



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 21, No. 7

Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009

July 2013

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M31, The Andromeda Galaxy

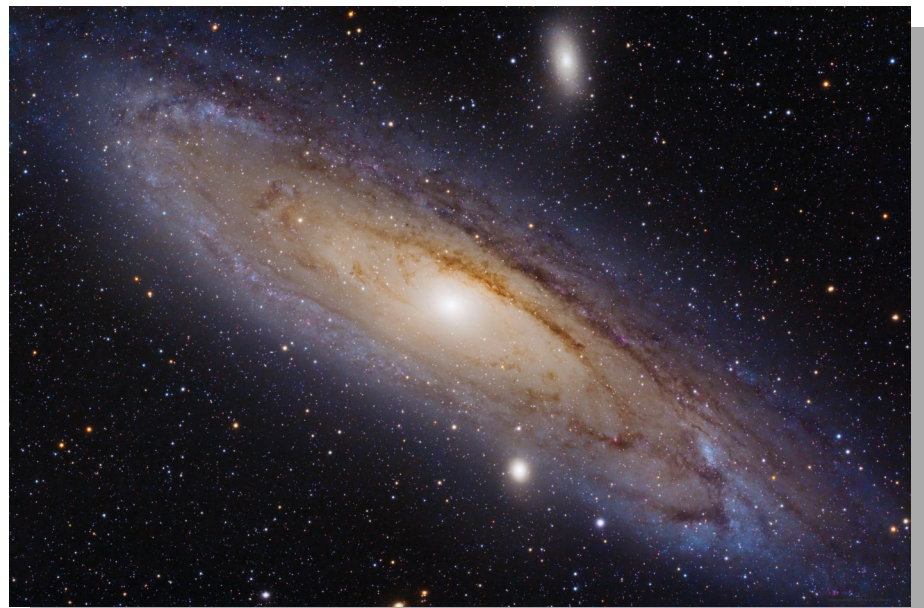


Image courtesy of [Lorenzo Comolli](#)

Important July 2013 Dates

- 8th** • New Moon, 3:15 a.m.
- 15th** • First Quarter Moon, 11:19 p.m.
- 22nd** • Super Full Moon, 2:16 p.m.
- 28th - 29th** • Delta-Aquarid Meteor Shower Peaks.
- 29th** • Last Quarter Moon, 1:44 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.

- ☼ **Friday, July 12, 2013.** CCAS Monthly Observing Session, Myrick Conservancy Center, BVA. The observing session starts at sunset.
- ☼ **Friday, July 26, 2013.** Nottingham Park Star Party. The observing session is from 8:30 to 10:30 p.m.
- ☼ **Friday, July 26, 2013.** Tyler Arboretum Star Party: "How to Read a Star".

Membership Renewals Due

07/2013	Hockenberry / Miller
08/2013	Harp Knabb Lurcott, Linda Zimmer
09/2013	Catalano & Family Lurcott, Ed

Summer 2013 Society Events

July 2013

10th • 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.

12th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA (inclement weather date July 13th). The observing session starts at sunset.

20th • The von Kármán Lecture Series: [Exploring the Extreme Universe with NuSTAR](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the August 2013 edition of [Observations](#).

26th • Nottingham Park Star Party. The observing session is from 8:30 to 10:30 p.m.

26th • Tyler Arboretum Star Party: "How to Read a Star" (inclement weather date August 2, 2013).

26th • Deadline for newsletter submissions for the August 2013 edition of [Observations](#).

27th • CCAS Summer Party at Barb & Don Knabb's house. See page 12 for more details.

August 2013

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.

9th • CCAS Monthly Observing Session, Myrick Conservancy Center, BVA (inclement weather date August 10th). The observing session starts at sunset.

15th • The von Kármán Lecture Series: [Exploring the Extreme Universe with NuSTAR](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

16th • Reservations start for the September 6th planetarium show at the WCU Planetarium. For more information, visit the [WCU Public Planetarium Shows](#) webpage.

20th • Open call for articles and photographs for the September 2013 edition of [Observations](#).

26th • Deadline for newsletter submissions for the September 2013 edition of [Observations](#).

In Memory of Roy Kalinowski

by Dave Hockenberry

One of our own, Roy Kalinowski, lost his battle with cancer on Tuesday, June 11. Roy has been a member of our Society for about 4 years, and in that short time Roy made himself an integral part of our community. He was with his wife and children when he passed, peacefully, in his sleep. He was 54 years old.

Roy first came to us through one of our outreach classes. He had bought a small Newtonian reflector, and was interested in how to use it. After taking Kathy Buczynski's class he joined CCAS and had been a member ever since. Soon after joining Roy was a regular enthu-

(Continued on page 3)



Roy Kalinowski
(1959—2013)

Nicholas's Humor Corner

by Nicholas La Para



Speakers for Autumn 2013 CCAS Meetings

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on September 10, 2013, starting at 7:30 p.m. The meeting will be held in Room 113, Merion Science Center (former Boucher Building), West Chester University. Guest Speaker: Mark Devlin, PhD Physics at the University of Pennsylvania. "Where did Half of the Starlight of the Universe Go?" Discussion of NASA BLAST experiments from high altitude balloon mounted submillimeter wavelength telescopes.

On October 8, 2013, we wel-

come Paul Evenson, PhD from the University of Delaware Physics and Astronomy Department. He will present "The Construction and Operation of the Ice Cube Neutrino Observatory at the South Pole."

Dave Goldberg, PhD from Drexel University Physics and Astronomy, will be our guest speaker at the November 12th meeting. His topic is not settled yet, but will either be about his research in Gravitational Lensing or on his new book

"Symmetry - the Universe in the Rear View Mirror."

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 our meetings in the 2013-2014 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

In Memoriam (Cont'd)

(Continued from page 2)

enthusiasm made our stargazing outings all the more enjoyable.

About 18 months ago, a tumor was discovered in his brain. He underwent treatment including very aggressive courses of chemotherapy. We could tell that it was tough on him, but he never complained. Indeed, he kept coming to our regular meetings and observing sessions when he could. No matter how he felt, he would always respond "Today is a good day."

Roy had a creative bent, and showed up with a unique Alt/Az "turntable" mount he built himself out of wood for his Newtonian. He actually fashioned a clutch mechanism from Plexiglas, felt, wax paper, and dowels. Roy also wrote the "Telescope Tips for Beginners" that we include in our introductory packet for every new member of CCAS. His quiet smile, easygoing manner and infectious

enthusiasm made our stargazing outings all the more enjoyable.

His resilience and courage in the face of his illness was truly remarkable; but by June he was in Hospice care at home. When Don informed me that he had asked Don to return the Radian eyepieces I had given him years ago, well, I knew it was serious

and we wouldn't have him with us much longer. He never would have parted with them otherwise!

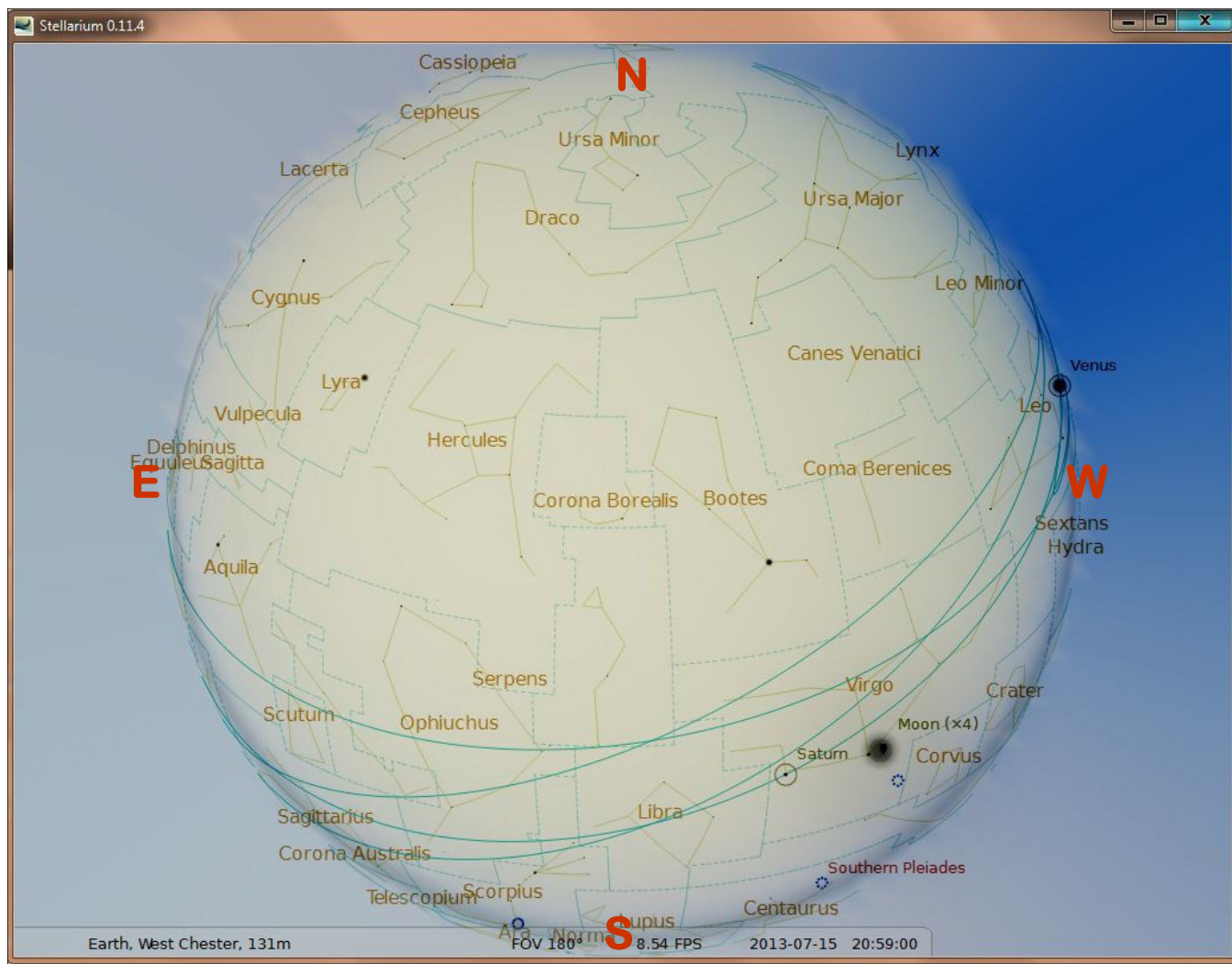
Those of us who knew Roy will cherish the memories we have of him. He was a remarkable man, and will be sorely missed by our membership. He is survived by his wife, Mary Jo, and his children Matthew and Marissa. Our Society has purchased a chair with Roy's name on it for the new West Chester University Planetarium in his memory.

I can think of no more fitting tribute we can make to a man who made our Society, and us, richer by his presence. Let us all keep him in our thoughts and hearts when we "keep looking up."

The Sky Over Chester County

July 15, 2013 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
7/01/2013	5:03 a.m. EDT	5:36 a.m. EDT	8:33 p.m. EDT	9:06 p.m. EDT	14h 57m 22s
7/15/2013	5:13 a.m. EDT	5:45 a.m. EDT	8:28 p.m. EDT	9:00 p.m. EDT	14h 43m 23s
7/31/2013	5:28 a.m. EDT	5:58 a.m. EDT	8:15 p.m. EDT	8:45 p.m. EDT	14h 16m 34s

Moon Phases					
Last Quarter	7/29/2013	1:44 p.m. EDT	First Quarter	7/15/2013	11:19 p.m. EDT
New Moon	7/08/2013	3:15 a.m. EDT	Full Moon	7/22/2013	2:16 p.m. EDT

July 2013 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

July 3	Venus is near the Beehive Cluster
July 8	New Moon
July 15	First-quarter Moon, Spica is nearby
July 16	Saturn shines above the Moon and the Lunar Straight Wall is visible
July 21	Venus and Regulus in Leo are close the next few nights
July 22	Full Moon
July 29	Last Quarter Moon

The best sights this month: Venus and Saturn light up the evening sky during July. I never tire of staring at Saturn for minute after minute in the eyepiece of a telescope. Share this sight with friends and neighbors to give them a memory that will last a lifetime. This time of the year is also our chance to gaze near the center of our home galaxy the Milky Way and all the incredible Messier objects that inhabit that area of the sky.

Mercury: After last month's great viewing of Mercury – we had wonderful views of Mercury and Venus at BVA – the only opportunity to see Mercury during July is in the pre-dawn sky the last week of the month.

Venus: Our sister planet remains low in the sky through July but is easily found as the sky begins to darken. Late in July the gap between Venus and Regulus, the “dot” at the bottom of the backward question mark of Leo the Lion, begins to close. On July 21st they are only 1 ¼ degree apart.

Mars: If you are an early riser you can find Mars and Jupiter very close in the morning sky on July 22nd. Jupiter will be easily visible, but you might need binoculars or a telescope to see dim Mars.

Jupiter: Jupiter inhabits the morning sky for many months to come. You can find the king of the planets near the feet of Gemini late in the month.

Saturn: Saturn is still the highlight of the evening

sky through July. It can be found to the left of Spica high in the south as soon as darkness falls.

Uranus and Neptune: These distant gas giants can be seen a few hours before dawn. I think I'll wait until they are visible at a more civilized hour later this year.

The Moon: Full moon occurs on July 22nd. Native Americans called this the Full Buck Moon because July is normally the month when the new antlers of buck deer push out of their foreheads with coatings of velvety fur. It was also often called the Full Thunder Moon, since thunderstorms are most frequent during this time of year.

Constellations: Fireflies, warm nights and the hazy stars of summer; this is July! This is one of the few months of the year when you can lay a blanket down on the lawn and not be cold, so enjoy it even if it is hot and humid during the day. Arcturus will be setting in the west and the Summer Triangle will be nearly at the zenith. If you sit up for a bit and look to the south you will see the big bug of summer, Scorpius. Then grab your binoculars and scan from Scorpius up the Milky Way through Sagittarius, on to Aquila and Cygnus and beyond!

Messier/deep sky: Globular clusters and nebula rule the summer sky for anyone with a telescope or binoculars. Sagittarius is full of Messier objects such as the Trifid and the Lagoon nebulas. In Scorpius is M4, a globular cluster that is easy to find using Antares as a guide. If you have a low western horizon look for NGC 6231 where the tail of Scorpius turns to the east. This open cluster is called the Northern Jewel Box.

Comets: Comet PanSTARRS continues to be visible but you'll need a dark site and a good sized telescope as the comet has faded to magnitude 9 or 10. There is a sky chart in the July issue of Astronomy magazine that plots the nightly position of the comet among the background stars.

Meteor showers: There is a lot to see for meteor fans during the last week of July. We can see a pre-

(Continued on page 12)

My Personal Encounter with Skylab

by CCAS Member John Conrad

Those of us of “a certain age” well remember America’s first great space station – Skylab. The Saturn rockets were available and in use on Apollo in the late 60s and early 70s, when somebody got a bright idea: how about using the large upper stage (S-IV) as an orbiting platform – a space station? American ingenuity – probably coupled with the profit motive to keep the space dollars flowing to the contractors who did NOT want to see the “fiscal cliff” at the end of the Apollo program – were fully evident in the decision to modify an S-IV launch vehicle stage to be a nice large habitable container for orbiting astronauts. Go-ahead came in 1969. Skylab was launched in May of 1973. That’s pretty much moving at the speed of light compared to how things get planned and executed today.

As things turned out (the reader can easily search out the details on the web), Skylab upon reaching orbit was in somewhat sorry shape – especially in the solar panel / sun shade areas. Far from focusing on the “blame game” and post-mortems, the decision makers turned these problems into opportunities – not only to salvage pretty much the entire mission, but along the way to show the value of ‘man in space,’ notably as an on-site troubleshooter and repairman.



Skylab (Image courtesy nasa.gov)

So where did I come in? I wasn’t an astronaut; rather, I was an Air Force aeronautical engineer working at Los Alamos. The three DOE nuclear weapons labs (Los Alamos, Livermore, and Sandia) and the DOD labs and systems engineers were hard-pressed in the years after the early 60’s to sustain and advance an effective and ready nuclear weapons deterrent, without the benefit of full-scale weapons testing (treaty restrictions). One “work-around” was to continue observing the physics and chemistry of effects similar to nuclear detonations in the target environments using high altitude rocket experiments and carefully staged and instrumented observations. The most robust of these test series took place every year or two, utilizing sounding rockets launched from Kauai, Hawaii (Barking Sands) and Alaska (Poker Flat). As the Air Force ‘rocket guy’ assigned to the nu-

clear labs, my role was pretty obvious: Rocket Coordinator. I had many and varied interesting jobs throughout my career, but these series will always stand out for the variety of participants, platforms, and instruments. I won’t try to list the dozen universities, government labs, and military operators who were involved in the months of planning and weeks of execution.

The instruments – every kind of optical and non-optical sensor you can imagine – were deployed in many ground-based locations (telescopes on Mauna Kea, Haleakala, and the western CONUS) and also on airborne platforms such as the NC-135 (modified Boeing 707 with many custom-mounted instruments) [see <http://en.wikipedia.org/wiki/NC-135>].

Why were aircraft of such range, as well as widely separated ground telescopes, needed? The experiments were launched to high altitudes, but not into orbit. The answer is that the experiments employed the earth’s magnetic field which interacted with, contained, and transported the materials injected at high altitudes. In order to observe with instruments at all points of interest, the aircraft would literally fly all over the Pacific, e. g., out of New Zea-

(Continued on page 7)

Skylab (Cont'd)



CCAS Member John Conrad

(Continued from page 6)

land to observe the results at the southern geomagnetic conjugate area and out of Hawaii to observe where the effects traveled above them over the geomagnetic equator, the highest altitudes of the earth's magnetic field lines.

So – finally – where did Skylab come in? Basically it was an opportunistic plan to add this space-borne platform for the rocket experiments planned for late 1973. This would allow observations (by camera only) from the unique perspective of being above the effects, looking down as the orbit took the astronauts overhead at just the right time. As you can see, there would be plenty to keep me and many other “coordinators” across the western US and Pacific quite busy.

The decision to include the Sky-

lab was not an easy one for NASA's decision-makers. Even though NASA was already involved in other aspects of the operation, the Skylab idea faced what could kindly be called “end of life” hurdles. The orbital observations would require flipping Skylab onto its back relative to where its other missions had it oriented at the time. Flipping this huge mass would tax the already “limping” attitude control and stationkeeping systems. Specifically, the attitude control thrusters were running out of gas, and the large control moment gyros (CMGs, whose angular momentum produced torque for station rotation) needed power from batteries / solar panels which were already being challenged. Despite these resource costs and risks, the potential value of this unique orbital perspective carried the day and it was planned to re-orient this massive station when the time

came, during the final Skylab crew's months in orbit.

The night of the experiment arrived. Actually it was closer to dawn on that cold December night in College, Alaska, at our University of Alaska ops center near the Poker Flats rocket launch site. All observers were on station at their various sites – telescopes, aircraft, and the Skylab, which approached right on schedule. The launch and injection experiment went off flawlessly, instruments were operated and observations were made – land, sky, and space!

Being more on the ops team than the science team, I had to wait for results. Weeks passed, and I learned of various successful measurements programs. But only after some months did the word of the Skylab results get to me. I actually heard two versions of the results – or I should correctly say *non-results*. I never asked further and will never know whether the “back was left off the camera” or the “film hadn't been loaded into the camera.”

This surprise ending may at least provide a teachable moment regarding the value of “man vs robot/machine in space,” although I'm not sure who would win this debate. One thing is sure, somebody learned a hard lesson – and we missed a golden opportunity for a unique observation.

High-Energy Spy

by Dr. Martin C. Weisskopf

The idea for the Chandra X-Ray Observatory was born only one year after Riccardo Giacconi discovered the first celestial X-ray source other than the Sun. In 1962, he used a sounding rocket to place the experiment above the atmosphere for a few minutes. The sounding rocket was necessary because the atmosphere blocks X-rays. If you want to look at X-ray emissions from objects like stars, galaxies, and clusters of galaxies, your instrument must get above the atmosphere.

Giacconi's idea was to launch a large diameter (about 1 meter) telescope to bring X-rays to a



focus. He wanted to investigate the hazy glow of X-rays that could be seen from all directions throughout the sounding rocket flight. He wanted to find out whether this glow was, in fact, made up of many point-like objects. That is, was the glow actually from millions of X-ray sources in the Universe. Except for the brightest sources from

nearby neighbors, the rocket instrument could not distinguish objects within the glow.

Giacconi's vision and the promise and importance of X-ray astronomy was borne out by many sounding rocket flights and, later satellite experiments, all of which provided years-, as opposed to minutes-, worth of data.

By 1980, we knew that X-ray sources exist within all classes of astronomical objects. In many cases, this discovery was completely unexpected. For example, that first source turned out to be a very small star in a binary sys-

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Composite image of DEM L50, a so-called superbubble found in the Large Magellanic Cloud. X-ray data from Chandra is pink, while optical data is red, green, and blue. Superbubbles are created by winds from massive stars and the shock waves produced when the stars explode as supernovas.

Space Place (cont'd)

(Continued from page 8)

tem with a more normal star. The vast amount of energy needed to produce the X-rays was provided by gravity, which, because of the small star's mass (about equal to the Sun's) and compactness (about 10 km in diameter) would accelerate particles transferred from the normal star to X-ray emitting energies. In 1962, who knew such compact stars (in this case a neutron star) even existed, much less this energy transfer mechanism?

X-ray astronomy grew in importance to the fields of astronomy and astrophysics. The National Academy of Sciences, as part of its "Decadal Survey" re-

leased in 1981, recommended as its number one priority for large missions an X-ray observatory along the lines that Giacconi outlined in 1963. This observatory was eventually realized as the Chandra X-Ray Observatory, which launched in 1999.

The Chandra Project is built around a high-resolution X-ray telescope capable of sharply focusing X-rays onto two different X-ray-sensitive cameras. The focusing ability is of the caliber such that one could resolve an X-ray emitting dime at a distance of about 5 kilometers!

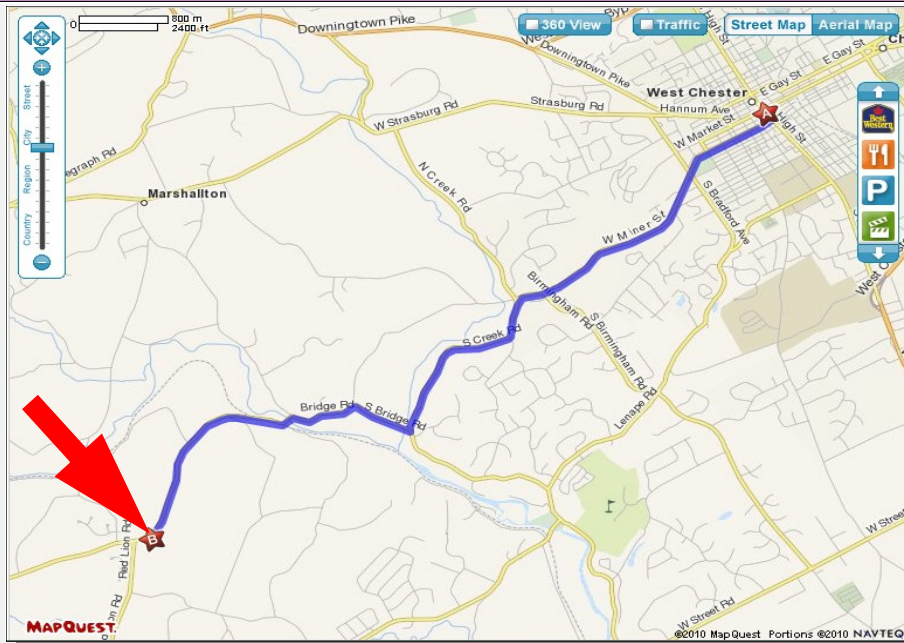
The building of this major scientific observatory has many stories.

Learn more about Chandra at www.science.nasa.gov/missions/chandra.

Take kids on a "Trip to the Land of the Magic Windows" and see the universe in X-rays and other invisible wavelengths of light at spaceplace.nasa.gov/magic-windows.

Dr. Weisskopf is project scientist for NASA's Chandra X-ray Observatory. This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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).

Through the Eyepiece: Messier 6, the Butterfly Cluster

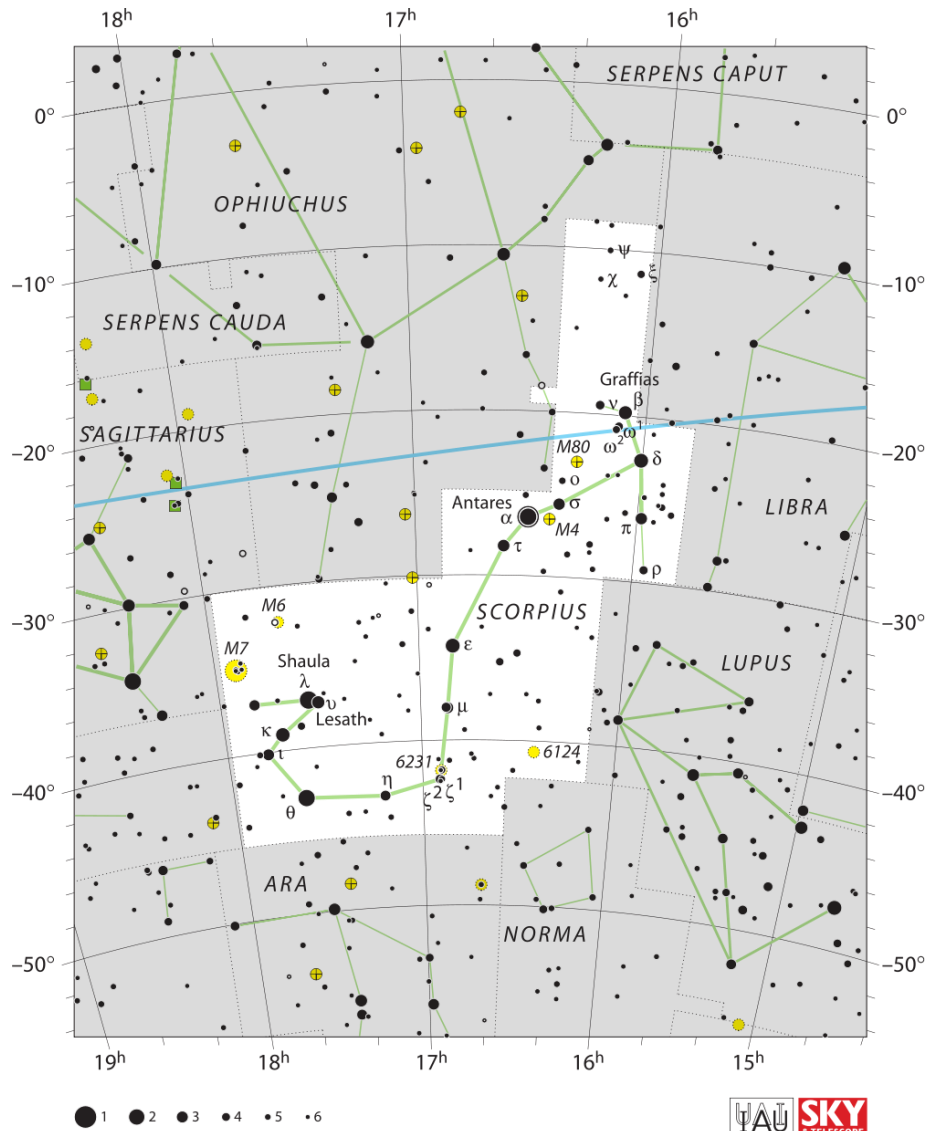
by Don Knabb, CCAS Treasurer & Observing Chair

During the summer months I find myself irresistibly drawn to the southern sky. This part of the sky is visible to us for only a few months, and it is full of incredible objects to gaze upon. One of these objects is the open cluster Messier 6, also known as the Butterfly Cluster.

From a dark sky site the cluster is easily detectable with the naked eye, close to the "stinger" of Scorpius. It is next to what many observers consider its companion object, M7, Ptolemy's Cluster, which I wrote about last July.

The bright star that represents the 'stinger' on the tail of the Scorpion is Shaula. With binoculars or a telescope with a low power eyepiece, scan to the northeast, up and to the left slightly. Under dark skies it will show as a hazy patch in the sky, but do not confuse it with its brighter, southeastern neighbor, M7.

In binoculars, Messier 6 stars will all appear to be around the same brightness and the 'butterfly' asterism will be unmistakable. In a telescope, many more stars will be revealed – making the namesake a bit harder to recognize, but more interesting because more stars are seen and color is distinguished. However, watch this cluster on nights when there is a little fine cloud in the sky or moonlight. You'll see the shape in a telescope quite clearly then! Be sure



to stay a minimum magnification when using a telescope, because this is a large open star cluster.

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 dis-

rupted 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.

M6 is estimated to contain about 80 stars, all moving through space together in an area span-

(Continued on page 11)

Eyepiece (Cont'd)



M6, The Butterfly Cluster

(Continued from page 10)

ning about 12 to 25 light years across – and may have formed anywhere from 51 to 95 million years ago.

It is commonly believed that the first astronomer to record the Butterfly Cluster's position in the sky was Giovanni Battista Hodierna in 1654. However, Robert Burnham, Jr. has suggested in the "Celestial Handbook" that Ptolemy may have seen it while noting the Ptolemy Cluster M7

Charles Messier observed M6 on May 23, 1764. He comment-

ed on the cluster: "In the same night of May 23 to 24, 1764, I have determined the position of a cluster of small stars between the bow of Sagittarius and the tail of Scorpius: At simple view [with the naked eye], this cluster appears to form a nebula without stars, but the slightest instrument which one employs to examine it makes one see that it is nothing but a cluster of small stars."

Robert Burnham, Jr. comments "The present author regards this as one of the most attractive clusters in the heavens for small instruments, a completely charming group whose arrange-

ment suggests the outline of a butterfly with open wings."

So while this beautiful cluster is visible low in the south during the summer months don't miss the opportunity to gaze upon it and look for the butterfly in the sky!

Information credits:

Dickinson, Terence 2006. Nightwatch: a practical guide to viewing the universe. Buffalo, NY. Firefly Books.

[http://en.wikipedia.org/wiki/](http://en.wikipedia.org/wiki/Butterfly_Cluster)

[Butterfly_Cluster](http://www.theskyscrapers.org/messier-6-and-messier-7)

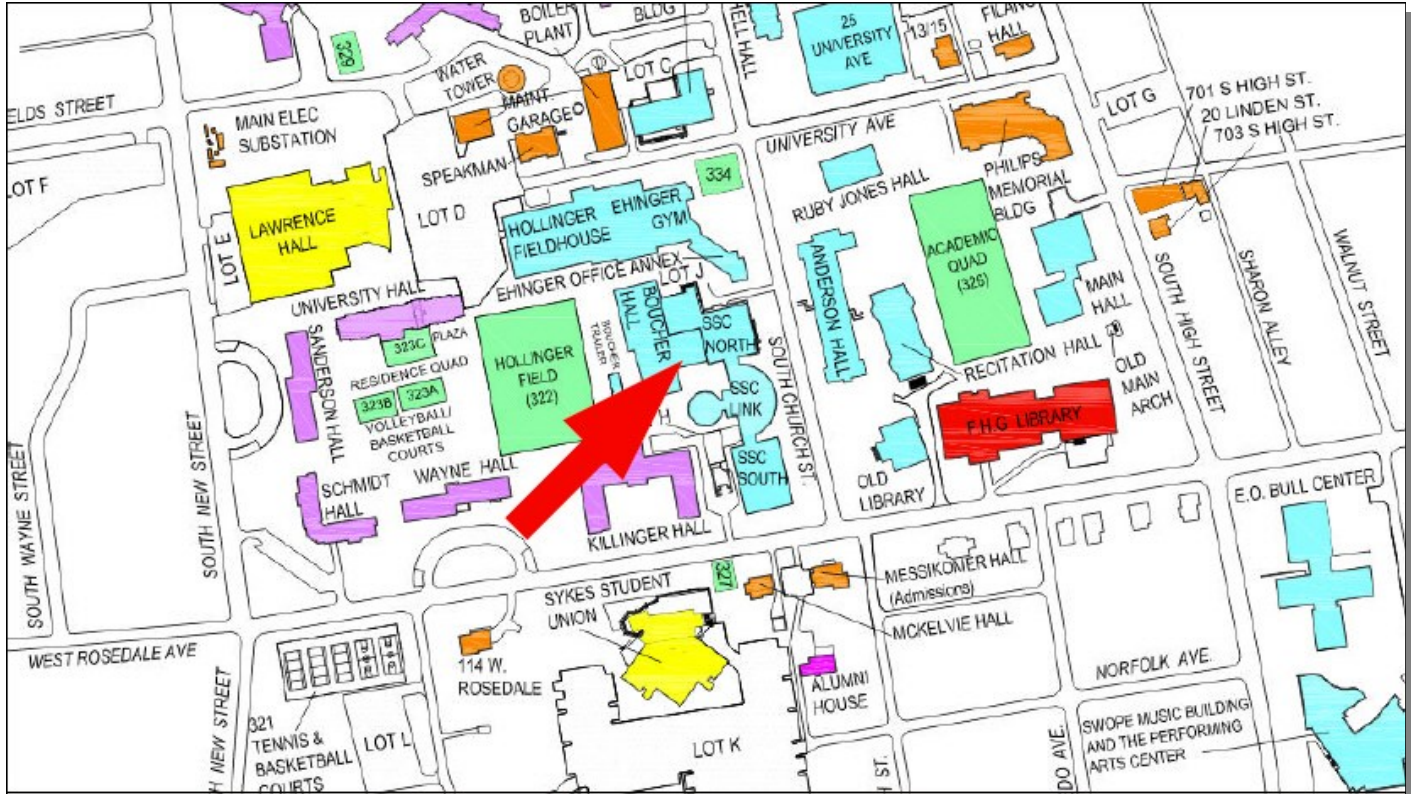
<http://www.theskyscrapers.org/messier-6-and-messier-7>

<http://www.universetoday.com/31219/messier-6/>

CCAS Directions

West Chester University Campus

The monthly meetings (September through May) are held in Room 113 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)

view of the Perseid meteor shower as this shower extends for several weeks before and after its peak in mid-August. And on the night of July 29/30 both the Alpha Capricornid and Southern Delta Aquarid showers peak.

New Member Welcome!

Welcome new CCAS members Richard Hunsinger of West Chester, PA. We're glad you decided to join us under the stars! Clear skies to you!

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

June 2013 Financial Summary

Beginning Balance	\$1,275
Deposits	\$760
Disbursements	<u>\$785</u>
Ending Balance	\$1,250

CCAS Summer Party

Barb and Don Knabb have graciously offered once again to host the summer picnic. Members and their families are invited to attend on July 27th, 2013. Please contact Barb and Don to let them know you will attend. Their contact information is on pg. 14 under "Membership Renewals."

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!



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 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.greeneearthlighting.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 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
2115 Lazor St.
Apt. 227
Indiana, PA 15701

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 (724) 801-8789 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 724-349-5981
Public Relations:	Deb Goldader 610-304-5303



CCAS Membership Information

The present membership rates are as follows:

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

Membership Renewals

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

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178
Phone: 610-436-5702
e-mail: treasurer@ccas.us

Sky & Telescope Magazine Group Rates

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

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**.