



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 28, No. 8 **Three-Time Winner of the Astronomical League's Mabel Sterns Award** ☀ 2006, 2009 & 2016 August 2020

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Cherry Springs Camping & Observing Trip



CCAS Members traveled to north-central Pennsylvania for an enjoyable three days of camping, hiking, and of course, observing at Cherry Springs Park, near Coudersport, Pennsylvania. Joined by members from the Delaware Valley Amateur Astronomers organization, CCAS members spent July 14th through the 17th under some of the darkest night skies to be found on the East Coast of the United States..

Membership Renewals Due

08/2020	Bogard Borowski Buki Johnston & Stein Knabb Kruss Lurcott, L. Tiedemann Tredinnick Trunk Zulitti
09/2020	Armored Holloway Johnson Lee Lurcott, E. Squire
10/2020	Conrad Lane Rosenblatt Wirth

August 2020 Dates

- 1st** • The Moon, Jupiter and Saturn form a large triangle.
- 3rd** • Full Moon, the Full Sturgeon Moon or the Full Coho Salmon Moon, 11:58 a.m. EDT.
- 11th** • Last Quarter Moon, 12:44 p.m. EDT.
- 12th** • The Perseid meteor shower peaks in the predawn hours.
- 18th** • New Moon, the Black Moon, 10:41 p.m. EDT.
- 25th** • First Quarter Moon, 1:57 p.m. EDT.
- 26th** • The Lunar Straight Wall is visible.



CCAS Upcoming Nights Out

In addition to our monthly observing sessions at the Myrick Conservancy Center, BRC (see pg. 2), CCAS has several special "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

☀ **Monthly observing sessions at Myrick Conservancy Center, BVA, and special observing dates have been cancelled until further notice as part of the national effort to limit the spread of the coronavirus. For more information about future observing opportunities, contact our Observing Chair, Don Knabb.**

Summer/Autumn Society Events

August 2020

20th • Open call for articles and photographs for the September 2020 edition of [Observations](#).

20th-21st • The von Kármán Lecture Series: [Venus: Earth's Evil Twin or Just Misunderstood?](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

26th • Deadline for newsletter submissions for the September 2020 edition of [Observations](#).

September 2020

8th • CCAS Monthly Meeting, ONLINE via Zoom. Meet & Greet online for members from 7:00 to 7:30 p.m. The meeting starts immediately after at 7:30 p.m. Guest Speaker: Dr. Sara Seager, MIT. Her presentation is entitled, "TESS Exoplanets and Beyond – The Search for Habitability and Signs of Life."

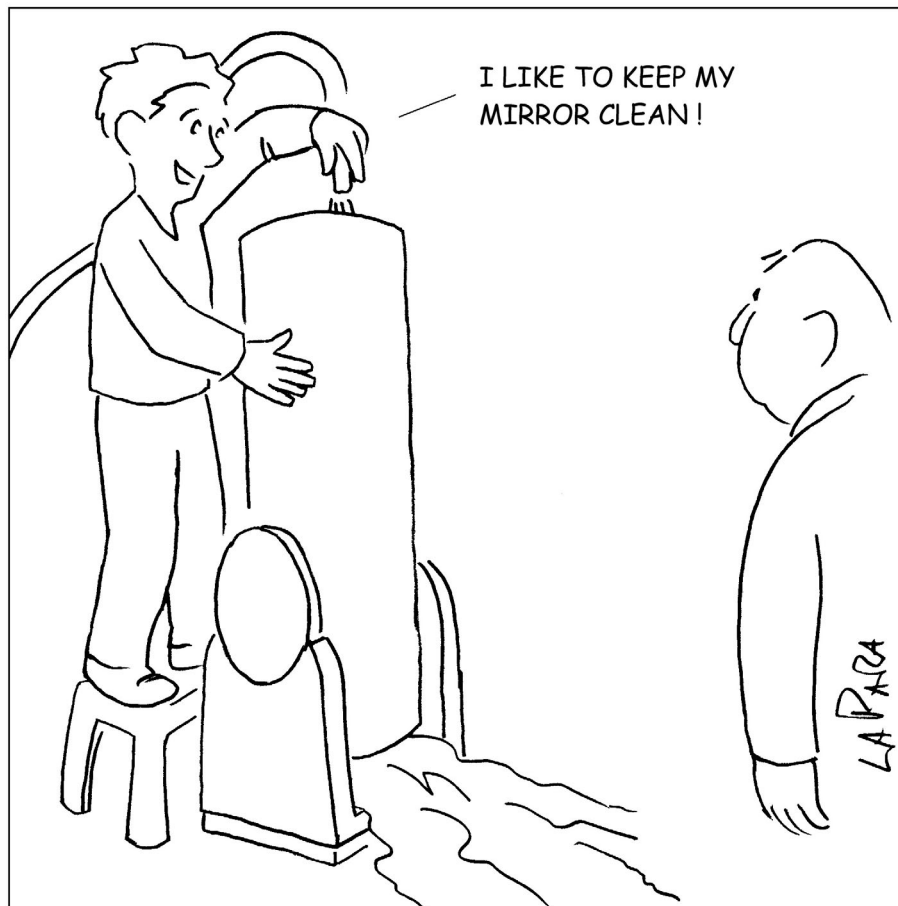
17th • The von Kármán Lecture Series: [Visualizing Space Exploration: AR, VR & Emerging Tech](#). Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

20th • Open call for articles and photographs for the October 2020 edition of [Observations](#).

22nd • September Equinox; first day of Autumn, 9:30 am EDT.

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

Classic La Para by Nicholas La Para



[Editor's Note: The ongoing pandemic has encouraged many to focus on their homes, both inside and outside. Here's to the neat-freaks out there who like to keep both the interiors and exteriors extra clean this summer. JCH]

September 2020 CCAS Meeting Agenda by Bruce Ruggeri, CCAS Program Chair

Our next meeting will be held on September 9, 2020, starting at 7:30 p.m. The meeting will be held ONLINE via [Zoom.us](#). Our guest speaker will be Dr. Sara Seager, Professor of Planetary Science, Professor of Physics, and Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology. Her presentation is entitled, "TESS Exoplanets and Beyond – The Search for Habitability and Signs of Life."

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

As for future meetings, we are looking for presenters for our 2020-2021 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

UAE Mars Mission: Extraordinary Feat Shows How Space Exploration Can Benefit Small Nations

by Ine Steenmans & Neil Morrisetti, *the Conversation*



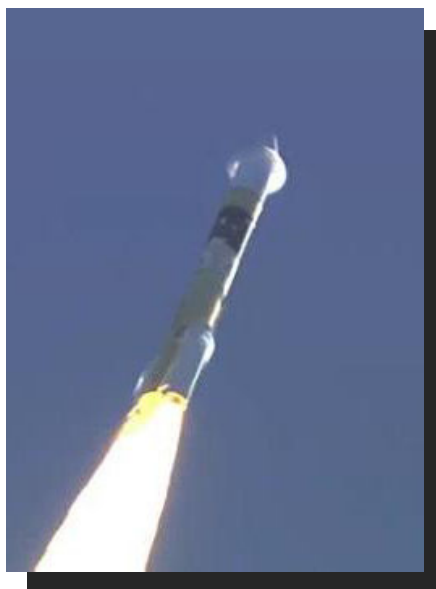
The Hope probe will learn about climate change on Mars. NASA/JPL/USGS

The United Arab Emirates (UAE) successfully launched its Mars mission dubbed “Al Amal”, or “Hope”, from the Tanegashima Space Centre in southern Japan on July 20. This is the first space mission by the UAE, and the first Arab mission to Mars – making the world’s first launch countdown in Arabic a moment for the history books.

The mission’s journey to its launch date has arguably been at least as remarkable as the launch itself. With no previous domestic space exploration experience, planetary science capacity or suitable infrastructure, the nation managed to put together a delivery team of 100% local, Emirati staff with an average age of under 35. And setting a deadline of six years rather than ten, as most comparable missions do, it pulled the launch off on time and within budget – now proudly joining the small cadre of nations who have launched a mission to reach Mars.

But given these odds, and the

fact that Mars missions are notorious for their high failure rates (about 30% since the early 2000s), why did the UAE aim for the red planet in the first place? Space programs have historically been used as catalysts for geopolitical influence. What’s more, we often think of them as costly endeavors of scientific curiosity, with few immediate and tangible benefits here on planet Earth. Does this reflect



Shock waves form around the nose of a Mitsubishi Heavy Industries H-2A rocket as it accelerates toward space carrying a Mars probe built by the United Arab Emirates. If all goes well, the spacecraft will brake into orbit around Mars in February 2021. Image credit: Mitsubishi Heavy Industries

the UAE journey?

Space missions typically depart trying to answer scientific questions, before they ask how their value can extend to the society behind it. The Hope mission, however, has inverted this traditional logic. Instead, its conception arose from a quest to fundamentally redirect a nation’s trajectory.

The UAE’s mission has been timed to coincide Hope’s arrival into Martian orbit with the nation’s 50th anniversary as an independent country. Through its design and execution, the mission aims to diversify UAE’s economy from traditional activity, including oil and finance. Instead, it wants to inspire a young Arab generation towards scientific and entrepreneurial careers – and away from other, less socially beneficial pathways.

Hope will also study the Martian atmosphere and gather data to generate the first truly holistic model of the planet’s weather system. The analysis and insights generated will help us better understand the atmospheric composition and ongoing climate change of our neighbour planet.

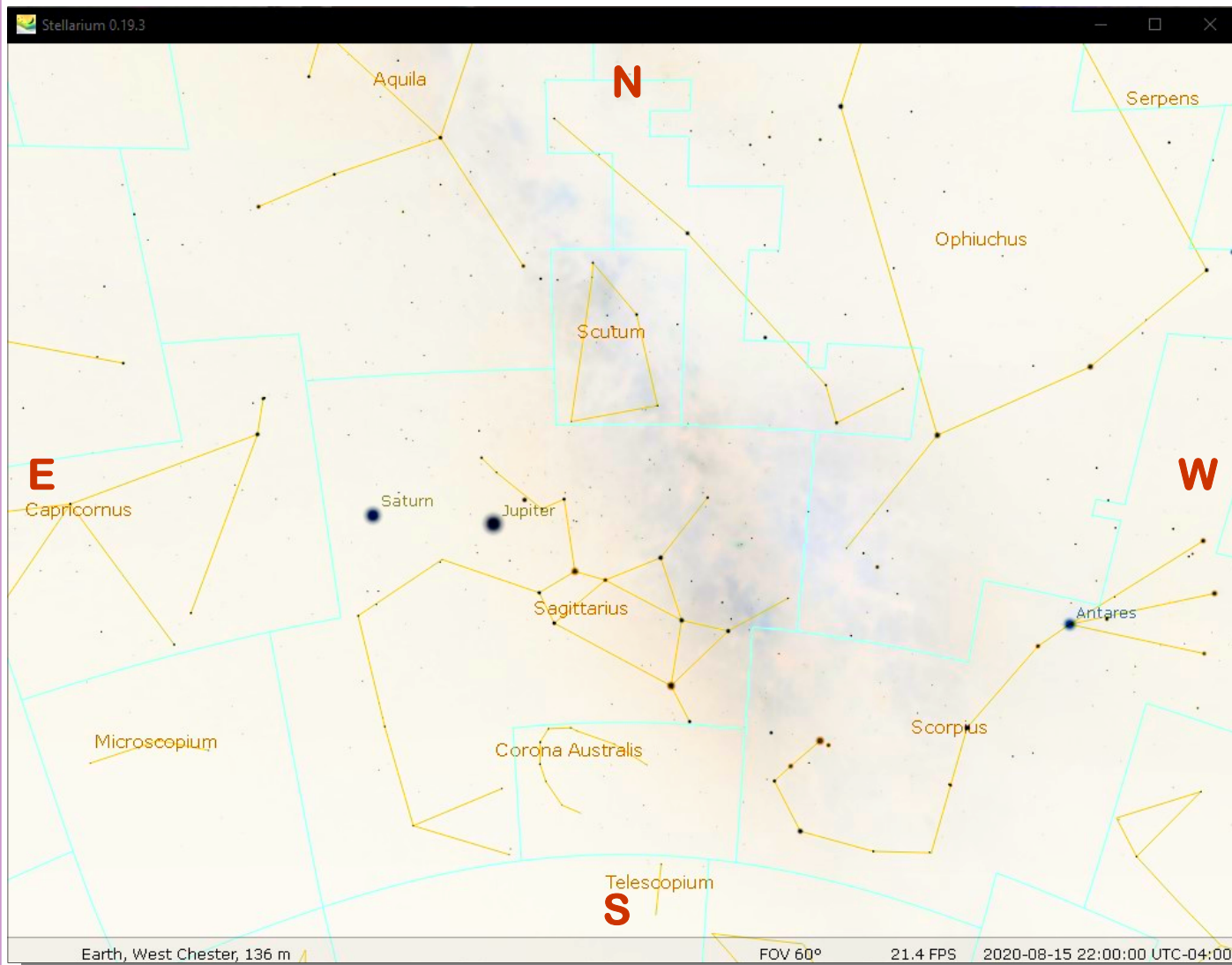
What could other nations learn from this distinctive approach to space exploration? Can a space mission really transform a national economy? These are the questions at the heart of an external review of the Emirates Mars mission undertaken by a group of researchers at the Department for Science, Technology, Engineering and Public Policy at University College London.

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The Sky Over Chester County

August 15, 2020 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
08/01/2020	5:31 a.m. EDT	6:01 a.m. EDT	8:15 p.m. EDT	8:45 p.m. EDT	14h 13m 58s
08/15/2020	5:45 a.m. EDT	6:14 a.m. EDT	7:58 p.m. EDT	8:27 p.m. EDT	13h 43m 36s
08/31/2020	6:01 a.m. EDT	6:29 a.m. EDT	7:34 p.m. EDT	8:02 p.m. EDT	13h 04m 35s

Moon Phases					
Last Quarter	08/11/2020	12:44 p.m. EDT	Full Moon	08/03/2020	11:58 a.m. EDT
First Quarter	08/25/2020	1:57 p.m. EDT	New Moon	08/18/2020	10:41 p.m. EDT

August 2020 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

1	The Moon, Jupiter and Saturn form a large triangle
3	Full Moon, the Full Sturgeon Moon or the Full Coho Salmon Moon, 11:58 a.m. EDT
11	Last Quarter Moon, 12:44 p.m. EDT
12	The Perseid meteor shower peaks in the predawn hours
18	New Moon, the Black Moon , 10:41 p.m. EDT
19	Look for a very thin crescent Moon in the west just after sunset
25	First Quarter Moon, 1:57 p.m. EDT, and the Lunar X is visible around 6 p.m. EDT
26	The Lunar Straight Wall is visible
27	The Moon, Jupiter, and Saturn form a line above the southern horizon

The best sights this month: Comet NEOWISE continues to be visible during August as it rises into the northern sky after darkness falls. Use binoculars to appreciate the bright nucleus and beautiful tail of this rare visitor from the outer solar system. We also have bright Jupiter and Saturn to see this month, along with the Perseid meteor shower on the night of August 11/12. And to top off the month the elusive Lunar X is visible on August 25th around 6 p.m.

Mercury: Mercury is not well positioned for observation during August.

Venus: Our sister planet rises around 3 a.m. and shines brightly at magnitude -4.4.

Mars: The red planet rises about 2 ½ hours after sunset and grows noticeably brighter as the month progresses, finishing the month at magnitude -1.8. The best view of Mars will be a few hours before sunrise when it will be near the meridian.

Jupiter: Jupiter shines brightly in the southeast during August at magnitude -2.6. Watch the Galilean moons as they dance around the planet, changing position by the hour. And use high magnification to see the Great Red Spot as it moves across Jupiter.

Saturn: The ringed planet follows Jupiter across the August sky with the amazing rings tilted at 22° from horizontal. Summer evenings can often bring calm air so you can use high magnification to really see details on the gas giants, although they are both fairly low in the sky so you will be looking through a lot of atmosphere.

Uranus and Neptune: Both gas giants are best viewed in the hours before dawn. Or wait until later this year to gaze upon these distant, cold worlds so you don't need to wake up the cats when you head outside with your telescope.

The Moon: The Moon is full on August 3rd. Native Americans called this the Full Sturgeon Moon. The fishing tribes are given credit for the naming of this Moon, since sturgeon, a large fish of the Great Lakes was 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. Native Canadians called this the Centawen (Coho Salmon) Moon.

Constellations: August has so many great constellations it is difficult to name my favorites, but the southern constellations of Sagittarius and Scorpius are near the top of my list. But the big birds of summer – Cygnus the Swan and Aquila the Eagle, also are incredibly beautiful and Cygnus is just so full of stars it is amazing to gaze upon with binoculars. Then rising in the east is the Great Square of Pegasus with the Andromeda Galaxy not far behind, which is an amazing sight in binoculars.

Messier/deep sky: Aim your binoculars or telescope straight up during August and you will cut through most of the haze that often fills the sky at this time of year. That is fairly easy to do with binoculars or a Dobsonian telescope, but it's hard on one's neck if you are using a refractor. High overhead the sky has some beautiful deep sky objects such as M13 and M92, the two bright globular clusters in Hercules. Not far away is M57, the Ring Nebula in Lyra. This is a faint object that is best viewed with averted vision in binoculars or a small telescope. If you are using a refractor or an SCT, target the incredible collection of Messier objects in the southern constellations. Or, set your hardware aside, lay down a blanket and lie on your back and just enjoy the incredible glow of the Milky Way!

(Continued on page 11)

Through the Eyepiece: Comet NEOWISE

by Don Knabb, CCAS Treasurer & Observing Chair

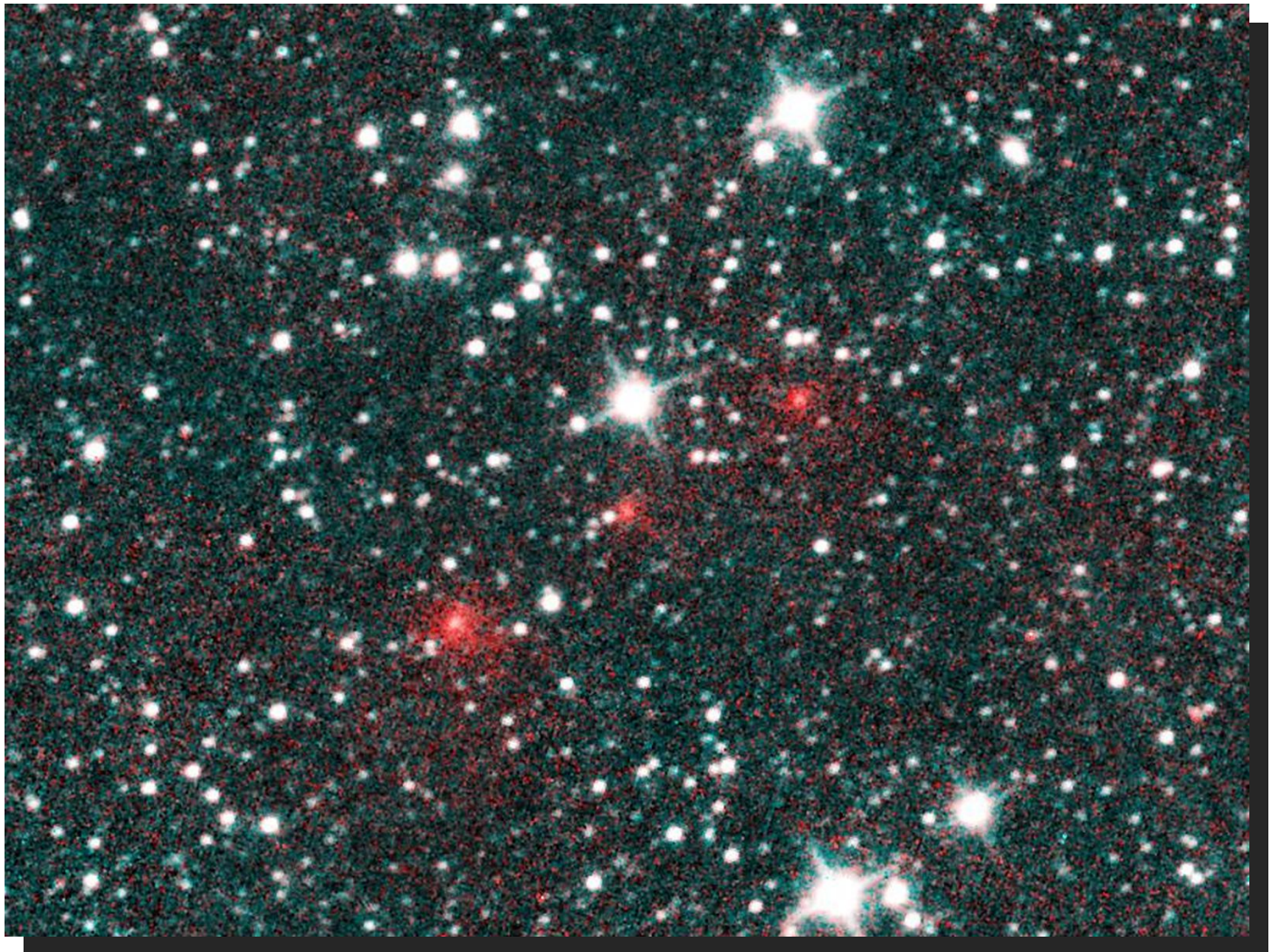


Image credit: NASA/JPL-Caltech, public domain photo

What a rare gift from the sky we were given during July – Comet NEOWISE! I hope many of you were able to see Comet NEOWISE with your naked eyes, binoculars, or a telescope. The sight was awe inspiring to say the least.

As you read this in early August there is still time to see the comet, but by now you will need binoculars or a telescope at a dark site. I viewed the comet on July 25th and it has faded considerably from its appearance during mid-July.

The comet travels from Ursa Major into Coma Berenices in the next few weeks. Highlights include a close pairing with the Black Eye Galaxy (M64) on August 3rd followed by an attractive grouping with the globular clusters M53 and NGC 5053 on August 6th. NEOWISE will shine around magnitude 6 at the time, the naked-eye limit.

Comets are cosmic snowballs of frozen gases, rock and dust that orbit the Sun. When frozen, they are the size of a small town. From the infrared signature, the

diameter of the nucleus of Comet NEOWISE is estimated to be approximately 5 km (3 mi).

When a comet's orbit brings it close to the Sun, it heats up and spews dust and gases into a giant glowing head larger than most planets. The dust and gases form a tail that stretches away from the Sun for millions of miles. There are likely billions of comets orbiting our Sun in the Kuiper Belt and even more distant Oort Cloud. The current number of known comets is: 3,653.

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Eyepiece (Cont'd)



*Comet NEOWISE. Photo credit: Don Knabb at Cherry Springs on July 15, 2020.
Image captured with a Canon EOS 7D.*

(Continued from page 6)

Comet NEOWISE is a long period comet with a near-parabolic orbit. It was discovered on March 27, 2020, by astronomers during the NEOWISE mission of the Wide-field Infrared Survey Explorer (WISE)

space telescope. At that time, it was an 18th-magnitude object, located 2 Astronomical Units (AU) from the Sun and 1.7 AU away from Earth.

By July it was bright enough to be visible to the naked eye. It is

one of the brightest comets in the northern hemisphere since Comet Hale-Bopp in 1997, but it is no Hale-Bopp, for those who remember the great comet of 1997.

At Cherry Springs State Park, it was easily visible to the naked eye, however from the light polluted skies of West Chester it was a faint smudge best seen with averted vision. But using binoculars the bright nucleus of the comet and its long tail was seen without a problem.

The comet survived its recent closest approach to the Sun, and is now headed back toward the outer solar system, where it travels to a farthest distance of 715 AU, from the Sun. For comparison, Earth orbits at 1 AU, Jupiter at 5 AU, and Neptune at 30 AU. Comet NEOWISE takes about 6,800 years to make one lap around its long, stretched out orbit, so it won't visit the inner solar system again for many thousands of years

The picture on the opposite page from NASA is how the comet was discovered. Comet NEOWISE appears as a string of fuzzy red dots in the composite of several heat-sensitive infrared images taken by NASA's Near-Earth Object Wide-field Infrared Survey Explorer (NEOWISE) mission on March 27, 2020.

The comet was discovered using these images to track its motion across the sky against the backdrop of stationary stars and galaxies. These images have been processed such that Comet NEOWISE appears red in color.

Comet NEOWISE has not been

(Continued on page 11)

NASA Night Sky Notes: Summer Triangle Corner—Deneb by David Prosper

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach.

Visit nightsky.jpl.nasa.gov to find local clubs, events, stargazing info and more.

The Summer Triangle is high in the sky after sunset this month for observers in the Northern Hemisphere, its component stars seemingly brighter than before, as they have risen out of the thick, murky air low on the horizon and into the crisper skies overhead. Deneb, while still bright when lower in the sky, now positively sparkles overhead as night begins. What makes Deneb special, in addition to being one of the three points of the Summer Triangle? Its brilliance has stirred the imaginations of



people for thousands of years!

Deneb is the brightest star in Cygnus the Swan and is positioned next to a striking region of the Milky Way, almost as a guidepost. The ancient Chinese tale of the Cowherd (Niulang)

and the Weaver Girl (Zhinü) - represented by the stars Altair and Vega - also features Deneb. In this tale the two lovers are cast apart to either side of the Milky Way, but once a year a magical bridge made of helpful magpies - marked by Deneb - allows the lovers to meet. Deneb has inspired many tales since and is a staple setting of many science fiction stories, including several notable episodes of *Star Trek*.

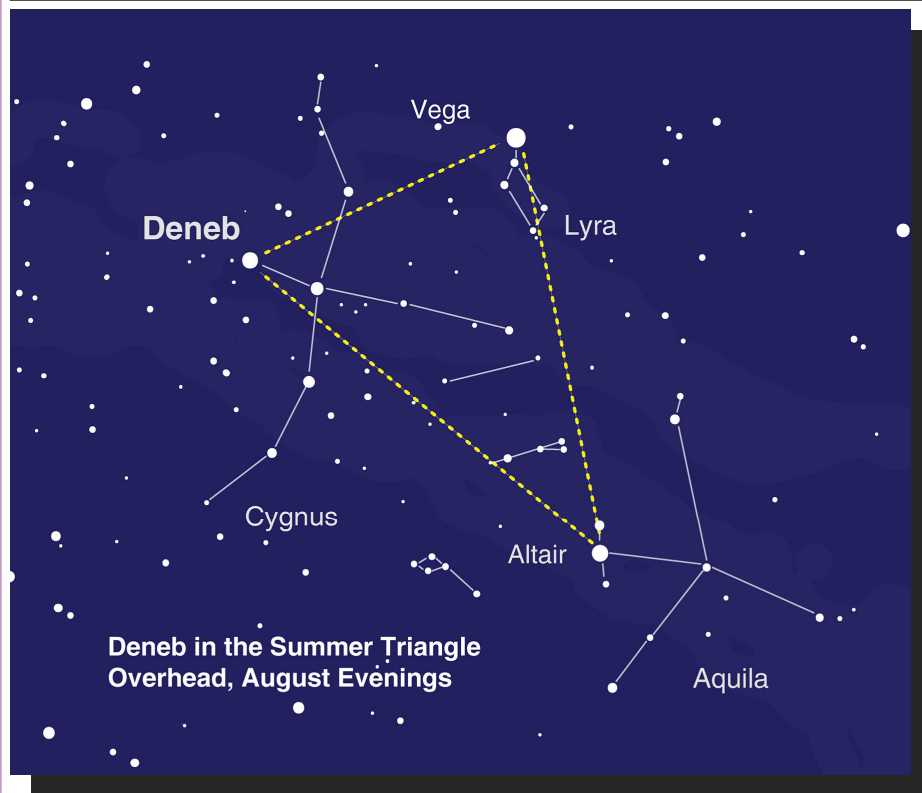
Astronomers have learned quite a bit about this star in recent years, though much is still not fully understood - in part be-

(Continued on page 9)



Long exposure shot of Deneb (brightest star, near center) in its richly populated Milky Way neighborhood.
Photo credit: Flickr user jpstanley. Source: <https://www.flickr.com/photos/jpstanley/1362619922>
License: <https://creativecommons.org/licenses/by-nc-sa/2.0/>

Night Sky Notes (Cont'd)



Deneb in the Summer Triangle Overhead, August Evenings

Spot Vega and the other stars of the Summer Triangle by looking straight up after sunset in August!

(Continued from page 8)

cause of its intense brightness. The distance to Deneb from our Sun was measured by the ESA's Hipparcos mission and estimated to be about 2,600 light years. Later analysis of the same data suggested Deneb may be much closer: about 1,500 light years away. However, the follow-up mission to Hipparcos, Gaia, is unable to make distance measurements to this star! Deneb, along with a handful of other especially brilliant stars, is too bright to be accurately measured by the satellite's ultra-sensitive instruments.

Deneb is unusually vivid, especially given its distance. Generally, most of the brightest stars seen from Earth are within a few dozen to a few hundred light years away, but Deneb stands out by being thousands of light years distant! In fact, Deneb

ranks among the top twenty brightest night time stars (at #19) and is easily the most distant star in that list. Its luminosity is fantastic but uncertain, since its exact distance is also unclear. What is known about Deneb is that it's a blue-white supergiant star that is furiously fusing its massive stocks of thermonuclear fuel and producing enough energy to make this star somewhere between 50,000 and 190,000 times brighter than our Sun if they were viewed at the same distance! The party won't last much longer; in a few million years, Deneb will exhaust its fuel and end its stellar life in a massive supernova, but the exact details of how this will occur, as with other vital details about this star, remain unclear.

Discover more about brilliant stars and their mysteries at nasa.gov.

Hope (Cont'd)

(Continued from page 3)

Over the course of five months, we undertook a comprehensive evaluation of the impact and value generated by the mission less than five years after its inception. What we found was that there's already evidence that the mission is having the intended impact. The country has massively boosted its science capacity with over 50 peer-reviewed contributions to international space science research. The forthcoming open sharing of Hope's atmospheric data measurements is likely to amplify this contribution.

The nation has also generated significant additional value in logistics by creating new manufacturing capacities and know-how. There are already multiple businesses outside the realm of the space industry that have benefited from knowledge transfer. These are all typical impacts of a space mission.

But while that is where most studies of the value of space missions stop looking for impact, for the UAE this would miss a huge part of the picture. Ultimately, its Mars mission has generated transformative value in building capacity for a fundamentally different future national economy – one with a much stronger role for science and innovation.

Through a broad portfolio of programs and initiatives, in just a few years the Hope mission has boosted the number of students enrolling in science degrees and helped create new graduate science degree pathways. It has also opened up new

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DIY Upgrades to a Dobsonian Reflector

by CCAS Member Navjot Hanspal

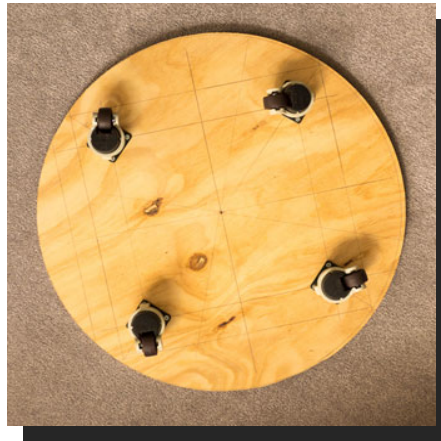
Dobsonian reflectors, with all their benefits, do have a problem - how to point them in a specific direction. Stellarium and other programs can give coordinates but using them with an inexpensive Dobsonian is not easy.

I modified my unit that West Chester University had kindly loaned to me by putting it on a pedestal with azimuthal markings and using a digital inclinometer for altitude.

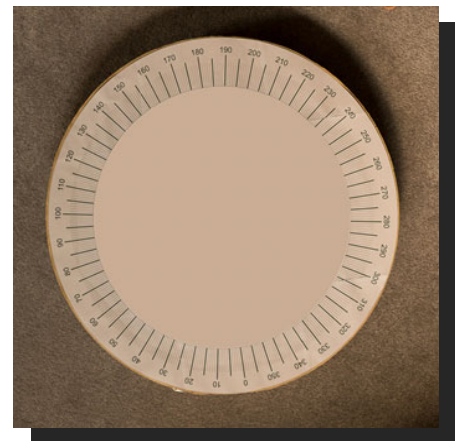
Follow the steps below if you want to modify your own Dobsonian.

- Step 1: A sturdy piece of plywood 2'x 2' is big enough. It needs to be bigger than Dobsonian base.
- Step 2: Draw a circle a few inches larger than the base of Dobsonian - 23 1/4" in my case.
- Step 3: Cut out the circular shape (cutting corners to make an octagon will be easier and work as well)
- Step 4: Affix leveling casters so that the base could be leveled. (Base Underside)
- Step 5: Draw/affix 360 degrees around the circle. I drew it with Corel Graphics printed and taped it. (Base Top)
- Step 6: Put an arrow mark perpendicular to the axis of rotation of the optical tube assembly. This would be the azimuth mark.

Lastly, line up the "0" of the base with true north, place the base of the Dobsonian on top of it, and enjoy a reasonably accurate navigation aid to the sky.



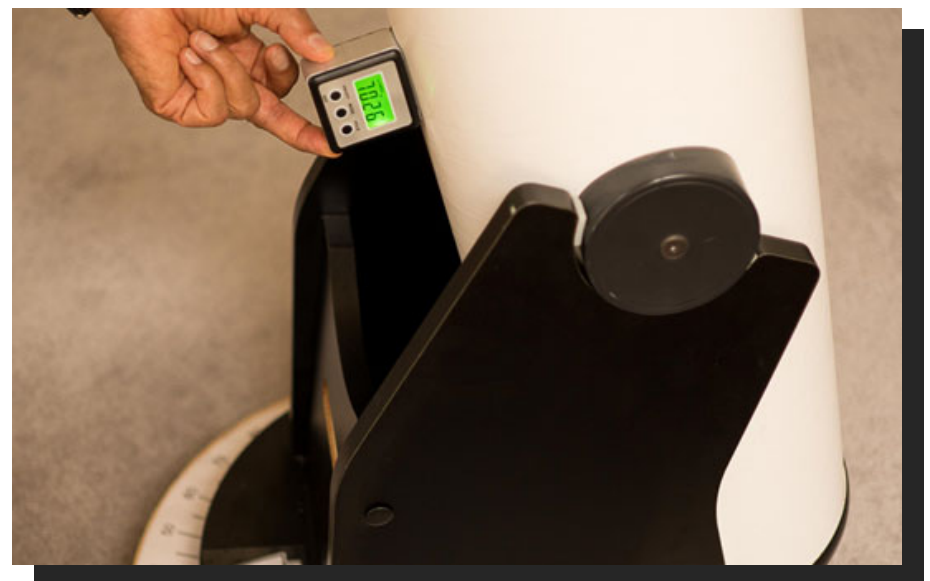
Step 4: Affix the casters to the base



Step 5: Draw/affix 360 degrees around the circle



Step 6: Put arrow mark perpendicular to the axis of rotation of the optical tube.



Digital inclinometer. [Available Online thru Amazon](#)

Hope (Cont'd)

(Continued from page 9)

sources of funding for research and made science an attractive career.

One of the lessons is therefore that when embedded within a long-term, national strategic vision, space exploration can in the short term generate major benefits close to home. While space may appear to primarily be about missions for science, when designed in this way, they can be missions for national development.

Hope will reach Martian orbit in February 2021. Only then will its scientific mission truly take off. But its message of Hope has already been broadcast.

Read the [article online](#).

THE CONVERSATION

Eyepiece (Cont'd)

(Continued from page 7)

classified a “great comet”. This distinction is usually reserved for comets that are easily observable with the naked eye, even with low to moderate light pollution.

So, grab your binoculars or telescope and use an astronomy app or program to help you find this amazing visitor from the outer realms of the solar system before it fades from sight.

Information credits:

- <https://solarsystem.nasa.gov/whats-up-skywatching-tips-from-nasa/>
- [https://en.wikipedia.org/wiki/C/2020_F3_\(NEOWISE\)](https://en.wikipedia.org/wiki/C/2020_F3_(NEOWISE))
- <https://skyandtelescope.org/astronomy-news/comet-neowise-dazzles-at-dusk/>

Observing (Cont'd)

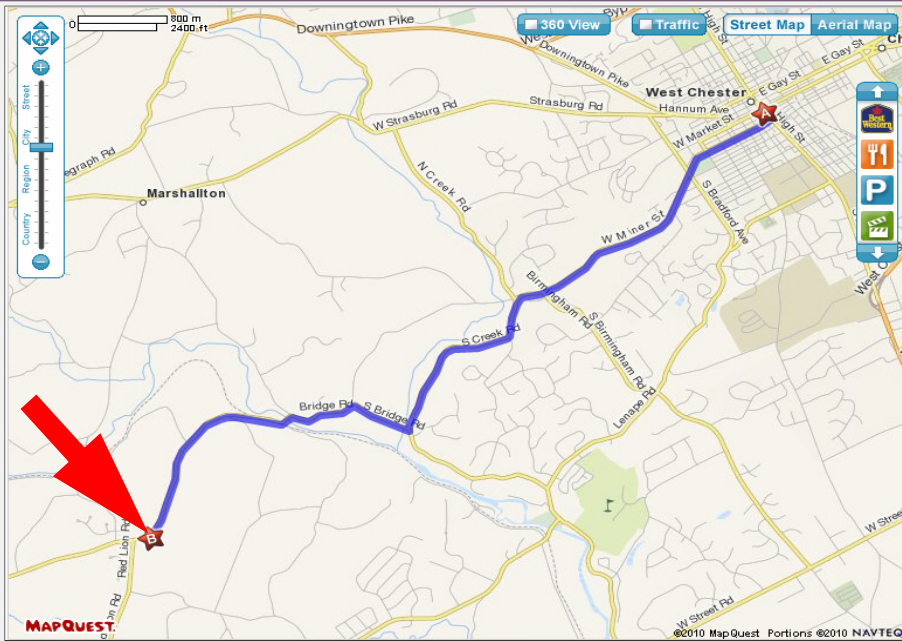
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Comets: Comet NEOWISE! Need I say more? This comet came out of nowhere to fill the northern sky with its bright nucleus and amazing tail. At Cherry Springs the tail extended over 5° upward from the horizon and was easily visible to the naked eye. NEOWISE will continue to be visible during August as it rises higher into the evening sky, but it will also become dimmer, so on any clear evening go outside with your binoculars and enjoy this rare bright comet.

Meteor showers: It is again time for the most popular meteor shower of the year, the Perseid meteor shower! The first quarter Moon will rise around midnight on the night of August

(Continued on page 12)

CCAS Directions



Brandywine Red Clay Alliance

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

<http://brandywinewatershed.org/>

BRC was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

Brandywine Red Clay Alliance

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

To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).

CCAS Directions

West Chester University Campus

The monthly meetings (September through May) are held in Room 112 in Merion Science Center (formerly the Boucher Building), attached to the Schmucker Science Center. The Schmucker Science Center is located at the corner of S. Church St & W. Rosedale Ave. Parking is generally available across Rosedale in the Sykes Student Union parking lot (Lot K).



Observing (Cont'd)

(Continued from page 11)

11/12, which will wash out many of the meteors during the peak viewing time in the hours just before dawn.

But my favorite part of this shower is just as the sky darkens 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. Do not miss this shower! When you see a fireball fly cross the sky you will never forget it.

CCAS Membership Information and Society Financials

Treasurer's Report

by Don Knabb

July 2020 Financial Summary

Beginning Balance	\$884
Deposits	\$224
Disbursements	-\$495
Ending Balance	\$613

New Member Welcome!

Welcome new CCAS members Brandon Barker, Downingtown, PA, and Meghan Force & Family, Malvern, 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.

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:

Dr. John C. Hepler
21103 Striper Run
Rock Hall, MD 21661

CCAS Newsletters via E-mail

You can receive the monthly newsletter (in full color!) via e-mail. All you need is a PC or Mac with an Internet e-mail connection. To get more information about how this works, send an e-mail request to Dr. John Hepler, the newsletter editor, at: newsletter@ccas.us.

CCAS Website

Dr. John Hepler is the Society's Webmaster. You can check out our Website at:

<http://www.ccas.us>

Dr. Hepler 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 Dr. Hepler at (410) 639-4329 or e-mail to webmaster@ccas.us

CCAS Purpose

The Chester County Astronomical Society was formed in September 1993, with the cooperation of West Chester University, as a non-profit organization dedicated to the education and enjoyment of astronomy for the general public. The Society holds meetings (with speakers) and observing sessions once a month. Anyone who is interested in astronomy or would like to learn about astronomy is welcome to attend meetings and become a member of the Society. The Society also provides telescopes and expertise for "nights out" for school, scout, and other civic groups.

CCAS Executive Committee

For further information on membership or society activities you may call:

President: Dave Hockenberry
610-558-4248

Vice President: Pete Kellerman
610-873-0162

ALCor, Observing, & Treasurer: Don Knabb
610-436-5702

Secretary: Beatrice Mazziotta
610-933-2128

Librarian: Barb Knabb
610-436-5702

Program: Bruce Ruggeri
484-883-5092

Education: Don Knabb
610-436-5702

Dennis O'Leary
610-701-8042

Webmaster & Newsletter: John Hepler
410-639-4329

Public Relations: Ann Miller
610-558-4248



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**.