Southwest Florida Astronomical Society, Inc.
SWFAS

The Eyepiece
November 2019

Contents:

A MESSAGE FROM THE PRESIDENT

We have been busy during October. The Ding Darling Day event was clouded out, but still had a good number of people stop by. The weather got us real good with the Cub Scouts, the storm postponed it one week and then Mike McCauley and I arrived the next weekend, started to setup, saw rain coming and put stuff away. Don Bishop and Richard Kinley came out. We set back up and then another shower snuck in on us and soaked the equipment. We called it a night. Don and Richard came out the next day and helped at KidsFest. We had clear skies but just a few small prominences.

Weather got us for the star party last weekend. Joe Dermody and I went out, but the clouds never broke and it also started raining.

Mike McCauley reported that his school event was very busy.

This month we have multiple events that we need help on. Mike McCauley is coordinating the Estero Country Club event on the 9th and the Babcock Ranch SkyCruise on the 29th. I am doing the Girl Scouts on Saturday the 16th at Camp Caloosa off SR31 in N Fort Myers. We need extra hands and scopes at these events, so please contact Mike directly for his events and me for the Girl Scouts.

Don't forget that next month's meeting is the annual election meeting. Please contact me before the meeting if interested in a position or leaving a position.

Brian

Program this Month

Bruce Dissette, a long time SWFAS member and amateur astronomer, will be presenting at the November meeting of the South West Florida Astronomical Society. Utilizing the planetarium equipment, Bruce will be giving a live tour of the autumn night sky. The timing is perfect for a refresher course as we enter a new season of awesome celestial observing in south west Florida. Bruce's presentation will begin at 7:30pm on Thursday, November 7th, at the Calusa Nature Center and Planetarium. The regular monthly meeting of the South West Florida Astronomical Society will follow immediately thereafter.

The program will begin promptly at 7:30pm with the regular monthly business meeting following immediately thereafter.

Michael J. McCauley
VP/Program Coordinator SWFAS

Star Party Schedule

Big Cypress Preserve – Ochopee - Dec 21 2019, Jan 25 2020, Feb 22, Mar 21

SeaHawk Park – Nov 30th

Caloosahatchee Regional Park – Dec 21st

We have scheduled some of the Seahawk Park nights to coincide with the moon being a crescent to 1st quarter stage to allow for lunar observing.

Ideas for Using Outreach Funds

SWFAS would like to hear from members for any suggestions for applying outreach funds.

Members' Recommended Reading & News Links

Members are encouraged to submit to the editor links to recommended articles and books that might be of interest to Club members.

Each Weekly Newsletter of S&T has a 60-second news section. The general link for S&T Astronomy News is https://www.skyandtelescope.com/astronomy-news/ .

Sky and Telescope has a new free introductory E-book "Stargazing: Getting Started" if you sign up with your email. https://skyandtelescope.com

"Transit of Mercury", *By S.N. Johnson-Roehr, November 2019, Sky & Telescope, pages 48-49.*

For NASA-JPL News see https://www.jpl.nasa.gov/ .

Astronomy magazine has a feature section this month on the 50th anniversary of Apollo 12.

"Mercury Transits the Sun", November 2019, Astronomy, pages 36-37, 42-43.

In the Sky this Month

Moon:– 1st Quarter – November 4; Full – November 12; Apogee – November 7; Last Quarter – November 19 (EDT); Perigee - November 23; New– November 26

Mercury transits the Sun on November 11. The transit begins at 7:35 a.m. and ends at 1:04 p.m., EST. The entire transit will be visible in eastern North America. See the article on the "Transit of Mercury" in recommended reading. About a week after the transit, it starts to get brighter by about ½ magnitude and rises 7 minutes earlier each day, until the last week. Around the 28th, it rises 1 ½ hours before the Sun and is at magnitude -0.5.

Venus (dusk-evening, Southwest) starts the month a bit more than 23° from Jupiter to 1.5° by November 23rd . At this point, Venus is at a very bright magnitude of -3.9.

Mars (dawn - pre-dawn, looking East) rises around dawn on the 1st and 2 ½ hours before sunrise by the 30th. It is about magnitude -1.8. Its disk is less than 4".

Jupiter (dusk - evening, Southwest) is just 1.5° above Venus on the 22nd – 24th , after starting more than 23° apart on the 1st. Jupiter's disk is about 32", about three times that of Venus, but Venus is much brighter: -3.9 vs. -1.9 magnitude. Looking low above the horizon means observing through some atmospheric turbulence, proving to be a bit challenging to view a sharp image of both planets through a telescope simultaneously.

Saturn (dusk - evening, South-Southwest) is in a line with Jupiter and Venus for the month, the line going from the upper left to the lower right, starting with Saturn, then Jupiter, then Venus. Around the last wee of the month, Venus and Jupiter swap places, so the line of planets from upper left to lower right end as Saturn, Venus, then Jupiter. Saturn sets 4½ hours after the Sun on the 1st, and 2 2/3 hours after on the 30th. Its magnitude is +0.6 and is less than 16" wide, with the rings spanning nearly 36" at maximum tilt.

Uranus, (Southwest, ~midnight) highest in the early-mid-evening, rising 3 hours after Neptune, and visible most of the night. See https://is.gd/urnep for a finder chart.

Neptune, (West, ~midnight) highest in the early-mid-evening. See https://is.gd/urnep for a finder chart.

International Space Station: The ISS is visible in the time period of about 4:25 a.m. to 6 a.m. from 5-16 Nov, early evening from 17-22 Nov. See this link for specific times and routes for the ISS: http://www.heavens-above.com

The **Hubble Space Telescope** will be visible early morning (5-6:30 a.m.) from November 1-11, early evening (around 6-9 p.m.) from November 14-26, including late night views (~10 p.m.) November 24-28, then 7-7:30 p.m. on the 28th – 30th. See this link for specific times and routes for the HST: http://www.heavens-above.com

Minutes of the Southwest Florida Astronomical Society – October 3, 2019

The regular monthly business meeting of the Southwest Florida Astronomical Society was called to order at 7:33 pm by president Brian Risley in the Calusa Nature Center Planetarium.

Nineteen people were present.

The program was a planetarium video titled "Life: A Cosmic Story."

At 8:00 pm the business meeting resumed.

The past events listed in the printed agenda were reviewed.

Upcoming events listed in the printed agenda were discussed.

Vice President Mike McCauley, who is also a board member and officer of the Nature Center spoke about the Haunted Walk event fundraiser.

Jean Pilon made a motion, seconded by Sean Dey, to approve the minutes of the September meeting as contained in the October newsletter. The motion passed on a voice vote.

Treasurer John MacLean reported that the International Dark Sky Association dues and the club's annual liability insurance premium were paid during September, leaving an ending balance of $1791.18. He investigated and reported we have the best deal available for commercial liability insurance. Tony Heiner made a motion, seconded by Mary Vilbig, to approve the report. The motion passed on a voice vote.

Astronomical League coordinator John MacLean reported that the quarterly membership update is being turned in.

The business meeting was adjourned at 8:20 pm.

Submitted by Don Palmer, secretary

Southwest Florida Astronomical Society, Inc.
Event Schedule for 2019/2020

Date	Event	Location	Time/Note
November 9th	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon
November 9th	Private Event	Estero Country Club –	Dusk Mike McCauley Co-ord.
November 11th	Transit of Mercury	FSW Moore Observatory Punta Gorda Campus	8am-1pm
November 13th	Rocket Club Observing	Austen Youth Center Cape Coral	6:30-7:30pm
November 16th	Girl Scout Event	Camp Calusa of SR31 NFM	6:00pm Brian Risley Co-ord.
November 22nd	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
November 29th	Sky Watch Cruise	Babcock Ranch – Fee for participation	Dusk Mike McCauley Co-ord.
November 30th	Monthly Star Party	Seahawk Park	Dusk
December 5th	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
December 14th	Solar Observing	Ponce De Leon Park Punta Gorda	9:00 am - Noon
December 21st	Monthly Star Party	Caloosahatchee Regional Park	Dusk
December 21st	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
Dec 27th, 2019	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
Dec 28th, 2019	Monthly Star Party	Seahawk Park	Dusk (Tentative)
January 2nd, 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
January 11th, 2020	Solar Observing	Bayshore Live Oak Park Port Charlotte	9:00 am - Noon
January 18th, 2020	Monthly Star Party	Seahawk Park	Dusk (Tentative)
January 24th, 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
January 25th, 2020	Astronomy Swap Meet	El Joe Bean –Charlotte County	TBD
January 25th, 2020	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
February 6th, 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
February 8th, 2020	STEMtastic/Edison Day of Discovery	Lee County Public Ed Center – Colonial/Metro	
February 8th, 2020	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon

Feb 15th, 2020	Monthly Star Party	Caloosahatchee Regional Park	Dusk (Tentative)
Feb 21st, 2020	Rotary Park Star Party	Rotary Park Cape Coral	5:30-10:00pm
Feb 22nd, 2020	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
Feb 28th, 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
Feb 29th, 2020	Burrowing Owl Festival	Rotary Park Cape Coral	10:00am – 4:00pm
March 5th, 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
March 14th, 2020	Solar Observing	Ponce De Leon Park Punta Gorda	9:00 am - Noon
March 21st, 2020	Big Cypress Observing	Big Cypress Preserve Ochopee	7:00 pm
March 27th, 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
March 28th, 2020	Monthly Star Party	Seahawk Park	Dusk (Tentative)
April 2nd, 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
April 11th, 2020	Solar Observing	Bayshore Live Oak Park Port Charlotte	9:00 am - Noon
April 18th, 2020	Monthly Star Party	Seahawk Park	Dusk (Tentative)
April 24th, 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
April 25th, 2020	Monthly Star Party	Caloosahatchee Regional Park	Dusk (Tentative)
May 7th, 2020	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
May 9th, 2020	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon
May 22nd, 2020	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
May 23rd, 2020	Monthly Star Party	Seahawk Park	Dusk (Tentative)

All observing events are Weather Permitting.

If it is cloudy or a chance of rain, we may not setup at all.

There may be no way to provide advance notice of cancellation.

Events may be cancelled several hours before scheduled time based on observed conditions and forecasts at that time and weather may change.

Monthly Star Parties: These are held at either Seahawk Park in Cape Coral or at Caloosahatchee Regional Park (CRP) off SR78 7 miles east of SR31. Other than park fees noted, these are free and open to the public. Those wanting to learn how to use equipment can bring it to the monthly star parties or the monthly meetings. We are always glad to help people learn how to use their telescopes. It is also a great way to learn about different telescopes and try some out before making a purchase.

Seahawk Park is in North Cape Coral off Wilmington Blvd. (Nelson Rd or Chiquita Blvd are the nearest cross streets.) There is a brown sign in the center median at the entrance to the park. (GPS may not get you to the park, as some of the local roads have been closed.) You will make a big J hook before getting to the parking area. Seahawk Park is managed by the *Cape Coral* R/*Seahawks* Club for Radio Controlled Planes and they have priority. They are usually done by sunset but may be there before sunrise. Park in the lot and transport your equipment to the concrete staging area before the runway. This park is handicap capable as there is level concrete leading from parking to the staging area.

CRP has a gate that closes at dusk, you can check the county's website for current gate closing times and the status of the park's Northside entrance as that is where we observe from. (They may close the area if there are issues with the trails.) There is a parking fee of $1/hr or $5/day at CRP. Park in the main Northside parking lot. We sometimes setup down the dirt road that goes to the east. That area is grassy and may not be level, so one should walk on the dirt road as much as possible and watch their step.

Big Cypress: The Big Cypress Visitor Center is located off US41 5 miles east of SR29 about 25 miles east of Naples. Big Cypress has earned a Dark Sky Park designation. They hold observing events down the road that extends south of the Welcome Center during the winter months. This is a real dark sky site. Their observing events are free.

Solar Events: We have daytime solar events where one can safely look at the Sun. Things such as sunspots and prominences may be visible. These are free unless tied to another event that may have an entrance fee. There are seasonal monthly events held at different parks around Charlotte County as well as at other major public events in SW FLA.

Rotary Park Star Party: This is a free public star party held at Rotary Park at the south end of Pelican Blvd in South Cape Coral. Park to the west of the main building and walk to where we are setup to the east of the main building.

Moore Observatory, FSW Punta Gorda Campus: The campus is located off Airport Rd just east of I-
75. Go to the right around the lake and park. The observatory is located down the path along the lake. Besides the telescope in the observatory, additional scopes may be setup around the observatory. This is a free event.

Star Party Etiquette: Bright white flashlights are not welcome. We use red flashlights to preserve our night vision. At the parks, please use just your parking lights if possible. As there may be cords and tripod legs that are hard to see in the dark, we ask that all children be well behaved and cautious around the telescopes. If you need help in moving around in the dark, just ask. Someone will be happy to guide you with a red light. If you have a telescope and need help with it, just ask. Someone will be glad to show you how to use it.

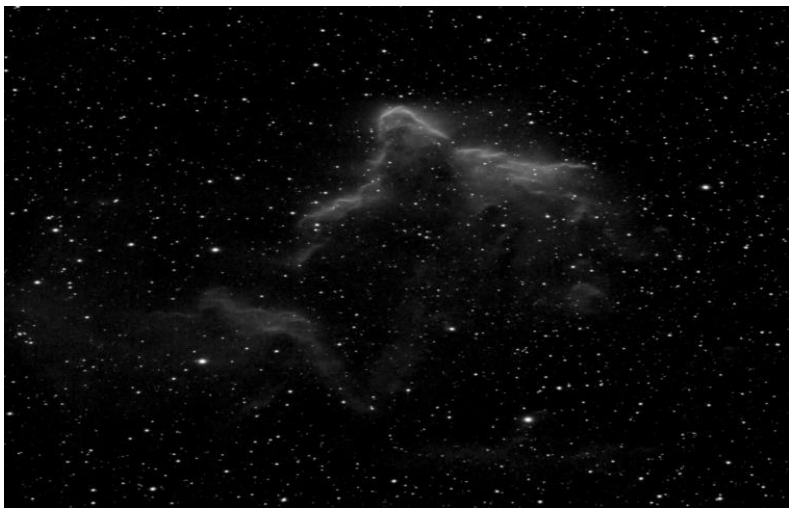
Golden Rules to Telescope Observing: Move your eye to the telescope, don't try to move the telescope to your eye! Ladders/chairs are there for your support, the telescopes do not provide support and should not be touched.

Website: www.theeyepiece.org Check us out on Facebook too.

Membership Photos - Three by Chuck Pavlick

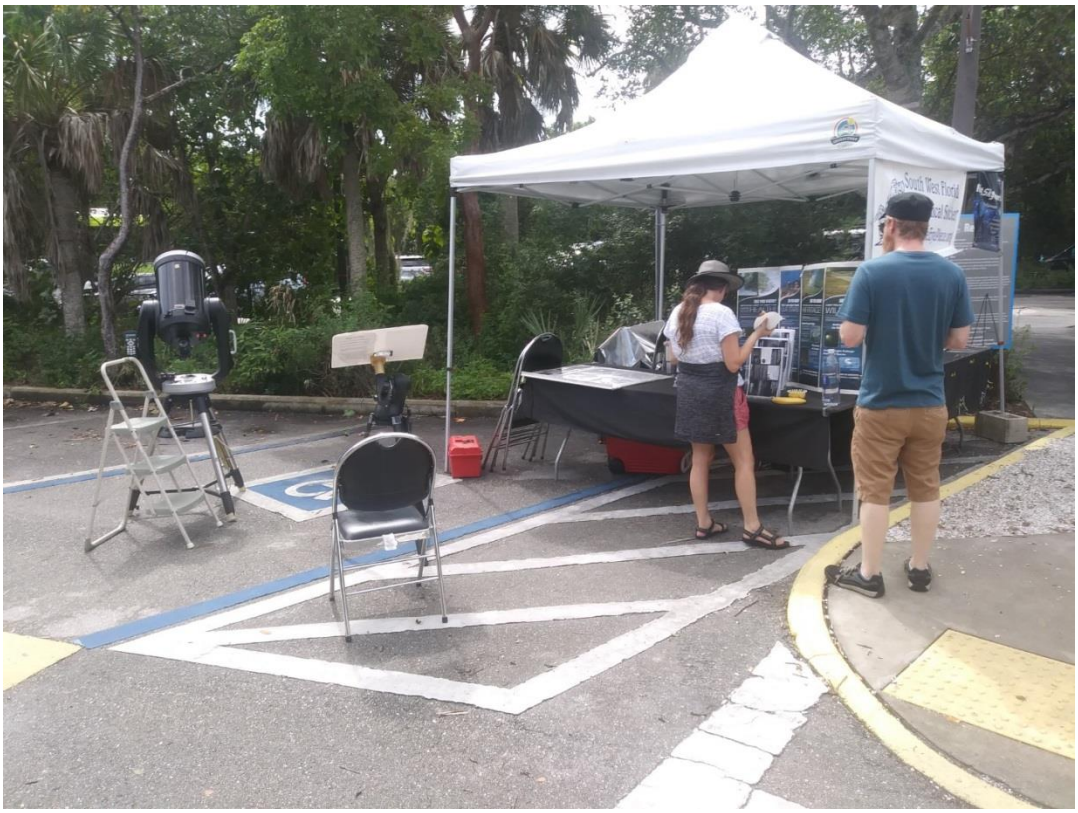
Ring Nebula

Pacman Nebula
NGC281



Ghost Nebula

Event Photos



Ding Darling Days 2019

KidsFest 2019

NASA's Curiosity Rover Finds an Ancient Oasis on Mars

JPL-News Weekly, October 7, 2019
https://www.jpl.nasa.gov/news

If you could travel back in time 3.5 billion years, what would Mars look like? The picture is evolving among scientists working with NASA's Curiosity rover.

Imagine ponds dotting the floor of Gale Crater, the 100-mile-wide (150-kilometer-wide) ancient basin that Curiosity is exploring. Streams might have laced the crater's walls, running toward its base. Watch history in fast forward, and you'd see these waterways overflow then dry up, a cycle that probably repeated itself numerous times over millions of years.

That is the landscape described by Curiosity scientists in a Nature Geoscience paper published today. The authors interpret rocks enriched in mineral salts discovered by the rover as evidence of shallow briny ponds that went through episodes of overflow and drying. The deposits serve as a watermark created by climate fluctuations as the Martian environment transitioned from a wetter one to the freezing desert it is today.

Scientists would like to understand how long this transition took and when exactly it occurred. This latest clue may be a sign of findings to come as Curiosity heads toward a region called the "sulfate-bearing unit," which is expected to have formed in an even drier environment. It represents a stark difference from lower down the mountain, where Curiosity discovered evidence of persistent freshwater lakes.

Gale Crater is the ancient remnant of a massive impact. Sediment carried by water and wind eventually filled in the crater floor, layer by layer. After the sediment hardened, wind carved the layered rock into the towering Mount Sharp, which Curiosity is climbing today. Now exposed on the mountain's slopes, each layer reveals a different era of Martian history and holds clues about the prevailing environment at the time.

"We went to Gale Crater because it preserves this unique record of a changing Mars," said lead author William Rapin of Caltech. "Understanding when and how the planet's climate started evolving is a piece of another puzzle: When and how long was Mars capable of supporting microbial life at the surface?"

He and his co-authors describe salts found across a 500-foot-tall (150-meter-tall) section of sedimentary rocks called "Sutton Island," which Curiosity visited in 2017. Based on a series of mud cracks at a location named "Old Soaker," the team already knew the area had intermittent drier periods. But the Sutton Island salts suggest the water also concentrated into brine.

Typically, when a lake dries up entirely, it leaves piles of pure salt crystals behind. But the Sutton Island salts are different: For one thing, they're mineral salts, not table salt. They're also mixed with sediment, suggesting they crystallized in a wet environment - possibly just beneath evaporating shallow ponds filled with briny water.

Given that Earth and Mars were similar in their early days, Rapin speculated that Sutton Island might have resembled saline lakes on South America's Altiplano. Streams and rivers flowing from mountain ranges into this arid, high-altitude plateau lead to closed basins similar to Mars' ancient Gale Crater. Lakes on the Altiplano are heavily influenced by climate in the same way as Gale.

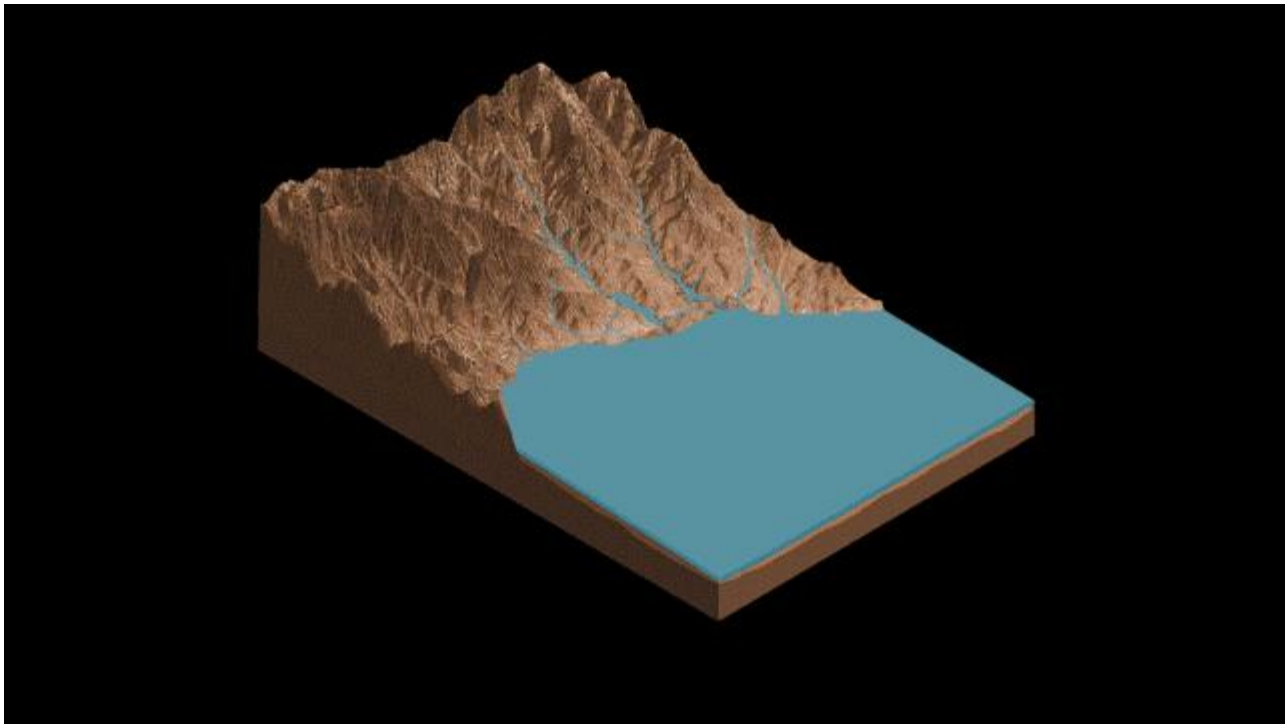
"During drier periods, the Altiplano lakes become shallower, and some can dry out completely," Rapin said. "The fact that they're vegetation-free even makes them look a little like Mars."

Filled with briny lakes, the Quisquiro salt flat in South America's Altiplano represents the kind of landscape that scientists think may have existed in Gale Crater, which NASA's Curiosity rover is exploring. Credit: Maksym Bocharov ***Full image and caption***

Signs of a Drying Mars

Sutton Island's salt-enriched rocks are just one clue among several the rover team is using to piece together how the Martian climate changed. Looking across the entirety of Curiosity's journey, which began in 2012, the science team sees a cycle of wet to dry across long timescales on Mars.

"As we climb Mount Sharp, we see an overall trend from a wet landscape to a drier one," said Curiosity Project Scientist Ashwin Vasavada of NASA's Jet Propulsion Laboratory in Pasadena, California. JPL leads the Mars Science Laboratory mission that Curiosity is a part of. "But that trend didn't necessarily occur in a linear fashion. More likely, it was messy, including drier periods, like what we're seeing at Sutton Island, followed by wetter periods, like what we're seeing in the 'clay-bearing unit' that Curiosity is exploring today."



This animation demonstrates the salty ponds and streams that scientists think may have been left behind as Gale Crater dried out over time. The bottom of the image is the floor of Gale Crater, with the peak being the side of Mount Sharp. Credit:ASU Knowledge Enterprise Development (KED), Michael Northrop > Download larger gif

Up until now, the rover has encountered lots of flat sediment layers that had been gently deposited at the bottom of a lake. Team member Chris Fedo, who specializes in the study of sedimentary layers at the University of Tennessee, noted that Curiosity is currently running across large rock structures that could have formed only in a higher-energy environment such as a windswept area or flowing streams.

Wind or flowing water piles sediment into layers that gradually incline. When they harden into rock, they become large structures similar to "Teal Ridge," which Curiosity investigated this past summer.

"Finding inclined layers represents a major change, where the landscape isn't completely underwater anymore," said Fedo. "We may have left the era of deep lakes behind."

Curiosity has already spied more inclined layers in the distant sulfate-bearing unit. The science team plans to drive there in the next couple years and investigate its many rock structures. If they formed in drier conditions that persisted for a long period, that might mean that the clay-bearing unit represents an in-between stage - a gateway to a different era in Gale Crater's watery history.

"We can't say whether we're seeing wind or river deposits yet in the clay-bearing unit, but we're comfortable saying is it's definitely not the same thing as what came before or what lies ahead," Fedo said.

For more about NASA's Curiosity Mars rover mission, visit:

https://mars.nasa.gov/msl/

https://nasa.gov/msl

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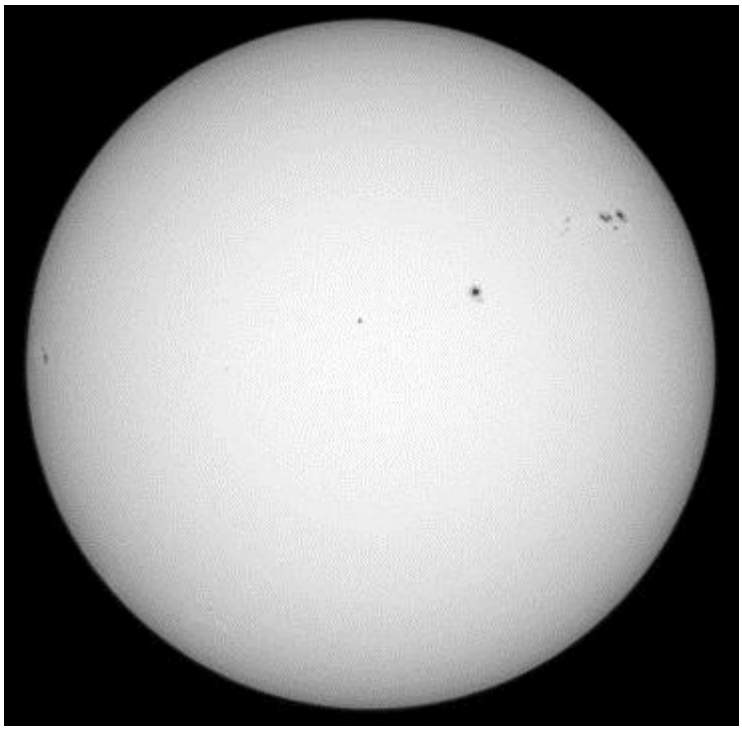
2019-202

How to Safely Photograph the Sun (and the Transit of Mercury)

Richard S. Wright Jr, Sky & Telescope Weekly, October 15, 2019

Photographing the Sun can be perfectly safe, as long as you take the proper precautions. You can use these techniques to photograph the November 11th transit of Mercury.

Photographing the Sun is not usually the first idea that pops into your head when you hear the word astrophotography. But why not? The Sun is, after all, a star — the closest one to our planet. It's sobering to think that our Sun is an average citizen of the celestial host we see overhead each night. It's just a bit more up close and personal.



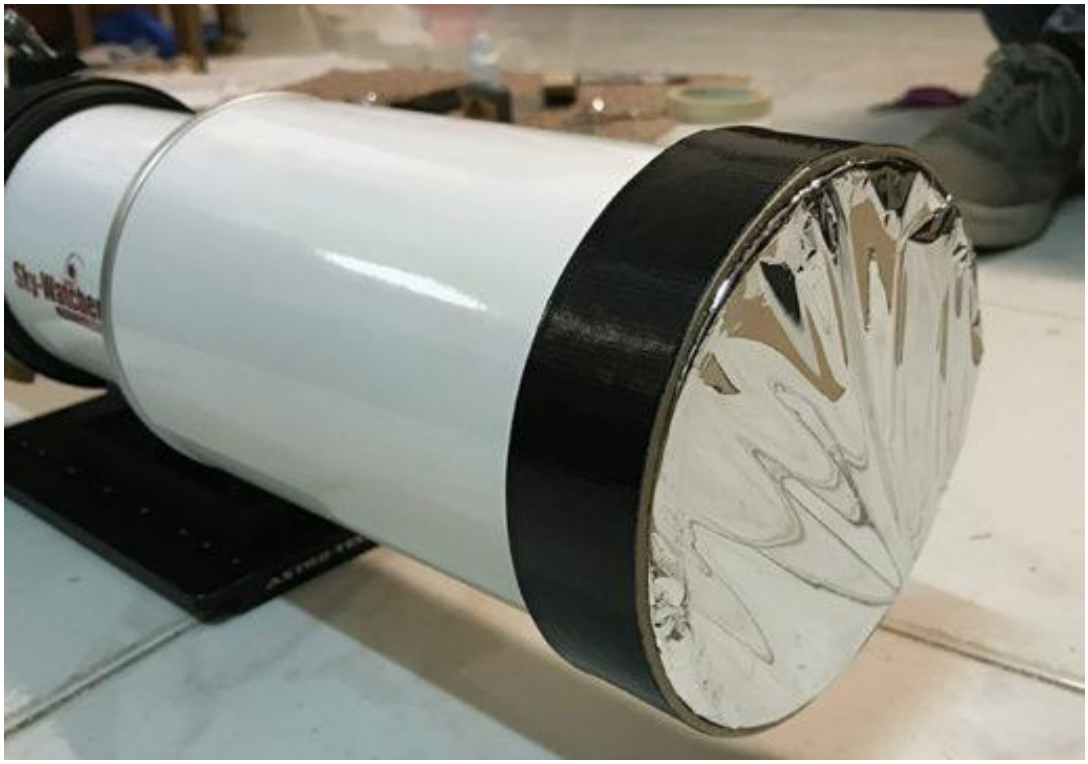
The Sun is actually much more white than yellow, and when active still has features to reveal. Richard S. Wright Jr.

Although there are several methods for photographing the Sun, let's focus this month's technical discussion on white-light solar imaging. White-light solar photography means that any filtering we use is intended to reduce the amount of light, rather than isolate any particular wavelength (such as when using a specialized solar hydrogen-alpha filter).

White light solar imaging does a great job of showing sunspots and facula, and is the easiest and most economical method you can use to photograph next month's transit of Mercury on November 11th. Hey, you didn't think I just pulled this topic out of a hat did you? White light is really what the Sun looks like assuming you could look at it without going blind. Most any color camera, such as a DSLR or

mirrorless camera can capture a pleasing white light image, so you can use pretty much any camera you already have.

Solar photography is easy but great care must be taken when pointing any telephoto lens or telescope at the Sun. I don't need to tell you, it's really hot and it hurts just to look directly at it! A big light-gathering optic captures all that energy and focuses it down to a smaller area. I've often said in astrophotography that more light is always better . . . this might be the one time I'm wrong! Focused, unfiltered sunlight will almost immediately burn or melt anything at the focal plane. This includes camera shutters, sensors, your hand, or God forbid, human eyeballs.



A supply of the Baader solar film can be used to make your own custom filters. Richard S. Wright Jr.

When imaging the Sun, the trick is to simply reduce to a safe level the amount of light from the Sun that is reaching your sensor. Many of the cameras damaged during the 2017 solar eclipse were the result of bad advice — some had stated that a strong neutral density filter on the front of the camera lens would sufficiently reduce the light entering the lens or telescope. This is not only wrong, but *extremely* dangerous.

There are several inexpensive white-light filters that fit over the front aperture of your telescope or camera lens. My personal favorite is Baader AstroSolar film. Any of these certified solar filters will reduce the amount of light entering your optical system by 99.999% — a 100,000× reduction in intensity — and make photographing the Sun a safe and easy activity, similar to photographing the Moon.

Years ago, I purchased a bulk roll of AstroSolar film to make my own customized solar filters. Taking care not to damage the material, you can make a full-aperture filter with the film material for your camera lens or telescope with a little cardboard and tape. Craft night! You can also use it to make safe solar glasses or filters for your binoculars. I simply used a rubber band to hold the foil over the front of a telephoto lens, and it worked great.

Some safe filtering material can turn any imaging rig and a DSLR into a great solar telescope.
Richard S. Wright Jr.

Most of my tips for imaging the Moon apply equally to white-light solar photography, such as locking up the mirror in your DSLR. A Sun-specific tip is to bring a light-blocking blanket along to put over your head. Out in bright sunlight it's very difficult to see the LCD on the back of your camera. When shooting the Sun, it's best to bracket your exposures, so you can ensure that at least one of them is properly exposed. It's also better to underexpose a bit, as it's very easy to lose contrast on sunspots or facula features. Trust the histogram — the more spread out it appears the better, even if it's a little darker (more to the left) than where you think it should be.

Photographing the Sun can be done safely, and cheaply, but be sure and have a sober respect for what you are doing. Like playing with fire, a moment of carelessness or inattention could end in disaster. When using a front aperture filter, be mindful of the wind as well as curious pets or children, who have no idea how important that little bit of shiny foil is. Stay safe, have fun, and good luck on November 11th!

The Astronomical League

As a member of the Southwest Florida Astronomical Society you are automatically also a member of the Astronomical League, a nationwide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you including receipt of The Reflector, the AL's quarterly newsletter, use of the Book Service, through which you can buy astronomy related books at a 10% discount. You can also participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others. To learn more about the Astronomical League and its benefit s for you, visit http://www.astroleague.org

Introduction to the Astronomical League Observing Programs

There are some 50 formal Observing Programs available to choose from covering the whole gamut of object types accessible to the amateur astronomer. In addition there are from time to time additional programs set up for special targets including comets, eclipses, transits and so forth. Certificates and pins are awarded for successful completion and submission of the required observations for a particular program. There is no time limit for completing observations. The programs are categorized by level of difficulty (Novice, Intermediate, and Advanced) and each program is also categorized by recommended equipment ranging from the naked eye through binoculars and telescope aperture. There are programs for Imagers and also for solar observers using H-alpha scopes. Visit http://www.astroleague.org/observing to obtain full details. Starting in February 2019, we will highlight one or two programs each month in the Newsletter.

Reflector Magazine

The email distribution system for the quarterly Reflector magazine is still not resolved. However they can be downloaded by going to the Astronomical League homepage https://www.astroleague.org/ and scrolling down the left hand side and clicking on the Reflector link. The direct link is: https://www.astroleague.org/reflector

The Astronomical League Stellar Evolution Observing Program

This observing program, which is suitable for the beginning observer as well as the more advanced, allows one to get a solid grasp of the fundamentals of stellar evolution while tying all the new found knowledge together by completing an observing list of 100 associated objects.

A modest 6 inches of aperture is recommended although several objects are observable via the naked eye or binoculars.

The League provides an excellent downloadable guide to basic stellar astrophysics in the form of the "Observing Stellar Evolution" document. Stellar evolution is presented in an accessible, non-mathematical, but still quite thorough exposition centered around explaining the Hertzsprung-Russell diagram. Clear explanations are provided as to how low-mass stars (up to 8 solar masses) have very different evolutionary paths than high-mass stars (those having more than 8 solar masses.) Topics covered include Stellar Birth, Open Clusters – Early Stars, Main Sequence – Mid Life of Stars, Low mass vs. High mass Stars, and Red Dwarfs. The difference between Type Ia and Type II supernovas is covered as is the well-known O,B,A,F,G,K,M spectral classification sequence. The relevance of the H-R diagram to Variable Stars and Globular Clusters is explained.

The 100 related observing targets are broken down as follows:

Stellar Nurseries	14
Colorful Stars (OBAFGKM)	34
Young Open Clusters	7
Low Mass Stars	8
Red Giant Stars	6
Carbon Stars	5
Planetary Nebulae/White Dwarfs	9
High Mass Main-sequence Stars	6
Red Supergiant Stars	5
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Tackling this program is an excellent way to learn about "what makes stars tick" and relate that knowledge to specific objects in the sky. This can't help but make nights at the telescope that much more enjoyable.

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

The Messenger Crosses the Sun: Mercury Transit 2019

David Prosper

Did you know that there are two other objects in our skies that have phases like the Moon? They're the inner planets, found between Earth and the Sun: Mercury and Venus. You can see their phases if you observe them through a telescope. Like our Moon, you can't see the planets in their "new" phase, unless they are lined up perfectly between us Earthlings and the Sun. In the case of the Moon, this alignment results in a **solar eclipse**; in the case of Mercury and Venus, this results in a **transit**, where the small disc of the planet travels across the face of the Sun. Skywatchers are in for a treat this month, as Mercury transits the Sun the morning of **November 11**!

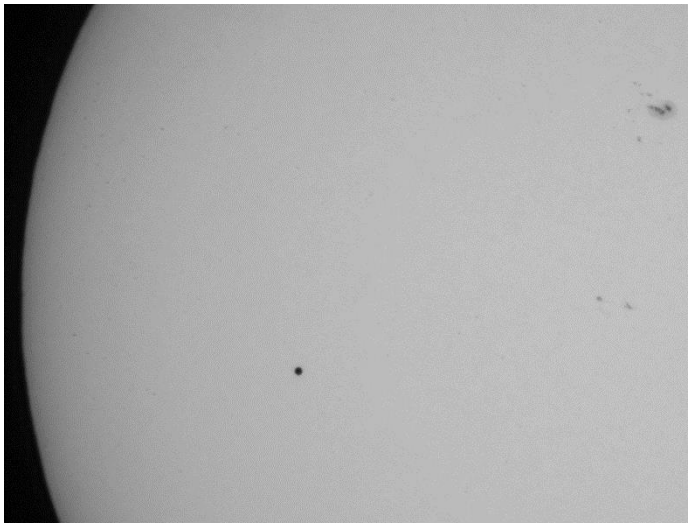
You may have seen the transit of Venus in 2012; you may have even watched it through eclipse glasses! However, this time you'll need a solar telescope to see anything, since eclipse glasses will only reveal the Sun's blank face. Why is that? Mercury is the smallest planet in our solar system, and closer to the Sun (and further away from Earth) during its transit than Venus was in its 2012 transit. This makes Mercury's disc too small to see without the extra power of a telescope. Make absolutely certain that you view the transit via a telescope equipped with a safe solar filter or projection setup. Do NOT combine binoculars with your eclipse glasses; this will instantly burn a hole through the glasses – and your eyes! While most people don't have solar telescopes handy, many astronomy clubs do! Look for clubs hosting Mercury transit observing events near you at bit.ly/findnsn (USA) or at bit.ly/awbtransit (worldwide).

What a fun opportunity to see another planet during the day! This transit is expected to last over five hours. Folks on the East Coast will be able to watch the entre transit, weather permitting, from approximately 7:35 am EST until around approximately 1:04 pm EST. Folks located in the middle of North America to the west coast will see the transit already in progress at sunrise. The transit takes hours, so if your weather is cloudy, don't despair; there will be plenty of time for skies to clear! You can find timing details and charts via eclipse guru Fred Espenak's website: bit.ly/mercurytransit2019

Mercury's orbit is small and swift, and so its position in our skies quickly changes; that's why it was named after the fleet-footed messenger god of Roman mythology. In fact, if you have a clear view of the eastern horizon, you'll be able to catch Mercury again this month! Look for it before dawn during the last week of November, just above the eastern horizon and below red Mars. Wake up early the morning of November 24th to see Mars, the Moon, and Mercury form a loose triangle right before sunrise.

Discover more about Mercury and the rest of our solar system at nasa.gov

Photo of the May 9, 2016 transit of Mercury. Mercury is the small dot on the center right. Note how tiny it is, even compared to the small sunspot on the center left. Credit: Dave Huntz



This photo from the same 2016 transit event shows Mercury a bit larger, as it should; it was taken at a higher magnification through a large 16 inch telescope! Credit: J. A. Blackwell

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