



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 21, No. 9

Two-Time Winner of the Astronomical League's Mabel Sterns September 2013

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M1: The Incredible Expanding Crab



Image Credit & Copyright: Adam Block, Mt. Lemmon SkyCenter, U. Arizona

Membership Renewals Due

09/2013	Catalano & Family Lurcott, Ed
10/2013	Conrad Gonzalez Leiden Payne Toth Vence
11/2013	Buczynski DiGregorio Hepler Holenstein Taylor

Important September 2013 Dates

- 5th** • New Moon, 7:37 a.m.
- 12th** • First Quarter Moon, 1:09 p.m.
- 19th** • Full Moon, 7:13 a.m.
- 22nd** • Autumnal Equinox, 4:44 p.m.
- 26th** • Last Quarter Moon, 11:56 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, September 14, 2013.** CCAS Special Observing Session, Hoopes Park Star Party. The observing session is from 8:00 to 9:30 p.m.

☼ **Saturday, October 12, 2013.** CCAS Special Observing Session, Anson Nixon Park Star Party, Kennett Square.

Summer/Fall 2013 Society Events

September 2013

4th • 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.

10th • CCAS Monthly Meeting, Room 112, Merion Science Center (former Boucher Building), West Chester University. The meeting starts at 7:30 p.m. 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.

14th • CCAS Special Observing Session, Hoopes Park Star Party. The observing session is from 8:00 to 9:30 p.m.

15th • The von Kármán Lecture Series: [Telexploration: How video game technologies can take NASA to the next level](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

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

22nd • Autumnal Equinox; first day of Fall.

24th • CCAS Special Observing Session, Bucktoe Creek State Park.

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

October 2013

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 Observing Session, Myrick Conservancy Center, BVA (inclement weather date October 5th). The observing session starts at sunset.

10th • CCAS Monthly Meeting, Room 112, Merion Science Center (former Boucher Building), West Chester University. The meeting starts at 7:30 p.m. Guest Speaker: Paul Evenson, PhD from the University of Delaware Physics and Astronomy Department who will be presenting "The Construction and Operation of the Ice Cube Neutrino Observatory at the South Pole."

10th • The von Kármán Lecture Series: [Theodore Von Karman and the Creation of JPL](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

12th • [Fall Astronomy Day](#). Learn more about Astronomy Day events by checking the web site of the Astronomical League.

18th • West Chester University Planetarium Show: "Venus, the Evening Star," in the Schmucker Science Building. For more information and reservations, visit the [WCU Public Planetarium Shows](#) webpage.

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

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

Solar System Ambassadors Program Accepting Applications

submitted by JPL Solar System Ambassadors Program

The NASA's Jet Propulsion Laboratory Solar System Ambassadors, or SSA, Program, a nationwide network of space enthusiast volunteers, will accept applications from Sept. 1 through Sept. 30, 2013.

Highly motivated individuals will be given the opportunity to represent NASA's Jet Propulsion Laboratory as volunteer Solar System Ambassadors to the public for a one-year, renewable term beginning Jan. 1, 2014.

While applications are being sought nationwide, interested parties from the following states are especially encouraged to apply: Alaska, Delaware, Missis-

sippi, Montana, Nebraska, Oklahoma, South Dakota, West Virginia, Wyoming and the District of Columbia. SSA hopes to add 100 new volunteers to the program in 2014.

To learn more about the Solar System Ambassador Program and to apply online, visit <http://www2.jpl.nasa.gov/ambassador/>. The Announcement of Opportunity and application form will be available beginning Sept. 1, 2013.

If you have questions about this opportunity, contact Kay Ferrari, SSA Coordinator, by email at ambassad@jpl.nasa.gov.

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 112, 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 future meetings. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

Happy 20th Anniversary CCAS!

by John C. Hepler, CCAS Webmaster & Newsletter Editor

Back in 1993 a group of dedicated astronomy enthusiasts, led by Ed Lurcott, started the Chester County Astronomical Society. The first meeting was held in September, with the first public meeting the following month.

The society grew quickly over the subsequent months, with 45 members by October 1994. An association with the Astronomy faculty at West Chester University provided meeting space and technical expertise.

Looking over the first five years of the newsletter, I'm impressed by the commitment of the members (and the longevity of many who are still active today) and the willingness to "pitch in" — a trait that continues to this day.

I think the idea of doing some-

thing to recognize the anniversary of the society was on many members' minds, especially with Ed's recent surgery. I had the bright idea to go through the old newsletters and develop something — what, I wasn't sure. I expected to find photos and other materials I could use for a PowerPoint or media presentation of some sort.

I immediately ran into some stumbling blocks; the first year and half of editions were scanned paper pages. They were literally PDF files where each page was one whole image. Impossible to work with.

The next challenge was the fact that no photographs were included in the first five years of publication (the first photos don't appear until the January 1999 edi-

tion). By that time I was coming to the realization of another problem: time vs. information. The hours passed as I read the old editions; nevertheless, I was pleased to encounter familiar names and learn more about CCAS's history.

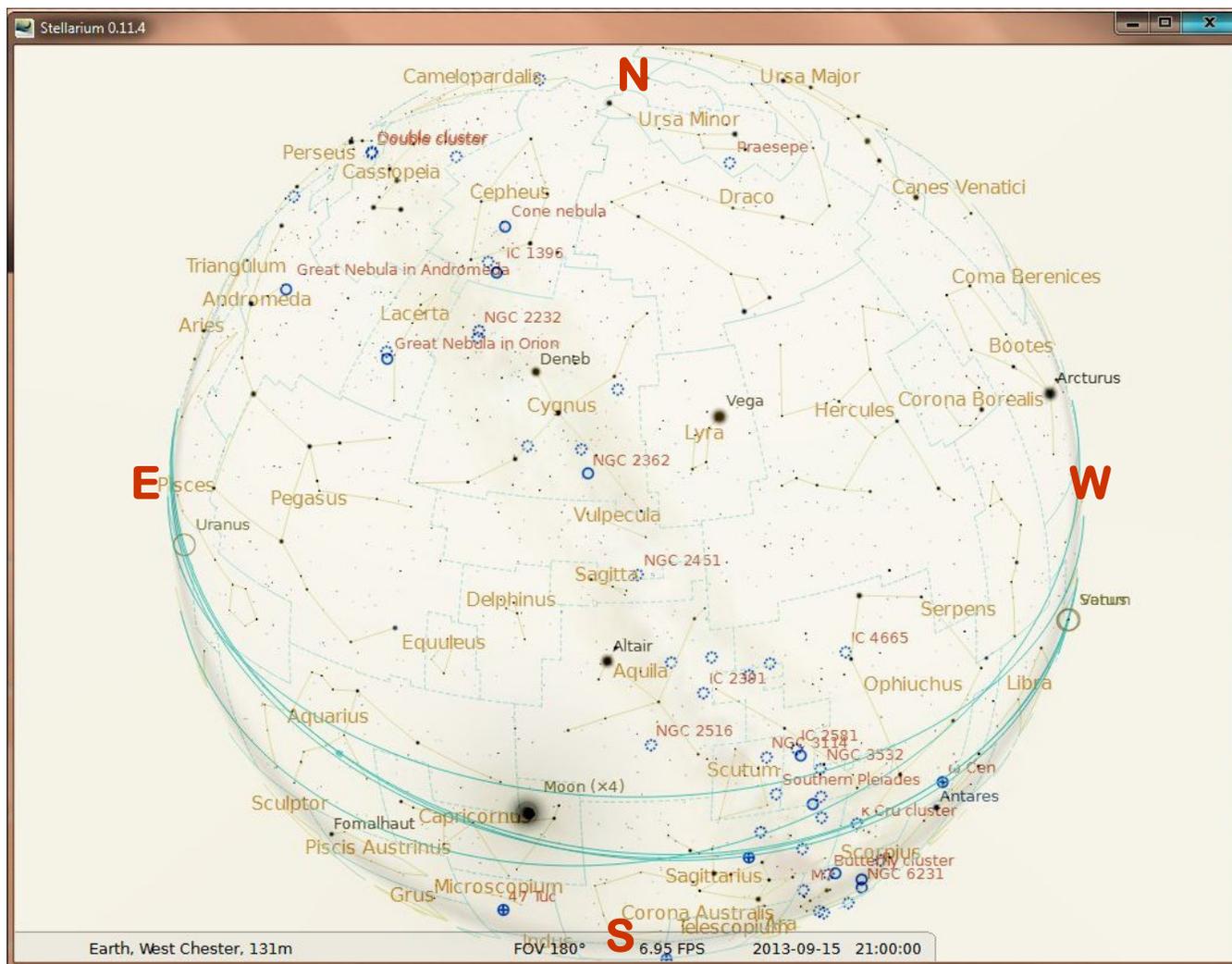
As a result, my compromise for the meeting tomorrow (sorry so late!), was to develop a timeline of the first five years of the society. I selected a combination of society and astronomical events in a chronological order from September 1993 through December 1997. I hope to continue revisiting the history of CCAS throughout the year.

So turn to page 6 to start your journey through the society's history. I hope you enjoy reading it as much as I did assembling it.

The Sky Over Chester County

September 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
9/01/2013	6:01 a.m. EDT	6:29 a.m. EDT	7:32 p.m. EDT	7:59 p.m. EDT	13h 03m 00s
9/15/2013	6:15 a.m. EDT	6:42 a.m. EDT	7:09 p.m. EDT	7:36 p.m. EDT	12h 27m 06s
9/30/2013	6:29 a.m. EDT	6:56 a.m. EDT	6:44 p.m. EDT	7:11 p.m. EDT	11h 48m 04s

Moon Phases					
New Moon	9/05/2013	7:37 a.m. EDT	Full Moon	9/19/2013	7:13 a.m. EDT
First Quarter	9/12/2013	1:09 p.m. EDT	Last Quarter	9/26/2013	11:56 p.m. EDT

September 2013 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

5	New Moon
8	The Moon is near Venus
8	Mars is in M44, the Beehive Cluster, before Dawn
12	First-quarter Moon
19	Full Moon
22	The Autumnal Equinox occurs at 4:44 p.m.
26	Last Quarter Moon

The best sights this month: Saturn and Venus shine in the west just after the light from the closest star to our planet, the Sun, fades in the evening. On September 8th there will be a beautiful meeting of Spica, Venus, a thin crescent Moon and Saturn about 45 minutes after sunset.

Mercury: Mercury is not in good position for viewing during September.

Venus: The “evening star” shines brightly in the west as day fades into night throughout September. Venus is the brightest of all the planets and shines at magnitude -4.0 this month.

Mars: The red planet peaks over the eastern horizon around 4 a.m. shining at a fairly dim magnitude 1.6. If you are an early riser, set up a telescope or binoculars on September 8th and 9th and watch Mars pass through M44, the Beehive Cluster, in the constellation Cancer the Crab.

Jupiter: The king of the planets is the brightest star-like object in the morning sky, shining at magnitude -2.1, climbing over the horizon around 2 a.m.

Saturn: Enjoy Saturn early in the month for the best views before the ringed planet gets lost in the heavy atmosphere near the horizon. You can get some nice views through a telescope well before it is fully dark.

Uranus and Neptune: Neptune was at opposition in late August, so it will be in excellent viewing position all night. Uranus is trailing Neptune by about 2 hours but you can find both of them high in the sky around midnight. You can find a sky map to help you locate these gas giants at skypub.com/urnep, the website of Sky and Telescope magazine.

The Moon: Full moon occurs on September 19th. This full Moon is called the Full Corn Moon by Native Americans. The Full Corn Moon corresponds with the time of harvesting corn. It is also called the Barley Moon, because it is the time to harvest and thresh the ripened barley. Maybe we can also call it the Beer Moon, since to make beer one starts with barley. I’ll drink to that!

This month, we also celebrate what we call a Harvest Moon, which is the full Moon nearest the autumnal equinox. It can occur in September or October and is bright enough to allow finishing all the harvest chores.

Constellations: Hercules and the Summer Triangle constellations is near the zenith throughout September with “the backbone of the night”, the Milky Way, arching across the sky. Stay up a bit later and the autumn constellations will rise in the east, so look for the Great Square of Pegasus, Cassiopeia and Perseus.

Messier/deep sky: September is your last chance of 2013 to catch the Messier objects in the southern constellations of Sagittarius and Scorpius. If you can find a clear view of the southern horizon you can find M4, M6, M7, M17, M8 and M22. On the other side of the sky, if you stay out late, you can catch the star clusters in Auriga rising: M36, M37 and M38.

Comets: There are no bright comets in the sky during September. But, we can start building our anticipation for Comet ISON later this year!

Meteor showers: There are no significant meteor showers during September.

CCAS Timeline: The First Five Years

by John C. Hepler, CCAS Webmaster & Newsletter Editor

1993

September

- Society founded September 1993 with Ed Lurcott acting president, Tim Ryan acting vice president, and Steve Lurcott acting treasurer.
- First meeting held September 17, 1993 in Ed Lurcott's home.

October

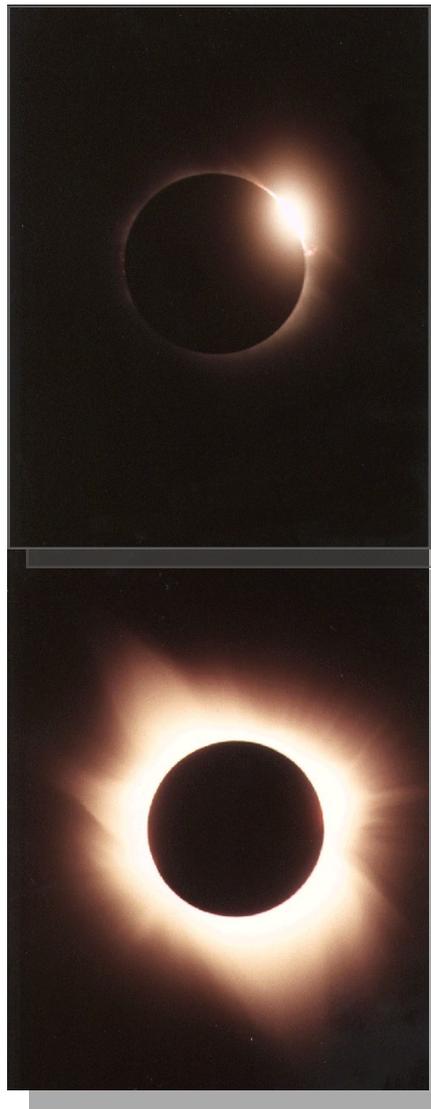
- October 12, 1993 second meeting held in WCU Planetarium.
- WCU faculty member Hugh Harber presented at second meeting.
- Acting Vice President Tim Ryan responsible for publishing Observations newsletter.

November

- WCU Planetarium selected as regular meeting location.
- First invited speaker, Dr. John Stolar presented on astrophotography at the November 9th meeting.
- Draft of proposed constitution and bylaws distributed at meeting for member review.
- Six new members were welcomed into the society.

December

- Dr. Hugh Harber presented on the Star Gazer's Stone and Mason & Dixon in America at the December 14th meeting.
- The newsletter included an update on December 4th cap-



Images of Solar Eclipse Taken by Ed Lurcott in La Paz, Mexico in July 1991.

ture of the crippled Hubble Telescope by NASA astronauts for repairs.

1994

January

- The January 11th meeting featured a video by Ed and Steve Lurcott of the July 11, 1991 total eclipse in La Paz, Mexico.

February

- Meeting cancelled due to inclement weather.
- Newsletter included updates on the successful repairs on Hubble and the unsuccessful outcome of the Mars Observer mission.

March

- Guest speaker was WCU master's student Guy McCann who presented "Sir John Herschel and the Birth of Celestial Photography."
- **March 19, 1994 first observing session held at Ed Lurcott's home.**
- Last edition of the Observations newsletter to non-members.

April

- Dr. Anthony Nicastro presented "Vindication of Sloppey Pierre (Pierre Lemonnier)" at the April 12th meeting.
- Observing Chair Roger Taylor contacted BVA about establishing a regular observing site.
- April 16th was National Astronomy Day. **CCAS had first information booth at Exton Square Mall.**

May

- Meeting held on May 10th with members visiting the WCU Observatory after conducting society business meeting.
- Nominations for society president, vice president,

(Continued on page 7)

CCAS Timeline: The First Five Years (Cont'd)

(Continued from page 6)

treasurer and secretary announced.

- Membership grew to 20 people.

June

- June 16th meeting held at headquarters of Brandywine Valley Association. Guest speaker was James Mulaney, past curator of the Buhl Planetarium in Pittsburgh.
- **Officers formally elected: President, Ed Lurcott; Vice President, Mike Tucker; Treasurer, Steve Lurcott; and Secretary Nancy Armstrong.**
- Viewing predictions for crash of comet Shoemaker-Levy into Jupiter (very cool schedule included!).

July

- **Secretary Nancy Armstrong took over as Observations newsletter editor.**
- Summer meetings were held in conjunction with observing sessions at BVA.
- CCAS membership grows to 27 people. Several well-known names include Ed Lurcott, Steve Lurcott, Pete LaFrance, and Roger Taylor.

August

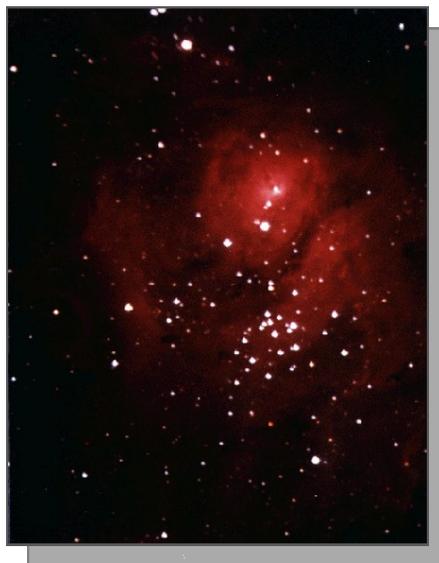
- CCAS welcomed 10 new members.
- Meeting held on August 12th to coincide with Perseid meteor shower.

September

- **Happy first anniversary CCAS!**
- Vice President Mike Tucker presented on his experience at the Texas Star Party at the September 13th meeting.
- CCAS welcomed 10 more new members.
- A member survey was included in the monthly newsletter.

October

- CCAS President Ed Lurcott presented “Stellar Classification and the Hertzsprung-Russel Diagram” at the October 11th meeting.
- **First educational star party held on October 10th at the New Garden Elementary School. Star Party organized by Pete LaFrance.**



The Lagoon Nebula by Pete LaFrance. Telescopes of 3" or greater are needed to show this well. The full complexity of the Lagoon Nebula and its pinkish-red color are brought out only on photographs.

- CCAS membership grew to over 45 people.

November

- WCU graduate student Pru Campbell demonstrated the WCU planetarium projector at the November 8th meeting.
- CCAS Observing Session moved to Friday nights starting November 4th at the home of member Bob Hartje.
- Cathy Cseke assumed the new position of public relations representative.
- CCAS logo selection took place at the monthly meeting.

December

- WCU Associate Physics Professor Dr. Michael Martens presented a “computer Internet connection” and demonstrated how to find astronomy-related information online!
- Presentation of CCAS Logo designed by Ed Lurcott in monthly newsletter.
- **Monthly observing sessions moved to BVA on Friday, December 9th.**
- CCAS welcomed new members Barbara Metford and Kathy Buczynski.

1995

January

- CCAS Vice President Mike Tucker demonstrated a se-

(Continued on page 8)

CCAS Timeline: The First Five Years (Cont'd)

(Continued from page 7)

lection of astronomical computer programs at the January 10th meeting.

- The monthly newsletter included an article entitled "Oh! Ryan."

February

- CCAS member Dr. Emil Volcheck presented "Space Travel: Is it for Real?" at the February 14th meeting.
- Pete LaFrance reported his viewing of the occultation of Spica in the monthly newsletter.
- The monthly newsletter included an article entitled "Orion's Sword."

March

- CCAS Logo first appeared in the monthly newsletter's masthead.
- Pete LaFrance showed how he took photographs of Messier objects at the March 14th meeting.
- **Discount subscription to Sky & Telescope magazine offered for first time.**
- The monthly newsletter included an article entitled "Galaxies, Anyone?"

April

- Guest speaker Dr. Al Nacman presented on the early American women who influenced the field of astronomy at the April 11th meeting.
- The monthly newsletter included an article by Ed Lurcott entitled "Double Stars,



Pete LaFrance in his observatory. Located in Avondale, Pennsylvania. The observatory houses Pete's 8" telescope. From here Pete takes most of his astrophotographs.

Anyone?"

May

- WCU Associate Professor Hugh Harber presented "Advances in Teaching the Aerospace Sciences" at the May 9th meeting.
- Officer elections were held during the May 9th meeting.
- Frank Angelini was welcomed as the 54th member.
- May 6th was National Astronomy Day. CCAS again had an information booth at the Exton Square Mall.
- A Star Party was held at Ridge Park School between Conshohocken and Plymouth Meeting on May 3rd.

June

- Monthly meetings moved again to BVA in conjunction with the observing sessions

for the summer months.

- **New officers were: President, Ed Lurcott; Vice President, Jim Sylvester; Treasurer, Pete LaFrance; and Secretary, Nancy Armstrong.**
- The monthly newsletter included an article by Jim Anderson entitled, "Coping with Light Pollution."
- Pete LaFrance invited members to visit his home observatory on June 30th.

July

- The July meeting was scheduled for Friday, July 21st at BVA.
- The monthly newsletter included an article by Jim Anderson entitled, "Notes on Corona Borealis."

(Continued on page 9)

CCAS Timeline: The First Five Years (Cont'd)

(Continued from page 8)

August

- The August meeting was scheduled for Friday, August 18th at BVA.
- The CCAS Executive Committee met on August 21st to discuss proposed changes to the society constitution (new membership types) and plans for outreach to other local astronomical organizations, the Astronomical League, and NASA.

September

- Observing Chair Mike Tucker presented his visit to Arizona's Kitt Peak National Observatory (with side trips to Meteor Crater and the Grand Canyon) at the monthly meeting on September 12th.
- The monthly newsletter included an article by Jim Anderson entitled, "Stellar Tales."

October

- Roger Taylor presented "A \$200 Hole" about building a home telescope at the October 10th monthly meeting.
- **Jim Anderson took over as newsletter editor.**
- Monthly observing highlights were officially incorporated into the newsletter.

November

- WCU Instructor Prudence Campbell presented the WCU planetarium and a discussion on Earth's passing



*Summer Milky Way Galaxy
by Pete LaFrance.*

through Saturn's ring plane at the monthly meeting on November 14th.

- CCAS took part in a star party for a home schooling organization in Kennett Square on November 28th.
- Changes to CCAS membership were announced, including new **family and senior memberships.**

December

- An open forum session was scheduled for the December 12th monthly meeting. This gave attendees the opportunity to ask questions about astronomical topics that interested them.
- The Galileo probe arrived at Jupiter on December 7th.

1996

January

- The monthly meeting on January 9th and monthly observing session on January 19th-20th were both cancelled due to inclement weather (the blizzard of 1996!).
- The monthly newsletter included an article by Jim Anderson entitled, "Follow-Up on Double Stars."

February

- WCU Professor John Stolar presented "Stellar Distance Measuring" at the February 13th monthly meeting.
- The monthly newsletter included an article by Chick Shorten entitled, "Dogs and Stars."
- **Jim Anderson started a monthly column highlighting historical events in space exploration.**

March

- The monthly meeting was preempted for a guided tour of the Mt. Cuba Astronomical Observatory by Dr. Emil Volcheck. The tour was conducted on March 12th.
- The Math & Science Committee of East Bradford Elementary School asked CCAS to participate at a star party during its annual Student Interest Night on March 11th.

(Continued on page 10)

CCAS Timeline: The First Five Years (Cont'd)

(Continued from page 9)

April

- CCAS Vice President Jim Sylvester presented "What is Life?" at the April 9th monthly meeting.
- **The monthly meeting location officially changed to Room 113 Boucher Hall** (now Merion Science Center).
- CCAS had another information booth set up in the Exton Square Mall for National Astronomy Day on April 20th.
- Members participated in a star party for Girl Scouts (and their parents and leaders) at Camp Tweedale near Oxford PA on April 27th. An estimated 80 girl scouts participated that night.

May

- CCAS Newsletter Editor Jim Anderson presented "Dead Constellations" at the May 14th meeting.
- CCAS members participated in a star party for first graders (and their parents) at Ridge Pike Elementary School on May 1st.

June

- Kathy Buczynski presented the constellation Boötes at the June meeting/observing session on Friday, June 14th.
- Results of the annual officer elections were announced. Ed Lurcott was elected President, Emil Volcheck became Vice President, with Pete LaFrance as Treasurer and



*Images of Aurora Borealis
by Kathy Buczynski.*

William O'Hara as Secretary.

July

- **Constellation of the Month presentations were inaugurated** after Kathy Buczynski's well-received presentation the previous month. For July, Ed Lurcott presented the constellation Hercules.
- Jim Anderson included an update on comet Hale-Bopp in the monthly newsletter.

August

- Jim Anderson presented "Zen and the Art of Telescope Building" at the August 16th meeting/observing

session.

- Recent new members were welcomed in the monthly newsletter. Some familiar names included John Imbruglia and Steve Leiden.

September

- Pete LaFrance presented how he used weather-related services on the Internet to determine observation conditions; Geoff Burtner gave a presentation on Meteors at the September 10th meeting.
- The society scheduled a special observing session to coincide with the Total Lunar Eclipse on September 26th.
- Jim Anderson reviewed upcoming missions to Mars (as of 1996) in the monthly newsletter.

October

- WCU Astronomy Instructor Bill McDaid presented "The New Mexico Experience" at the October 8th monthly meeting.
- Members participated in a star party for a home-school organization in the Downingtown area on October 18th.
- Kathy Buczynski was announced as Program Chair in the monthly newsletter.

November

- The November 12th meeting featured a video by Ed Lurcott of the July 11, 1991 total eclipse in La Paz, Mexico.

(Continued on page 11)

CCAS Timeline: The First Five Years (Cont'd)



Comet Hale-Bopp by Pete LaFrance

(Continued from page 10)

- The Mars Global Surveyor was successfully launched on November 7th.

December

- The regularly monthly meeting was preempted by a fieldtrip to Spitz, Inc., in Chadds Ford on December 10th.
- Mars Pathfinder launched successfully on December 2nd.
- First mention of light pollution and the **International Dark Sky Association** in the monthly newsletter.

1997

January

- Chuck Shorten presented astronomy-related Internet

resources in a university computer laboratory during the monthly meeting on January 14th.

- Jim Anderson continued a quarterly examination of the surface of the moon (started the previous month with the first-quarter moon) in the monthly newsletter.

February

- Space Shuttle Discovery launched on February 13th in the early morning hours to conduct the second maintenance mission to the Hubble Space Telescope.
- CCAS Member Frank Angelini published "Telescopes and Marriage" in the monthly newsletter.

March

- The President and Vice President of the Chesmont Astronomical Society, Rob Cordivari and Karl Krasley, were the guest speakers at the March 11th society meeting.
- **CCAS joined the Astronomical League.**
- A partial lunar eclipse occurred on March 23rd and was visible in the western hemisphere.

April

- CCAS Member Frank Angelini gave a presentation on CCD photography at the April 8th meeting.
- April 12th was National Astronomy Day. CCAS again had an information booth at the Exton Square Mall.
- CCAS was invited back to East Bradford Elementary School to participate in their annual Student Interests Night on April 9th.
- The Society was asked to help again with an annual star party at Park Ridge Elementary School in Plymouth Meeting on April 23rd.

May

- CCAS Vice President Dr. Emil Volcheck presented "A Cosmology Update" at the May 13th monthly meeting.
- CCAS and West Goshen Township held a public star party at West Goshen Township Park on May 16th. Over 100 people attended.

(Continued on page 13)

Size Does Matter, But So Does Dark Energy

by Dr. Ethan Siegel

Here in our own galactic backyard, the Milky Way contains some 200-400 billion stars, and that's not even the biggest galaxy in our own local group. Andromeda (M31) is even bigger and more massive than we are, made up of around a *trillion* stars! When you throw in the Triangulum Galaxy (M33), the Large and Small Magellanic Clouds, and the dozens of dwarf galaxies and hundreds of globular clusters gravitationally bound to us and our nearest neighbors, our local group sure does seem impressive.

Yet that's just chicken feed compared to the largest structures in the universe. Giant clusters and superclusters of galaxies, containing thousands of times the mass of our entire local group, can be found omnidirectionally with telescope surveys. Perhaps the two most famous examples are the nearby Virgo Cluster and the somewhat more distant Coma Supercluster, the latter containing more than 3,000 galaxies. There are millions of giant clusters like this in our observable universe, and the gravitational forces at play are absolutely tremendous: there are literally *quadrillions* of times the mass of our Sun in these systems.

The largest superclusters line up along filaments, forming a great cosmic web of structure with huge intergalactic voids in between the galaxy-rich regions. These galaxy filaments span anywhere from hundreds of mil-

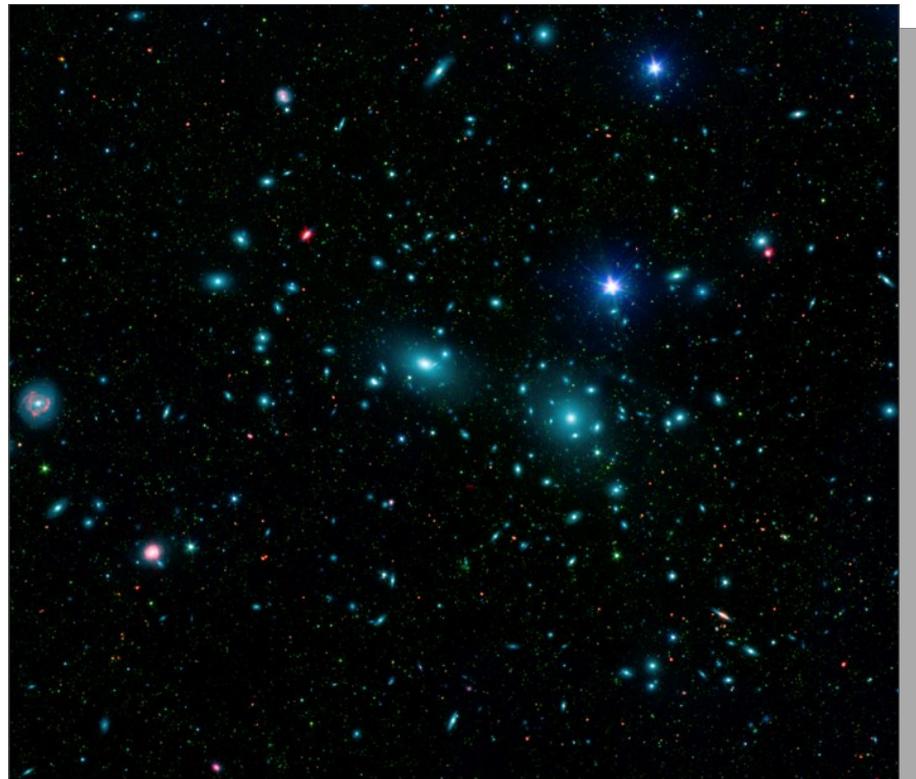


lions of light-years all the way up to more than a *billion* light years in length. The CfA2 Great Wall, the Sloan Great Wall, and most recently, the Huge-LQG (Large Quasar Group) are the largest known ones, with the Huge-LQG -- a group of at least 73 quasars -- apparently stretching nearly 4 billion light years in its longest direction: more than 5% of the observable universe!

With more mass than a million Milky Way galaxies in there, this structure is a puzzle for cosmology.

You see, with the normal matter, dark matter, and dark energy in our universe, there's an upper limit to the size of gravitationally bound filaments that should form. The Huge-LQG, if real, is more than *double* the size of that largest predicted structure, and this could cast doubts on the core principle of cosmology: that on the largest scales, the universe is roughly uniform everywhere. But this might not pose a problem at all, thanks to an unlikely culprit: **dark energy**. Just

(Continued on page 13)



Digital mosaic of infrared light (courtesy of Spitzer) and visible light (SDSS) of the Coma Cluster, the largest member of the Coma Supercluster. Image credit: NASA / JPL-Caltech / Goddard Space Flight Center / Sloan Digital Sky Survey.

Space Place (cont'd)

(Continued from page 12)

as the local group is part of the Virgo Supercluster but recedes from it, and the Leo Cluster -- a large member of the Coma Supercluster -- is accelerating away from Coma, it's conceivable that the Huge-LQG isn't a single, bound structure at all, but will eventually be driven apart by dark energy. Either way, we're just a tiny drop in the vast cosmic ocean, on the outskirts of its rich, yet barely fathomable depths.

Learn about the many ways in which NASA strives to uncover the mysteries of the universe: <http://science.nasa.gov/astrophysics/>. Kids can make their own clusters of galaxies by checking out The Space Place's fun galactic mobile activity: <http://spaceplace.nasa.gov/galactic-mobile/>

Timeline (Cont'd)



(Continued from page 11)

June

- Results of the annual officer elections were announced. Ed Lurcott was elected President, Kathy Buczynski became Vice President, with Pete LaFrance as Treasurer and William O'Hara as Secretary.
- Society members participated in the Summer Solstice Party at BVA on June 20th.

July

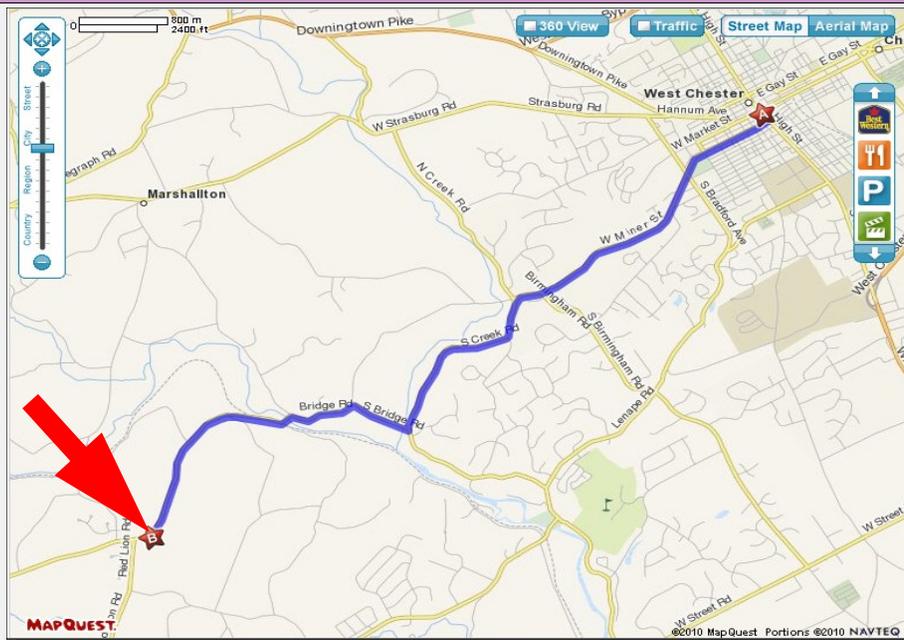
- CCAS Member Frank Angelini gave the second half of his presentation on CCD photography at the July 11th meeting.
- **The CCAS Lending Library was created with books donated by retiring WCU professor and CCAS co-founder Hugh Harber.**

August

- **CCAS gained a lending telescope, a 6" f/8 Dobsonian reflector from Orion Telescopes.** Frank Angelini arranged the donation from Pocono Mountain Optics in Moscow, PA.

(Continued on page 15)

CCAS Directions



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).

Brandywine Valley Association

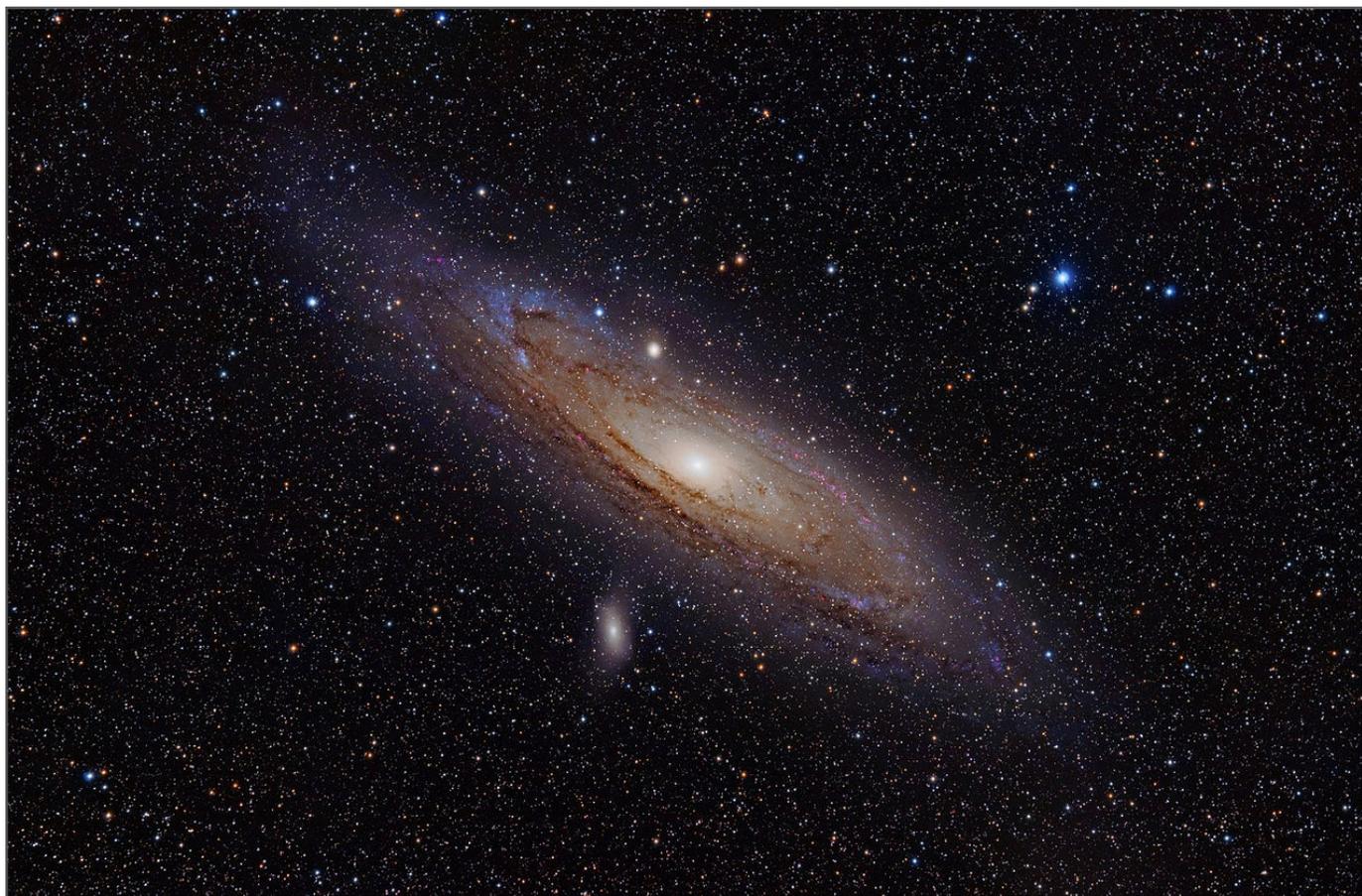
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090

<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.

Through the Eyepiece: The Andromeda Galaxy: Fuzzy spot supreme!

by Don Knabb, CCAS Treasurer & Observing Chair



[http://en.wikipedia.org/wiki/File:Andromeda_Galaxy_\(with_h-alpha\).jpg](http://en.wikipedia.org/wiki/File:Andromeda_Galaxy_(with_h-alpha).jpg)

If you stay up a bit late during September you can find the Great Square of Pegasus rising in the northeast. If you look from there toward the North Star, you will run into the constellation Cassiopeia. When I see those two constellations in the sky I always want to grab my binoculars or telescope and look about half way between the northeast corner of the Great Square and Cassiopeia. Just a bit to the left of that line I scan for what I believe is the grandest fuzzy spot of all: The Andromeda Galaxy.

Don't we wish the view in our

eyepiece was like the one above?

Unfortunately, it is not that clear. But with this image in mind, a cool clear September night, and a bit of time at the eyepiece you will get a familiarity with our neighbor galaxy that goes beyond just a large white center surrounded by fainter haze.

The Andromeda Galaxy is a barred spiral galaxy, much like our own Milky Way Galaxy. When you look at the Andromeda Galaxy you are looking at a glow of light that is made up of one trillion stars according to recent observations by the

Spitzer Space Telescope.

The Andromeda Galaxy is easily visible to the naked eye in dark skies, although any pair of binoculars will make the view tremendously better. Even at a true dark sky location one only sees the central part of the galaxy, but the full angular diameter of the galaxy is seven times that of the full Moon! Wouldn't that be a sight to see!

Measurements suggest that the Andromeda Galaxy and the Milky Way are heading toward each other at 75 miles per sec-

(Continued on page 15)

Eyepiece (Cont'd)

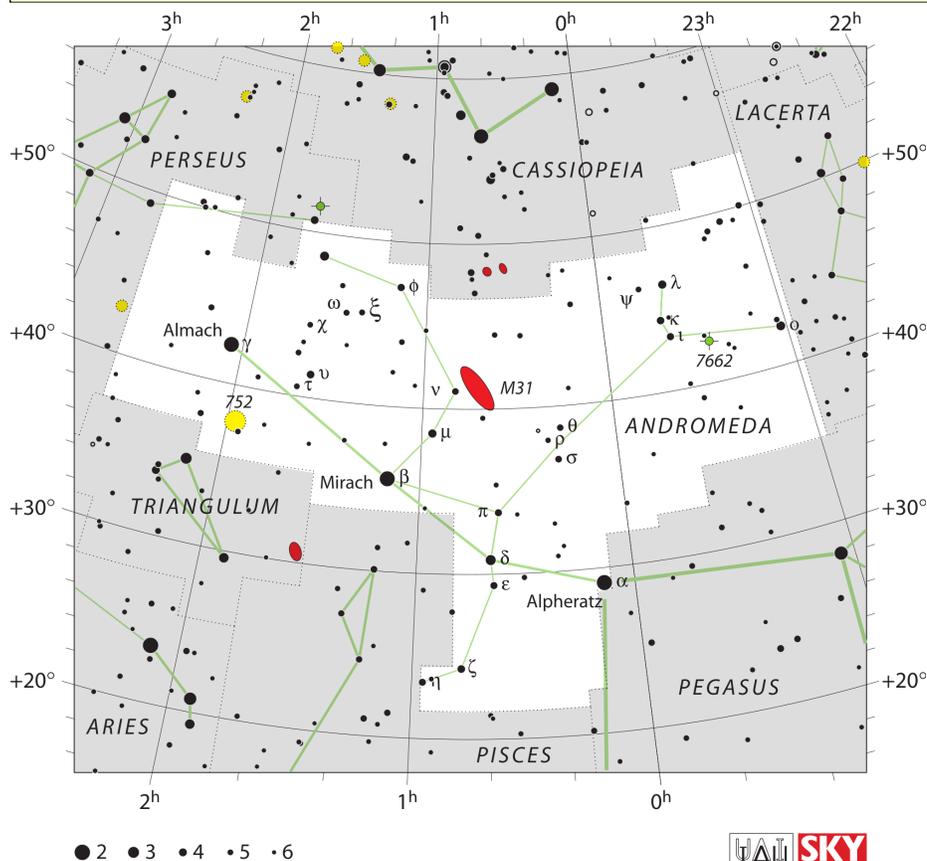
(Continued from page 14)

ond. Although it is not clear if there will actually be a collision, you should not lose sleep over this possibility since it will not occur for about 3 billion years.

If you'd like a bit more help finding M31, as the Andromeda Galaxy is also known, to the left is a sky map of Andromeda the constellation.

Information credits:

http://en.wikipedia.org/wiki/Andromeda_Galaxy
 Pasachoff, Jay M. 2000. A Field Guide to the Stars and Planets. New York, NY. Houghton Mifflin.
 Sky Safari Pro Mac app



http://en.wikipedia.org/wiki/File:Andromeda_IAU.svg

Timeline (Cont'd)

(Continued from page 13)

- On Wednesday, August 6th, Ed Lurcott and Chuck Shorten provided telescopes and expertise for a special star party for a children's educational program at the Brandywine Valley Association.

September

- Jim Anderson spoke about the Astronomical League's various Observing Programs and the Society's plans for implementing them at the September 9th meeting.



The 6" Dobsonian Lending Telescope

October

- CCAS founder Ed Lurcott presented the latest images of Mars from the various spacecraft investigating the red

planet at the October 14th monthly meeting.

- Following the guidelines of the Astronomical League Observing Awards, four observing clubs were started. These were the Messier Club, the Binocular Messier Club, the Lunar Club, and the Double Star Club.

November

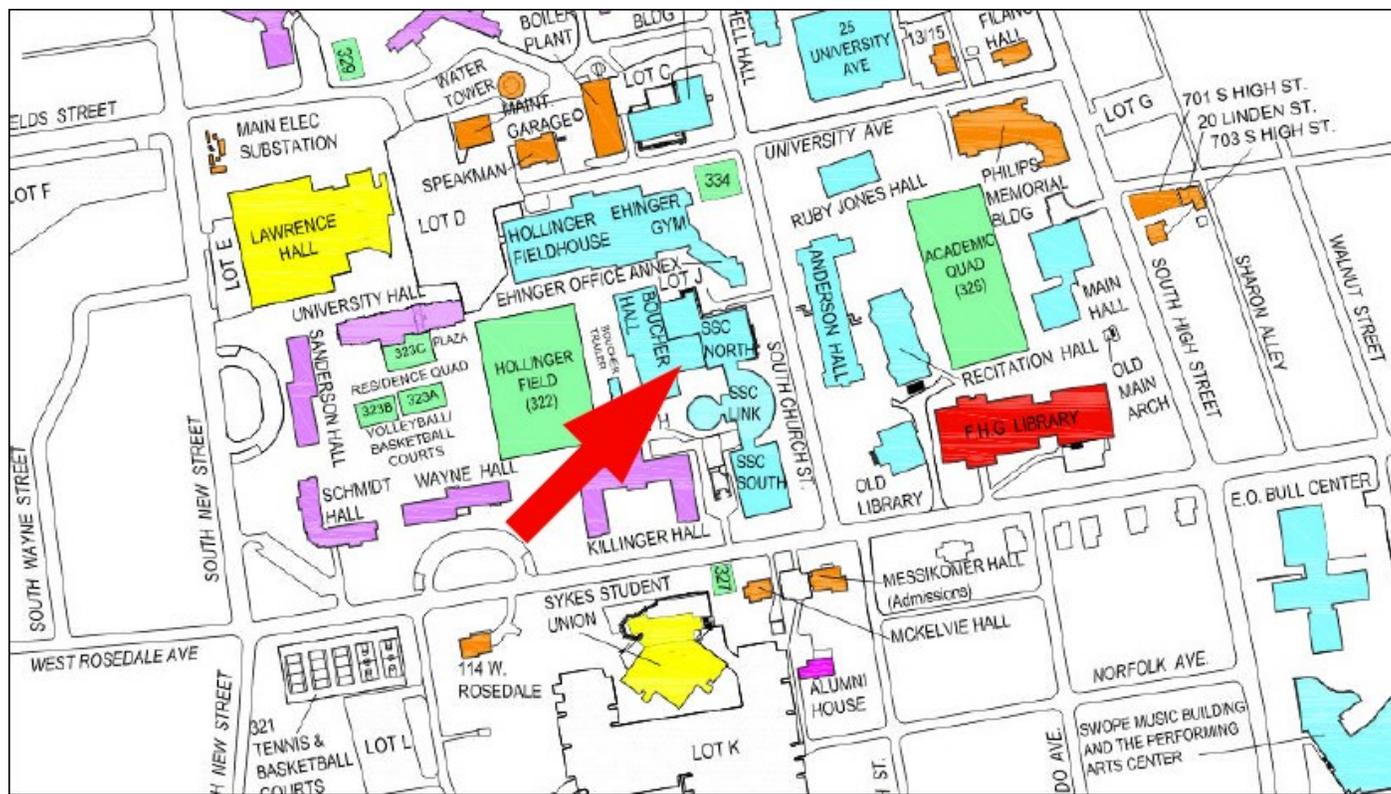
- CCAS Newsletter Editor Jim Anderson presented "Dead Constellations – Part II" at the November 11th meeting.

(Continued on page 16)

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).



Timeline (Cont'd)

(Continued from page 15)

December

- Mike Turco presented a combined audio and video program entitled *The Story of the Universe* at the December 9th meeting.
- CCAS participated in a Winter Solstice Celebration at the Brandywine Valley Association on December 19th.

[Editor's note: Phew! So much in just the first five years! I'll try to post the next five years sometime in the coming months.]

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

August 2013 Financial Summary

Beginning Balance	\$1,595
Deposits	\$68
Disbursements	\$417
Ending Balance	\$1,246

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!

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**.