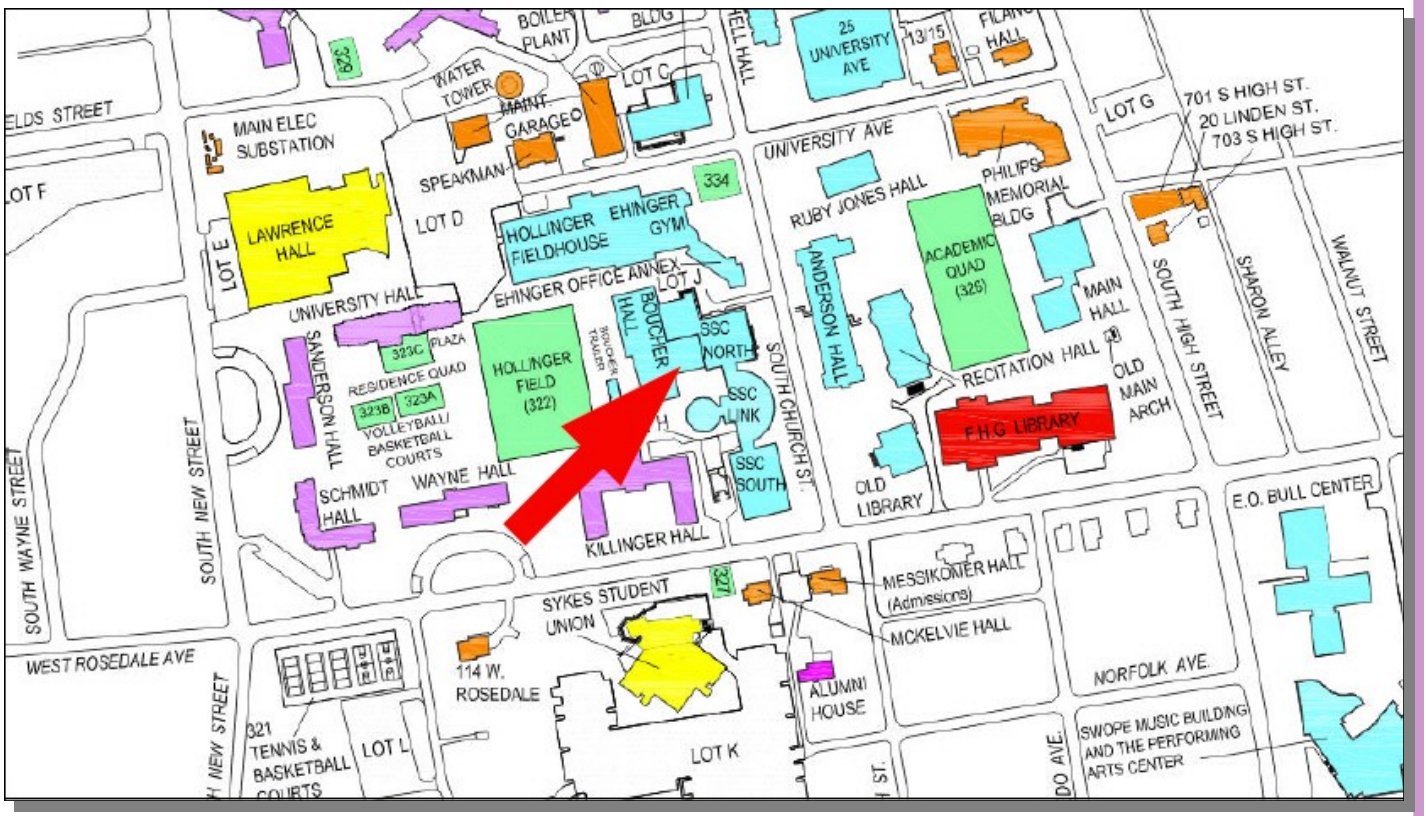
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route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



Space Place (Cont'd)

(Continued from page 9)

need to be taken into account to explain our observations.

Don't fret if you missed the Venus-Jupiter conjunction; three more big, bright, close ones are coming up later this year in the eastern pre-dawn sky: Mars-Jupiter on October 17, Venus-Jupiter on October 26, and Venus-Mars on November 3.

Keep watching the skies, and enjoy the spectacular dance of the planets!

CCAS Membership Information and Society Financials

Treasurer's Report
by Don Knabb

July 2015 Financial Summary

Beginning Balance	$2,211
Deposits	$140
Disbursements	$0
Ending Balance	$2,351

New Member Welcome!

Welcome new CCAS member Sue Johnston from Downingtown, PA. 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

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
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 & 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.**