



Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

Vol. 26, No. 7 **Three-Time** Winner of the Astronomical League's Mabel Sterns Award ☼ 2006, 2009 & 2016

July 2018

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CCAS Founder Ed Lurcott Celebrates 90th Birthday



Membership Renewals Due

07/2018	Hockenberry & Miller Hunsinger Johnston Piehl
08/2018	Buki Dwyer Knabb & Family Lurcott, L. Tiedemann
09/2018	Lurcott, E. Squire Family Stein Family

July 2018 Dates

- 6th • Last Quarter Moon, 3:50 a.m. EDT
- 11th-12th • Mercury is at its greatest eastern elongation
- 12th • New Moon, 10:47 a.m. EDT
- 19th • First Quarter Moon, 3:52 p.m. EDT
- 27th • Mars is at opposition
- 27th • Full Moon, the Full Buck Moon or the Birds Shed
Feathers Moon, 4:20 p.m. EDT
- 31st • Mars is at its closest point to Earth



CCAS Upcoming Nights Out

CCAS has several special "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

- ☼ **Friday, July 13, 2018** - CCAS Special Observing Session, Friday Night Lights, ChesLen Preserve, Coatesville, PA. For non-members registration is required with The Natural Lands Trust.
- ☼ **Friday, August 3, 2018** - CCAS Special Observing Session, Welkinweir Estate & Gardens, Pottstown, PA.
- ☼ **Saturday, August 18, 2018** - Natural Lands Trust Multi-Club Event, Moon & Planet Party, ChesLen Preserve, Coatesville, PA. For non-members registration is required with The Natural Lands Trust.

Summer 2018 Society Events

July 2018

6th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

10th-13th • CCAS Special Camping & Observing Session at Cherry Springs State Park, Coudersport, PA.

12th-13th • The von Kármán Lecture Series: [Walking on Mars](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

13th • CCAS Special Observing Session, Friday Night Lights, ChesLen Preserve, Coatesville, PA. For non-members registration is required with The Natural Lands Trust.

20th • Open call for articles and photographs for the August 2018 edition of [Observations](#).

26th • Deadline for newsletter submissions for the August 2018 edition of [Observations](#).

August 2018

3rd • CCAS Special Observing Session, Welkinweir Estate & Gardens, Pottstown, PA.

9th-10th • The von Kármán Lecture Series: [Spitzer Beyond: The Incredible Continuing Adventures of the Spitzer Space Telescope](#), Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

11th • CCAS Special Observing Session at Hickory Run State Park, White Haven, PA.

17th • CCAS Monthly Observing Session, Myrick Conservancy Center, BRC. The observing session starts at sunset.

18th • Natural Lands Trust Multi-Club Event, Moon & Planet Party, ChesLen Preserve, Coatesville, PA.

20th • Open call for articles and photographs for the September 2018 edition of [Observations](#).

26th • Deadline for newsletter submissions for the September 2018 edition of [Observations](#).

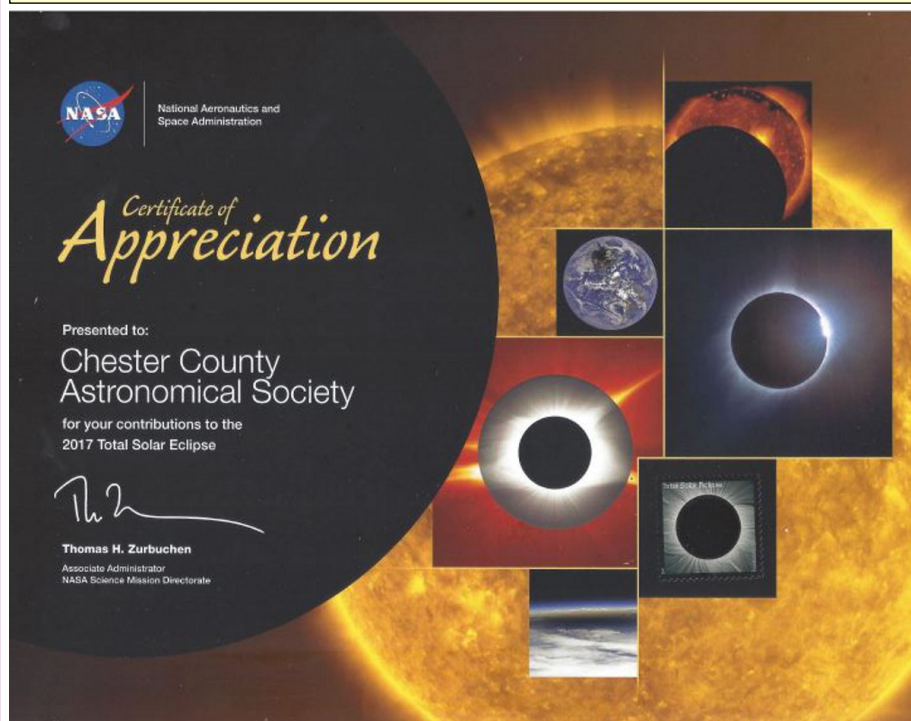
Mark Your Calendars for the CCAS Summer Picnic!

by Don Knabb, CCAS Treasurer & Observing Chair

Mark your calendars – we have selected Saturday, September 1, 2018, for the CCAS summer picnic. It will be at Barb's and my house and it will start at 6:00 p.m. With the recent examination of the 20 inch Ed Lurcott club telescope we are all set to see some sights in the sky. If you've never seen M13, the Great Globular Cluster in Hercules, through this telescope you really need to gaze into the eyepiece at that glorious collection of stars. And Mars and Saturn will also be fantastic, not to mention many other sights to see. More details about the picnic will be sent closer to the date, but be sure to mark your calendars and join us for an evening of companionship, food, drink and star gazing.

NASA Certificate of Appreciation Awarded to CCAS

by Roger Taylor, CCAS President



September 2018 CCAS Meeting Agenda

by Dave Hockenberry, CCAS Program Chair

Our next meeting will be held on September 11, 2018, 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: TBA.

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 2018-2019 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

New Radio Telescope in South Africa Will Study Galaxy Formation

by Daniel Clery, *Science Magazine*

On June 19, 2018, the Square Kilometre Array (SKA), a continent-spanning radio astronomy project, announced that Spain has come on board as the collaboration's 11th member. Meanwhile, on the wide-open plains of the Karoo, a semiarid desert northeast of Cape Town, South Africa, part of the telescope is already in place in the shape of the newly completed MeerKAT, the largest and most powerful radio telescope in the Southern Hemisphere.

The last of 64 13.5-meter dishes was installed late last year, and next month South African President Cyril Ramaphosa will officially open the facility. Spread across 8 kilometers, the dishes have a collecting area similar to that of the great workhorse of astrophysics, the Karl G. Jansky Very Large Array (VLA) near Socorro, New Mexico. But with new hardware designs and a powerful supercomputer to process data, the newcomer could have an edge on its 40-year-old northern cousin. Sensitive across a wide swath of the radio spectrum, MeerKAT can study how hydrogen gas moves into galaxies to fuel star formation.

MeerKAT, which stands for Karoo Array Telescope along with the Afrikaans word for "more," is one of several precursor instruments for the SKA. The first phase of the SKA could begin in 2020 and would add another 133 dishes to MeerKAT, extending it across 150 kilometers, and place 130,000 smaller radio antennas across Australia.

With MeerKAT's 64 dishes now in place, engineers are learning how to process the data they gather. In a technique called in-



*MeerKAT's 64 dishes can study the way hydrogen gas moves around galaxies.
Image courtesy South African Radio Astronomy Observatory*

terferometry, computers correlate the signals from pairs of dishes to build a much sharper image than a single dish could produce. For early science campaigns last year, 16 dishes were correlated. In March, the new supercomputer came online, and the team hopes to be fully operational by early next year.

MeerKAT's dishes are smaller than the VLA's, but having more of them puts it in "a sweet spot of sensitivity and resolution," says Fernando Camilo, chief scientist of the South African Radio Astronomy Observatory in Cape Town. Its dishes are split into a densely packed core, which boosts sensitivity, and widely dispersed arms, which increase resolution. The VLA can opt for sensitivity or resolution, but not both at once—and only after the slow process of moving its 27 dishes into a different configuration.

The combination makes MeerKAT ideal for mapping hydrogen, the fuel of star and galaxy formation. Because of a spontaneous transition in the atoms of neutral hydrogen, the gas con-

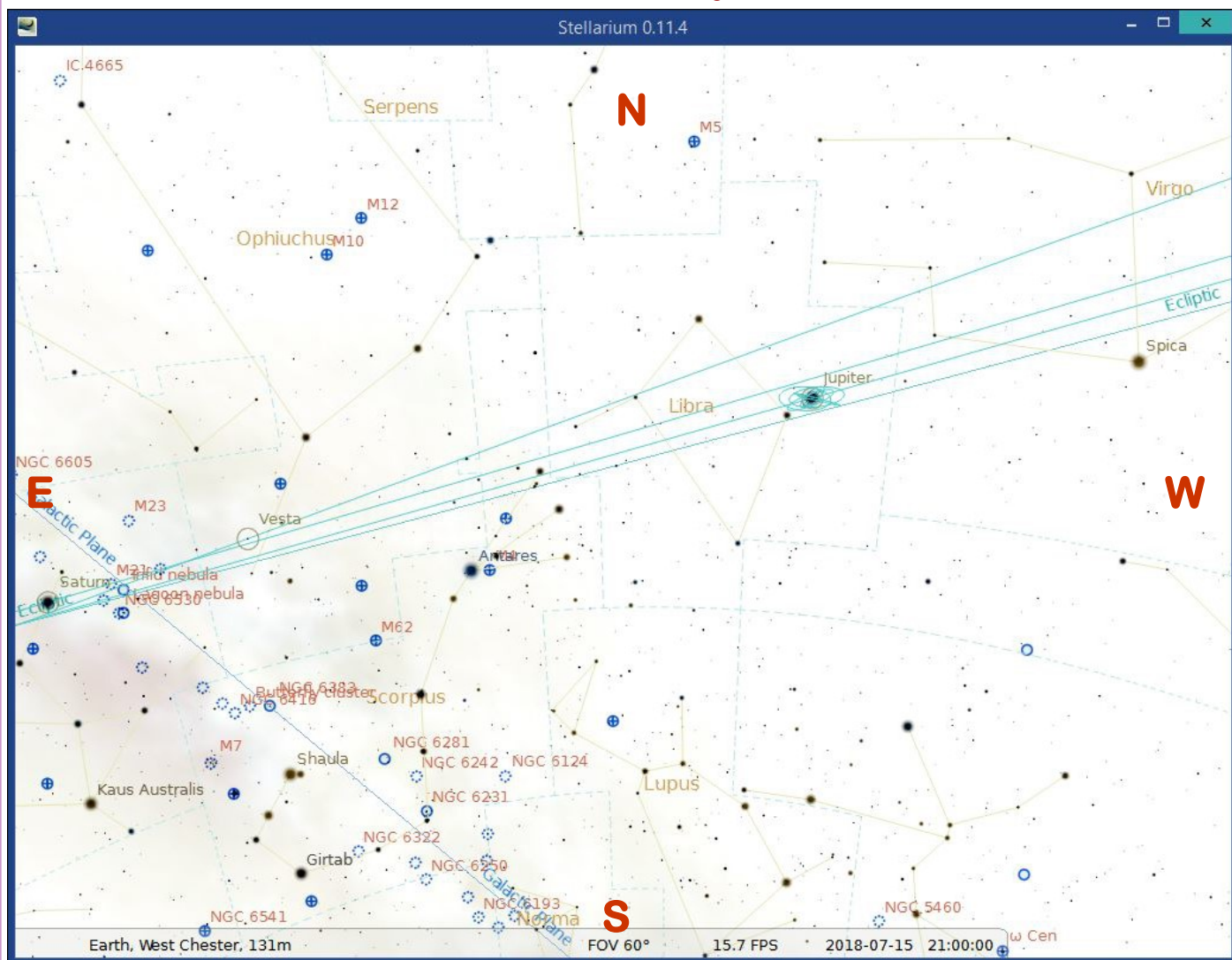
stantly emits microwaves with a wavelength of 21 centimeters. Stretched to radio frequencies by the expansion of the universe, these photons land in the telescope's main frequency band. It should have the sensitivity to map the faint signal to greater distances than before, and the resolution to see the gas moving in and around galaxies.

MeerKAT will also watch for pulsars, dense and rapidly spinning stellar remnants. Their metric radio wave pulses serve as precise clocks that help astronomers study gravity in extreme conditions. "By finding new and exotic pulsars, MeerKAT can provide tests of physics," says Philip Best of the University of Edinburgh. Heino Falcke of Radboud University in Nijmegen, the Netherlands, wants to get a better look at a highly magnetized pulsar discovered in 2013. He hopes it will shed light on the gravitational effects of the leviathan it orbits: the supermassive black hole at the center of the Milky Way.

The Sky Over Chester County

July 15, 2018 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
07/01/2018	5:03 a.m. EDT	5:35 a.m. EDT	8:33 p.m. EDT	9:05 p.m. EDT	14h 57m 25s
07/15/2018	5:12 a.m. EDT	5:44 a.m. EDT	8:28 p.m. EDT	9:00 p.m. EDT	14h 43m 36s
07/31/2018	5:27 a.m. EDT	5:58 a.m. EDT	8:15 p.m. EDT	8:45 p.m. EDT	14h 16m 56s
Moon Phases					
Last Quarter	07/06/2018	3:50 a.m. EDT	New Moon	07/12/2018	10:47 a.m. EDT
First Quarter	07/19/2018	3:52 p.m. EDT	Full Moon	07/27/2018	4:20 p.m. EDT

July 2018 Observing Highlights

by Don Knabb, CCAS Treasurer & Observing Chair

3	Look for Mercury near the Beehive Cluster
6	Last Quarter Moon, 3:50 a.m. EDT
11/12	Mercury is at its greatest eastern elongation
12	New Moon and Pluto is at opposition
15	The Moon is near Venus and Regulus
19	First Quarter Moon, 3:52 p.m. EDT
20	The Lunar Straight Wall is visible, and the Lunar X is visible at 1:00 a.m.
24	The Moon is near Saturn
27	Mars is at opposition
27	Full Moon, the Full Buck Moon or the Birds Shed Feathers Moon, 4:20 p.m. EDT
30	The Southern Delta Aquariid meteor shower peaks
31	Mars is at its closest point to Earth

The best sights this month: Venus, Jupiter and Saturn rule the evening sky and Mars rises late at night. Enjoy this parade of planets, especially Mars which is the closest it has been to Earth in 15 years!

Mercury: Mercury is visible early in the month, and for a nice show look for it near the Beehive Cluster on July 3rd or 4th.

Venus: You can't miss bright Venus in the evening sky. Look for it near the Moon on July 15th when Mercury and Regulus in Leo are to the lower right just after it gets dark around 9:30.

Mars: On July 27th, Mars reaches opposition, the point in its orbit when it is opposite the Sun from Earth. That means it rises at sunset and sets at sunrise. This is the most favorable opposition for 15 years since Mars reaches its closest point to Earth 4 nights later. The view of Mars won't be this good

again until 2035 so be sure to gaze at the Red Planet this summer.

Jupiter: Jupiter is starting to fall behind in our race around the Sun but is still amazing to view. Any telescope will allow you to see the two dark bands on the planet's surface and you can watch the dance of the Galilean moons from hour to hour and night to night. At BRC in June we watched Io's shadow on the planet and then saw the Great Red Spot move across Jupiter!

Saturn: From Jupiter, scan to the east (left) to find Saturn rising after the sky is fully dark. During this summer Saturn dances with several Messier objects in Sagittarius such as the Trifid Nebula, the Lagoon Nebula and the open cluster M25.

Uranus and Neptune: The distant gas giants can only be observed in the hours before dawn.

The Moon: Full Moon is on July 27th. 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. This Full Moon has also been called the Full Hay Moon. Native Canadians called this the Birds Shed Feathers Moon.

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 nebula. 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

(Continued on page 9)

Through The Eyepiece: Mars, the Red Planet

by Don Knabb, CCAS Treasurer & Observing Chair

This summer we have a real treat to see in the sky – the Red Planet Mars. Mars reaches perihelic opposition on July 27th. That is when a planet is both at opposition – the point in its orbit when it is on the opposite side of the Sun as viewed from the Earth – and it is also at its closest approach in its orbit to the Sun. This cosmic coincidence has not occurred since August of 2003, so let's enjoy it while we can.

On July 27th Mars will shine at a brilliant -2.8 magnitude. That is brighter than any star in the sky. The only objects in the night sky that are brighter are Venus and the Moon.

Mars, the fourth planet from the Sun in the Solar System is named after Mars, the Roman god of war. It is also referred to as the "Red Planet" because of its reddish appearance as seen from Earth. Before humans had telescopes, fear and foreboding rose whenever a blood-red dot looped its way across an otherwise still sky.

Mars is a rocky or terrestrial planet, with a thin atmosphere. Its surface features are reminiscent both of the impact craters of the Moon and the volcanoes, valleys, deserts and polar ice caps of Earth.

If it was not for the high radiation levels, with a good scuba suit and a warm winter jacket you could walk around on the surface of Mars. Are there places on Earth that are similar to Mars? Yes, the Canadian arctic for example, where Mars astronaut suits have been tested. Or perhaps Death Valley, Califor-

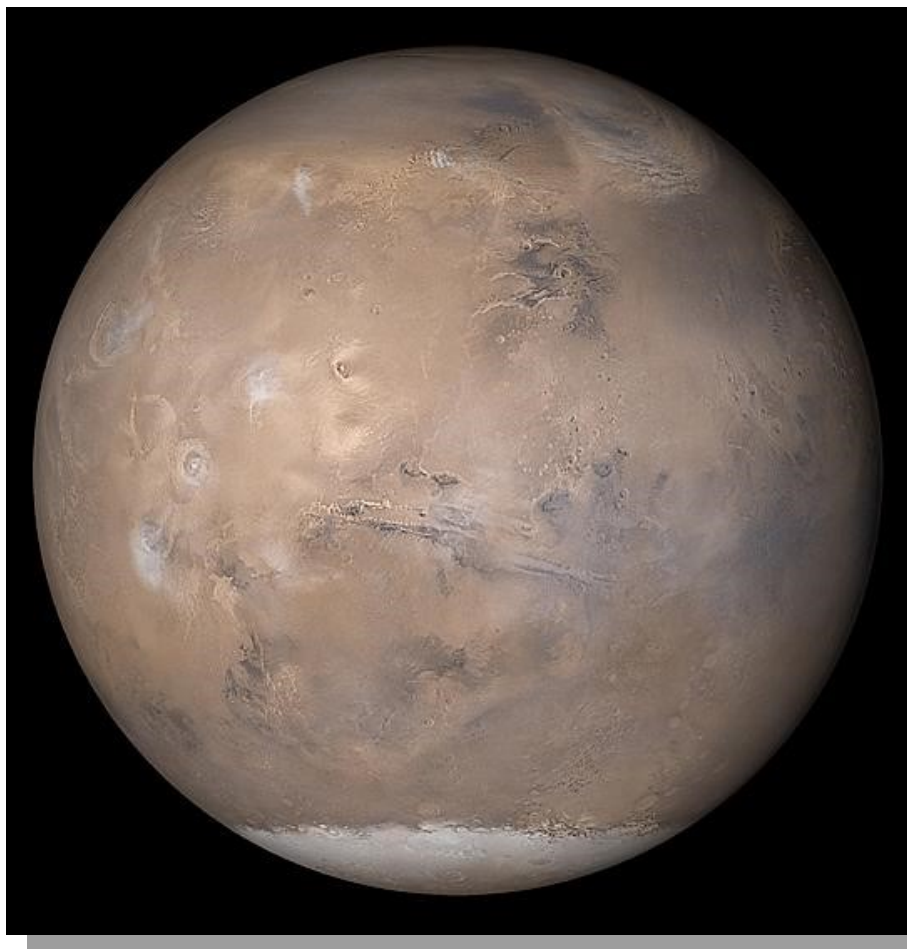


Image source: Mars Global Surveyor, NASA/JPL/Malin Space Science Systems

nia where we find geologic features similar to Mars.

Mars is home to Olympus Mons, the highest known mountain in the solar system, and of Valles Marineris, the largest canyon. In addition to its geographical features, Mars' rotational period and seasonal cycles are likewise similar to those of Earth.

To observe Mars, you really do not need a sky chart. In mid-July, just go outside around 11:00 p.m. and look toward the southeast. You will immediately see why Mars is called the Red Planet. Mars will rise earlier as the summer progresses, but the best viewing days are around July 27th.

It is hard to know how much detail we'll be able to see during this perihelic opposition. The dust storms on Mars are hard to predict. If conditions are good, you might be able to glimpse the northern ice cap using a 6 inch or larger telescope under good viewing conditions. Take your time at the eyepiece. The more you look, the more you will see as the atmospheric conditions change.

It was recently announced that NASA's Curiosity rover has found new evidence, "tough" organic molecules, preserved in rocks on Mars that suggests the planet could have supported an-

(Continued on page 7)

Eye-piece (Cont'd)



Credits: NASA/JPL-Caltech/MSSS

(Continued from page 6)

cient life, as well as new evidence in the Martian atmosphere that relates to the search for current life on the Red Planet. While not necessarily evidence of life itself, these findings are a good sign for future missions exploring the planet's surface and subsurface.

"Curiosity has not determined the source of the organic molecules," said Jen Eigenbrode of NASA's Goddard Space Flight Center in Greenbelt, Maryland, who is lead author of one of the two new Science papers. "Whether it holds a record of ancient life, was food for life, or has existed in the absence of life, organic matter in Martian mate-

rials holds chemical clues to planetary conditions and processes."

The low-angle self-portrait of NASA's Curiosity Mars rover on the left shows the vehicle at the site from which it reached down to drill into a rock target called "Buckskin" on lower Mount Sharp.

There is clear evidence that in the distant past, the Martian climate allowed liquid water – an essential ingredient for life as we know it – to pool at the surface. Data from Curiosity reveal that billions of years ago, a water lake inside Gale Crater held all the ingredients necessary for life, including chemical building blocks and energy sources.

Information sources:

<https://www.nasa.gov/press-release/nasa-finds-ancient-organic-material-mysterious-methane-on-mars>
<http://mars.jpl.nasa.gov/extreme/>
<http://en.wikipedia.org/wiki/Mars#Viewing>

Cherry Springs Camping & Observing Trip This Month

by Don Knabb, CCAS Program Chair & Treasurer

Due to inclement weather, the planned camping trip at Cherry Springs State Park in May had to be cancelled. We have rescheduled the trip for this month, as the weather should be more cooperative. We will depart on Tuesday, July 10th and return on Friday, July 13th.

Cherry Springs State Park is about a 4 ½ hour drive from West Chester. Pete Kellerman has been to Cherry Springs many times and he assures us that during the week we do not need to be concerned with find-

ing room to set up our camping sites on the astronomy field, but the sites are first come, first served.

Note that on the astronomy field the only light allowed after dark is red light unless the sky is 100% cloudy. Light sources in vehicles or computer screens must be blocked or filtered. Green lasers are prohibited. Open fires are prohibited but gas camp stoves are allowed. Electrical power is available for charging up batteries.

You can download a [park brochure and map](#) and registration is required for camping. This is done at the registration kiosk near the entrance to the astronomy field. Fee envelopes must be filled out and the fee placed into the envelope and deposited in the fee tube.

If you would like to join us in our second attempt, please send an email to [Don Knabb](#). Of course, the trip is again weather dependent. If rain is forecast again, we will have to cancel the trip.

A Close-Up View of Mars

by Jane Houston Jones and Jessica Stoller-Conrad

This article is distributed by NASA Space Place.

With articles, activities and games NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!

In July 2018, skywatchers can get an up close view of Mars—even without a telescope! In fact, on July 31, Mars will be closer to Earth than it has been in 15 years. Why is that?

Like all the planets in our solar system, Earth and Mars orbit the Sun. Earth is closer to the Sun,



and therefore it races along its orbit more quickly. Earth makes two trips around the Sun in about the same amount of time that Mars takes to make one trip.

Sometimes the two planets are on opposite sides of the Sun and are very far apart. Other times,

Earth catches up with its neighbor and passes relatively close to it. This is called Mars's closest approach to Earth, and it's happening this year on July 31. The Moon will be near Mars on that night, too!

Keep in mind that even during its closest approach, Mars is still more than 35 million miles away from Earth. That's really far. So, Mars won't appear as big as the Moon in the sky, but it will appear bigger than it usually does.

July and August will be a great time to check out Mars. Through a telescope, you should normally be able to make out some of the light and dark features of the

(Continued on page 9)

Apparent brightness changes as Mars gets closer to and farther from Earth



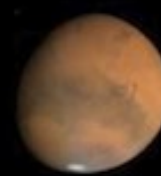
May 9

apparent
magnitude
-0.5



July 31 (closest to Earth)

apparent
magnitude
-2.8



Oct. 31

apparent
magnitude
-0.5

Caption: In 2018, Mars will appear brightest from July 27 to July 30. Its closest approach to Earth is July 31. That is the point in Mars' orbit when it comes closest to Earth. Mars will be at a distance of 35.8 million miles (57.6 million kilometers). Credit: NASA/JPL-Caltech

Space Place (Cont'd)

(Continued from page 8)

Red Planet—and sometimes even polar ice. However, a huge Martian dust storm is obscuring these features right now, so less planetary detail is visible.

There is another important Mars date in July: Mars opposition. Mars opposition is when Mars, Earth and the Sun all line up, with Earth directly in the middle. This event is happening on July 27 this year.

Although you may see news focusing on one of these two dates, Mars will be visible for many months. For about three weeks before and three weeks after opposition and closest approach, the planet will appear the same size to a skywatcher.

From July 7 through September 7 Mars will be the third brightest object in the sky (after the Moon and Venus), shining even brighter than Jupiter. The best time to view Mars during this time is several hours after sunset, when Mars will appear higher in the sky.

Mars will still be visible after July and August, but each month it will shrink in size as it travels farther from Earth in its orbit around the Sun.

In other sky news, there will be a partial solar eclipse on July 13, but it will only be visible from Northern Antarctica and southern Australia. On July 27 (beginning at 20:21 UTC), a total lunar eclipse will be visible in

(Continued on page 10)

Observing (Cont'd)

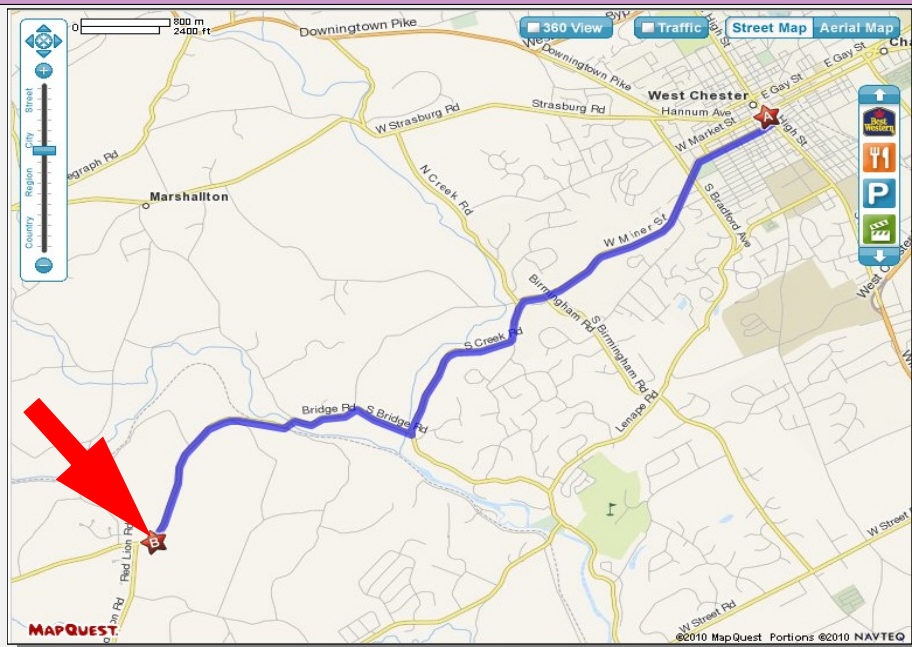
(Continued from page 5)

turns to the east. This open cluster is called the Northern Jewel Box. Then look high overhead with binoculars and find the coat hanger cluster between Vega and Altair. This is a great object to share with friends.

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

Meteor showers: The Delta Aquariid meteor shower peaks the night of July 29/30. We won't have an impressive shower, but one might see 25 fast meteors per hour from a dark site. This meteor shower has a broad peak, so you can look a day or two before or after the peak and still see meteors.

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.

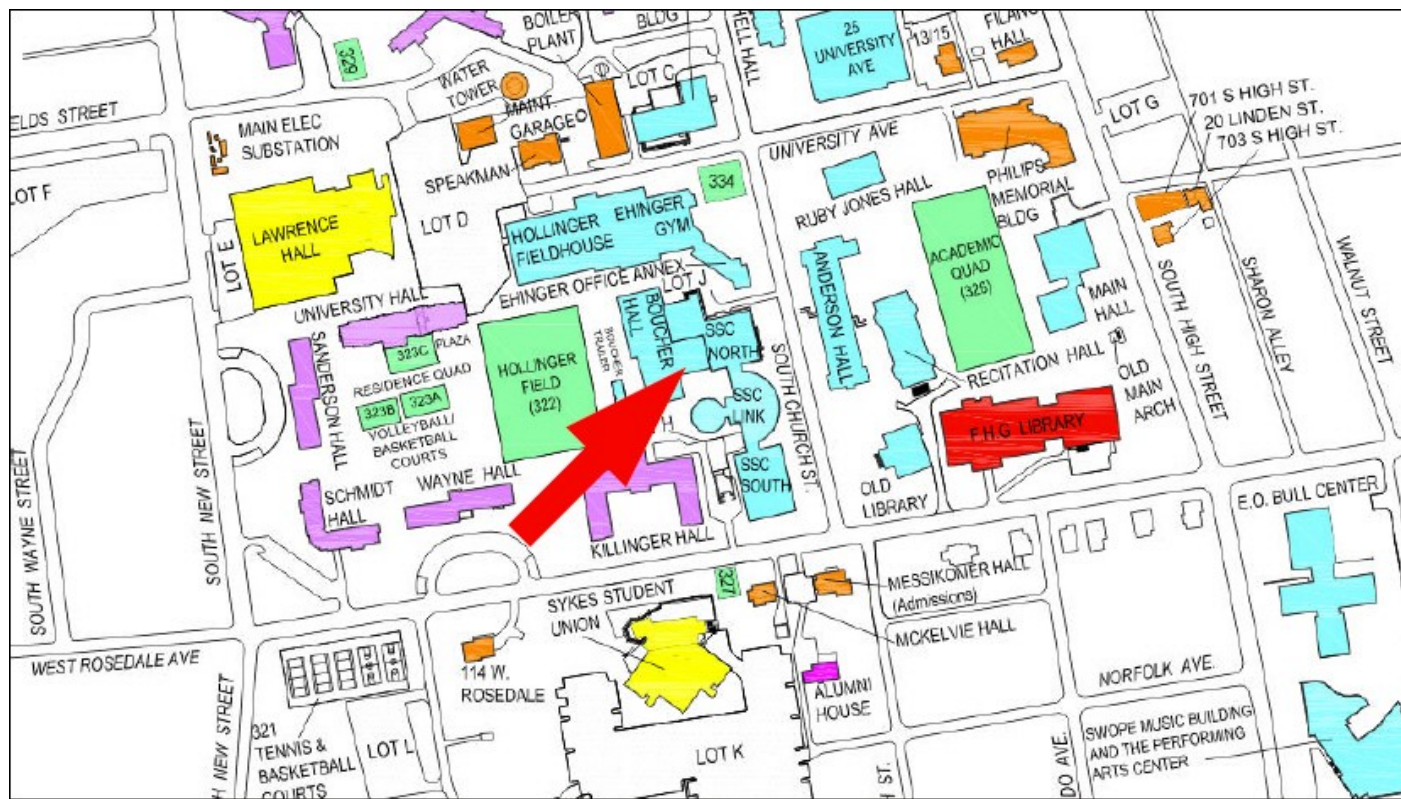
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BRC property, turn left off Route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



Space Place (Cont'd)

(Continued from page 9)

Australia, Asia, Africa, Europe and South America. For those viewers, Mars will be right next to the eclipsing Moon!

If you're wanting to look ahead to next month, prepare for August's summer Perseid meteor shower. It's not too early to plan a dark sky getaway for the most popular meteor shower of the year!

You can catch up on NASA's missions to Mars and all of NASA's missions at www.nasa.gov

CCAS Membership Information and Society Financials

Treasurer's Report by Don Knabb

June 2018 Financial Summary

Beginning Balance	\$1,604
Deposits	\$120
Disbursements	-\$520
Ending Balance	\$1,204

New Member Welcome!

Welcome new CCAS member Carol Ann Krus from 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!

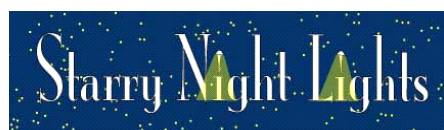
Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

<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 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: Roger Taylor
610-430-7768

Vice President: Liz Smith
610-842-1719

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

Secretary: Ann Miller
610-558-4248

Librarian: Barb Knabb
610-436-5702

Program: Dave Hockenberry
610-558-4248

Education: Kathy Buczynski
610-436-0821

Webmaster and Newsletter: John Hepler
410-639-4329

Public Relations: Deb Goldader
610-304-5303

CCAS Membership Information

The present membership rates are as follows:

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

Membership Renewals

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

Don Knabb
988 Meadowview Lane
West Chester PA 19382-2178

Phone: 610-436-5702

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.

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