



# The W.A.S.P.



Vol. 54, no. 6

Winner of the Astronomical League's 2021 Mabel Sterns Award

June 2022

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## The Warren Astronomical Society Publication

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# HIGHWAY TO HEAVEN



This is what Adrian Bradley is chasing when driving so many hours a night!

Equipment: Canon 6D modified, ISO 5000, f/2.8, 14mm (Samyang 14mm f/2.8 lens), [Move-Shoot-Move](#) Rotator on a Sirui Tripod, remote shutter. Location is on some lonely road in Alcona County.

# The WASP



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Dale Thieme, Editor

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The Warren Astronomical Society, Inc., is a local, non-profit organization of amateur astronomers. The Society holds meetings on the first Monday and third Thursday of each month, starting at 7:30 p.m.

### First Monday meeting:

Cranbrook: Institute of Science  
1221 North Woodward Ave  
Bloomfield Hills, Michigan

### Third Thursday meeting:

Macomb Community College  
South campus, Bldg. J, Room J221  
14600 Twelve Mile Rd.  
Warren, Michigan

## Membership and Annual Dues

Student	Individual	Senior Citizen	for families
\$17.00	\$30.00	\$22.00	add \$7.00

### Astronomical League (optional)\$7.50

Send membership applications and dues to the treasurer:  
c/o Warren Astronomical Society, Inc.  
P.O. Box 1505  
Warren, Michigan 48090-1505

Pay at the meetings

Also via PayPal (send funds to [treasurer@warrenastro.org](mailto:treasurer@warrenastro.org))

### Among the many benefits of membership are

- Loaner telescopes (with deposit). See 2nd VP.
- Free copy of each WASP newsletter.
- Free use of Stargate Observatory.
- Special interest subgroups. See chairpersons.

The Warren Astronomical Society Publication (WASP) is the official monthly publication of the Society.

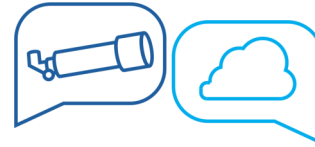
Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted in person, via US Mail, or by email ([publications@warrenastro.org](mailto:publications@warrenastro.org))

**Disclaimer:** The articles presented herein represent the opinion of their authors and are not necessarily the opinion of the Warren Astronomical Society or this editor. The WASP reserves the right to edit or deny publication of any submission.

**Stargate Observatory** is owned and operated by the Society. Located on the grounds of Camp Rotary on 29 Mile Road, 1.8 miles east of Romeo Plank Road, Stargate features an 8-inch refractor telescope under a steel dome. The observatory is open according to the open house schedule published by the 2nd VP.

# Snack Volunteer Schedule

The Snack Volunteer program is suspended for the duration. When it resumes, volunteers already on the list will be notified by email.



# Discussion Group Meeting

Come and talk astronomy, space news,



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## President's Field of View

It'd be nice to have an observing success story to run, but May wasn't that kind of month. The lunar eclipse that would've been our public return to Cranbrook? Clouds. The three-day weekend Up North that could've been dark sky observing under a new moon? Clouds. The Tau Herculis meteor storm? Dearborn's light-polluted skies washed out whatever there was.

But, astronomers persevere. We had a successful in-person meeting at Cranbrook last month with about two dozen members and one brand-new visitor brought in by Meetup. (Yes, the hybrid portion needed work. We're on it.) It was energizing to see and speak with members who hadn't been able to attend virtually in two long years, even if we weren't quite ready to break bread (snacks) together. Macomb meetings will remain virtual until at least September, but in the meantime we'll have a balanced menu of opportunities: Cranbrook in-person with a hybrid option, Macomb online, Stargate Open Houses in person, and we're exploring the possibilities for bringing discussion group back.

Also, as we're halfway through the year, it's time to start thinking about what the future looks like beyond getting the livestream sorted out. We have many term-limited officers including yours truly, and now we have the actual Presidential Podium back in action at Cranbrook. If you want to take command of that podium and this column... drop me a line.

Diane Hall,  
President

## Sunset Warmth on a Chilly Day



Sunset: May 9th, 2022

*The colors are warm, but I was cold without a jacket*

*Photo by Ray Bosshard*

## W.A.S. in the News

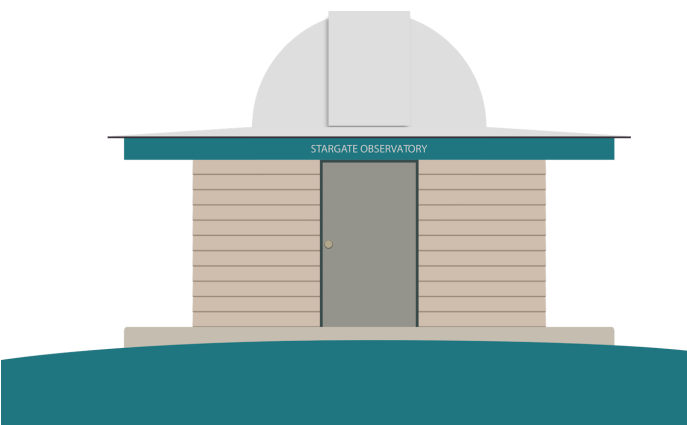
Diane Hall and Mark Kedzior are interviewed in this piece about the library telescope loan program



[Library programs are inspiring more interest in astronomy and other sciences – Macomb Daily](#)

Warren Civic Center Library was selected through a competitive application process to be part of NASA@My Library, an education initiative created to increase and enhance STEAM (science, technology ...

[www.macombdaily.com](http://www.macombdaily.com)





# Supermassive Black Hole in Center of Milky Way Imaged for First Time

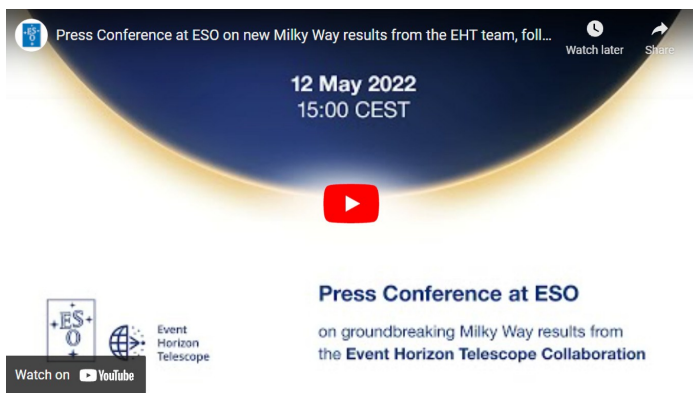
By Bob Trembley



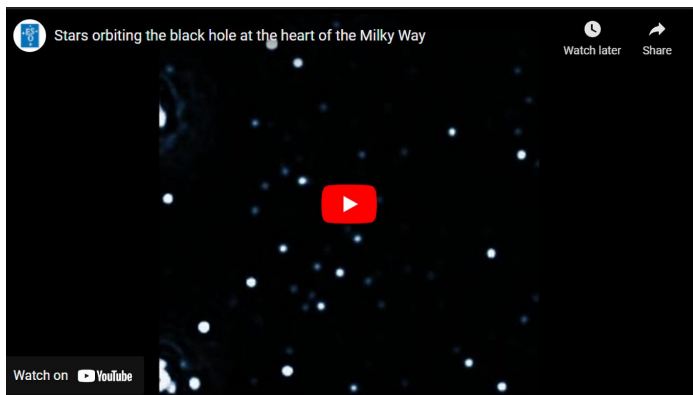
The Event Horizon Telescope has imaged the supermassive black hole at the center of our galaxy! When I heard that the EHT was going to be announcing something important about the Milky Way, I was pretty much expecting to see a black hole image similar to the [M87 black hole image](#) from 2019...

I still screamed “YES!” and jumped around when I saw this image!

The press conference video has several of the researchers explaining what the [Event Horizon Telescope](#) is, and how the image was created.



Sagittarius A\* (pronounced “Sagittarius A-Star”, abbreviated Sgr A\*) is the name of the object at the center of the Milky Way galaxy. It has been observed for decades, and has long been suspected of being a supermassive black hole – there is now direct evidence for this!



Sgr A\* was much more difficult to image than M87: it is 1000 times smaller than M87, and the gas in the accretion disk around it orbits it much faster than around M87 – the gas was changing while they were observing it!

Sgr A\* must also be observed through 27,000 light years of the Milky Way’s disk, where there is a lot of radio-wave scattering dust.

The amount of data created by the Event Horizon Telescope is staggering: 6000 terabytes! So much data that the internet was too slow – hard drives filled with data had to be shipped to a facility to be processed by supercomputers.



Artist concept of Sgr A\* seen from a few AU away. Credit: Bob Trembley / SpaceEngine

The announcement and associated image flooded social media – I saw a video of an astrophysicist watching the unveiling of the image, and WOOTing with joy like I did. There will be an animation released soon showing the rotation of Sgr A\*’s accretion disk – I expect to see that flooding social media as well!

The herculean effort made by these researchers is one for the history books. I keep thinking about what one of the speakers said during the announcement about all the young researchers who are just entering into this field – if this is what they are starting with, where might they take us in a decade?

Published [12 May 2022](#) Sacred Space Astronomy

Download images of Sgr A\* in various resolutions:  
<https://www.eso.org/public/images/eso2208-eh-t-mwa/>

ScienceAlert.com post about Sgr A\* :  
<https://www.sciencealert.com/live-scientists-reveal-groundbreaking-results-from-event-horizon-telescope>

Event Horizon Telescope Announcement:  
<https://eventhorizontelescope.org/blog/astronomers-reveal-first-image-black-hole-heart-our-galaxy>

Vatican Observatory’s Black Hole Podcast with Dr. Heino Falcke:  
<https://www.vaticanobservatory.org/general/black-holes/>





The Michiana Astronomical Society Presents:

The Twelfth Annual

# Michiana Star Party

At the

**DR. LAWLESS INTERNATIONAL DARK SKY PARK**  
Near Vandalia, MI

Box 262

South Bend, IN 46624

**June 3-5, 2022**

Observing opportunities  
Special speakers  
Dark sky  
Vendors  
Interaction with astronomy enthusiasts  
Many types of telescopes  
Camping, hiking trails, outdoor activities

## PROGRAM

### FRIDAY

Camp set-up after 3:00 p.m.

- ★ Observing
- ★ Green laser constellation hunts
- ★ Informal talks
- ★ 8:00 p.m.- speaker: Robert Parrish, Dr. Lawless Park Commissioner Light Pollution and Dark Skies

#### Eating and Sleeping

- ★ Community fireplace and grill
- ★ Microwave oven available
- ★ Campsites available for tents, campers, and RV's
- ★ Public restrooms and running water available in Pavilion
- ★ Motels/hotels in nearby communities

#### Park Opportunities

- ★ Wildlife observations
- ★ Hiking trails
- ★ Biking trails
- ★ Open fields for games, Frisbee

### SATURDAY

- ★ Vendors and swaps
- ★ Solar observing
- ★ Hiking, biking, free time
- ★ Outdoor activities for kids of all ages  
11 :00 Speaker: Melinda O'Malley  
Astronomy 101
- ★ 12:00 Lunch break
- ★ 1 :00 p.m. Speaker: Jim Hopkins  
The Outer Planets
- ★ 2:30 p.m. Speaker Dr. Chris Howk  
Galaxies on the Edge: Interstellar Matters in Edge-On Galaxies
- ★ 4:00 p.m. Group photo
- ★ Dinner break
- ★ Observing

### SUNDAY

- ★ Assist with clean-up
- ★ Pack up
- ★ Head Home

SEE:

[www.Michiana-Astro.org](http://www.Michiana-Astro.org) for more information about Michiana Astronomical Society.

[www.casscountymi.org/CountyParks/DrTKLawlessPark.aspx](http://www.casscountymi.org/CountyParks/DrTKLawlessPark.aspx) for more park information.





# Observing Reports

## 27-29 April (combined)

Barnard's Star. Obs'd by "Handsome" Joe McBride, William "The Conqueror" Beers, and Observer. Difficulty with charts w/o Burnham (1978), so telephone consultation with Clayton "The Brain" Carey. Star acquired in good order by Observer but medium yellow, unexpected for M3, even allowing for a variable. Bright against Galaxy back-ground. Henry's chapter in Obs. Hand. (2022): receding velocity 111 km/sec., 2nd closest system to Sun after Rigel Kentaurus.

Nova 2022 N.G.C. 4647. Faint galaxy all most on M-60 to N.W. Observer could not see nova but obs'd by the others.

Transparency excellent. (Wind one morning.)

4" refractor, 10" Newtonian.

## 4 - 5 May

**The Moon.** New M. on 30 April ++Cleomedes (126 km.)++ Dominates moonscape N. of Mare Crisium "[V]ery prominent crater" per Rukl. Low solar angle highlighted craterlets B & J. see *Alter's ATLAS* (from Lick plate) Plate 37 for excellent analogue for above date's lunar phase on Cleomedes. See all so: depictions of B and J on Rudeaux's small scale drawn map in *LAROUSSE ENCYCLOPAEDIA* (1959, '62) Space probe picture 54-3, in *ATLAS AND GAZETTEER OF THE NEAR SIDE . . .* (N.A.S.A 1971) adds tiny E and A to the craterlets. High resolution and perpendicular. The central peak cited by Rukl was not noted (!) by Observer, but obvious on Alter PLATES 37 and 39 (approaching sun-set). Magnification was insufficient to see the rima on crater's floor.

++Taruntius (56 km.)++ Opposite side of M. Crisium Observer noted odd appearance, in morning illu-

mination: minimal wall elevation above floor.

Effect drawn by Rudeaux, supra. Partially "filled" crater. 192-33 in N.A.S.A. lunar probe book indicates raised floor under high illumination.

Plate 62, Kopal's *NEW PHOTOGRAPHIC ATLAS* reveals Taruntius's ray system + faint central peak under afternoon illumination. Low sunlight and insuff. magnif did not allow these features.

Transparency fair (cirrus), seeing good.

6-cm f /13 refractor @ 65X

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COMMENTARY: When comparing visual impression of the Moon to various photographic depictions at different illuminations and widely different telescopes, one uses several sources. Space probe pictures are the ultimate test for what is possible, usually barely in small glass.

## 7 May

**The Sun.** Difficult to discern how many groups. Easternmost, a small cluster of ~ 6 spots some very small. On other side of the disc 1st impression was a very widely distributed group of two components: S. most = two spots and N. most = at least twelve incl a large formation with bifurcated umbra & penumbra. However, Observer postulates were two groups, Old Cycle and New Cycle because of latitude difference. Would require polarity image/ diagram to know.

Transparency excellent, seeing good.

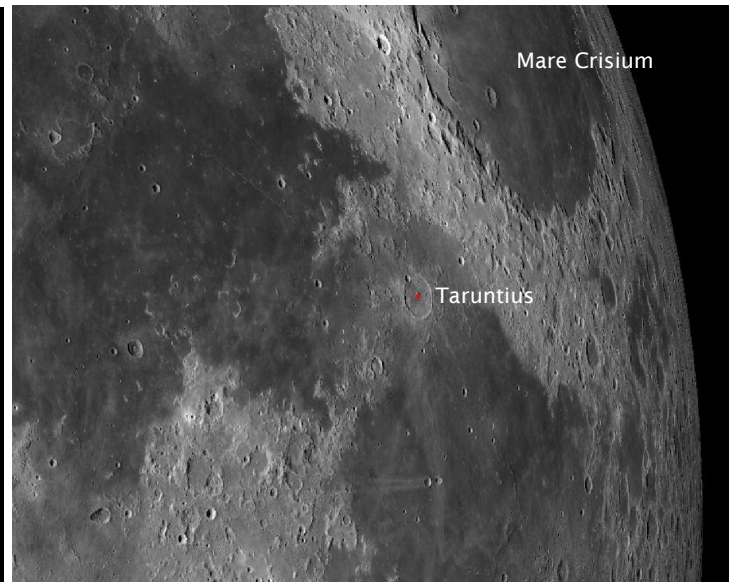
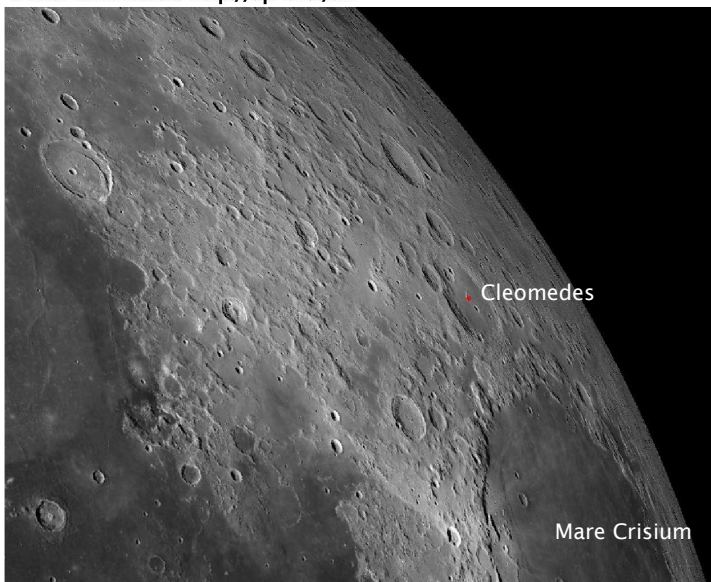
5-cm. F/ 11 refractor @ 45X + mylar filter.

## 8 - 9 May

**Procyon.** Arresting sight of pale yellow in keeping

(Continued on page 7)

Virtual Moon Atlas: <http://ap-i.net/avl>



(Continued from page 6)

with "F" class star. Under-rated from proximity to Sirius and Betelgeuse. Observer understood a double, but mis-informed others that a) blue star to E. was the B, b) Procyon was "5th or 6th" closest system to Sun. Actually 16th. Companion is in fact only 11th. mag and very close to Procyon A, totally beyond instrument.

**The Sun.** More convinced the spots' array near W. limb is 2 groups. Latitude dist. too great for one group. A group approaching central merid. has 4 small spots. New spot just entered from E. limb.

.....  
**COMMENTARY:** Procyon is 11.44 ly away, slightly farther than 61 Cygni. (*OBS. HAND. 2020*). Burnham (1978) lists as 6th farthest, but very faint objects known latterly. "[V]ery remarkable example of a white dwarf star", Procyon B indicated per calculation but search failed until 1890s with 36" Lick refractor by J. Schaeberle. Periastron is approx. now. Procyon identified with a dog from earliest antiquity: Kakkab Paldara (Babylonian) "Star of the Crossing of the Water Dog".

**8 - 9 May (addenda)**

Transparency poor (Moon + warm front?), seeing good.

6-in Newtonian, f /8.6 @ 50X

.....  
Transparency fair (cirrus), seeing fair.  
5-cm refractor @ 45X, mylar filter.

**12 May**

**The Sun.** Three groups, one very close to E. limb: 2 spots. Group near central disc, small w/ 3 diminutive spots. Principal has at least 18 spots, most very small, none of size.

Transparency poor (cirrus), seeing good.

5-cm refractor @ 45X. Mylar filter.

**17 May**

**The Sun.** Four widely scattered groups, all but one in N. hemis. small. 6-7 spots, 2 spots, 4 spots, at least 25 spots (dense) with one small penumbral development.

Transparency excellent, seeing fair.  
5-cm. f /11 refractor with sub-dia. mylar filter.

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**COMMENTARY:** Most groups at one time for Observer in years.

**23 May**

**The Sun.** Two groups across disc. One sparse ~ 3 spots. The other extensive in two concentration. Numerous small features and extensive penumbral development.

Transparency excellent. Seeing good.

5-cm. f /11 refractor with sub-dia. mylar filter. Magn. as before.

**27-28 May**

**Saturn.** Shadow of ring system on S. hemis. of ball, very thin black line, but obvious. Colour of ball vaguely greenish-yellow. Titan well to west but not yet at elongation. Next satellite in: Dione, after her, Rhea. Both barely vis.

Transparency poor (cirrus), seeing poor @ very low altitude.

16" f /10 Borr Telescope, 460X.

**28 May**

**The Sun.** 2 groups in S. hemisphere. 1 spot and 3 spots with substantial penumbra incl. 2 umbras. Given recent activity, bare surface.

Transparency fair (cirrus), seeing good.

5-cm. refractor @ 45X, sub-dia mylar filter.

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**COMMENTARY:** Suspicion one group Old Cycle, other New given approx. estimate of latitude.

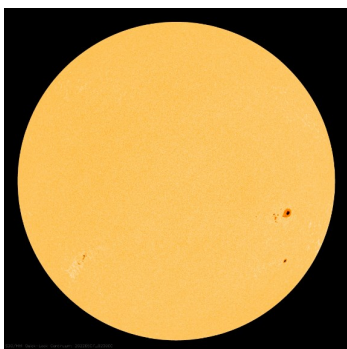
**30 May**

**The Sun.** 3 groups spread across disc incl. one very close to easterly edge. 6 spots, 2 spots, 1 spot. The "pair" is with in a tight umbra.

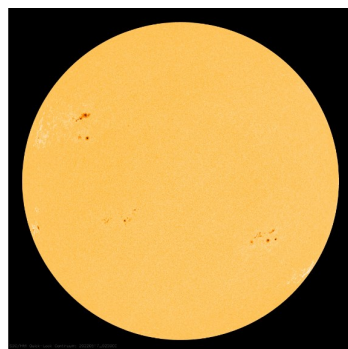
Transparency fair (cirrus), seeing good.

5-cm. refractor @ 45X, sub-dia. mylar filter.

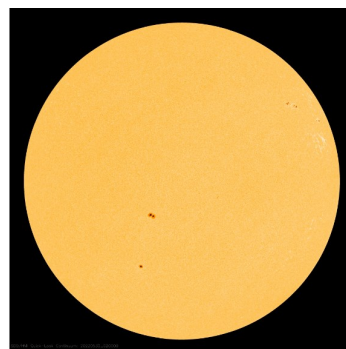
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**COMMENTARY:** Prev. remarks about groups representing old vs. new cycle to be disregarded.



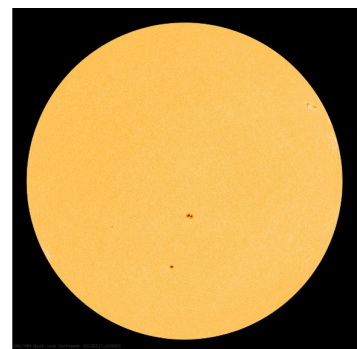
07 May



17 May



23 May



30 May

Images from Spaceweather.com





# ALCON 2022

July 28 – 30

## EMBASSY SUITES HOTEL

1000 Woodward Pl. NE

Albuquerque, New Mexico 87102

<https://alcon2022.astroleague.org/>

(Website available by January 14, 2022)



Hosted by:

**The Albuquerque Astronomical Society**

[www.TAAS.org](http://www.TAAS.org)





# W.A.S. Astro-Images

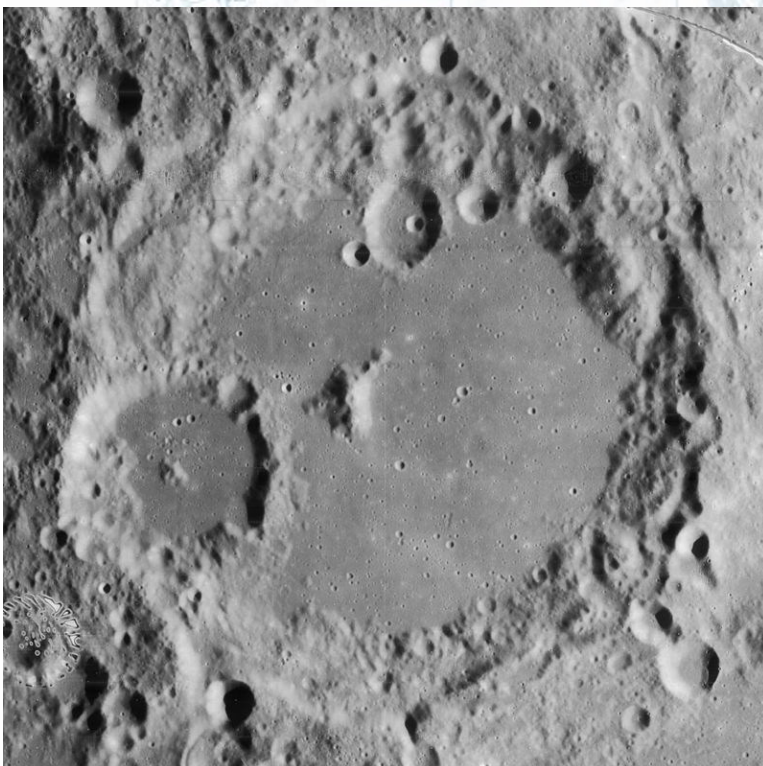


ALBATEGNIUS (136 km.) with KLEIN (44 km.) With "mighty" 10-inch by Gerald Christopher Persha at his observatory in southern New Mexico, this lunation.

Lunar Orbiter image for comparison. Central peak in Albategnius seems off-centre, but actually not given large slough at left, made when the giant meteor struck its wall, making Klein. There is a tiny "ray" (?) craterlet at very top of the central peak which might reasonably be mistaken for a volcano. Jerry says the N.A.S.A. commentary regards the mini-feature as very recent. One might say the impact was very lucky, but given the lunar mountains in both hemispheres, inevitable.

Albategnius is Latinate for an Arabian prince and astronomer, ca. 900 C.E.

Klein was a German selenographer and populariser, ca. 1900 C.E. (*LUNAR ATLAS*, Rukl)



**Left:** Image of Albategnius taken by the Lunar Reconnaissance Orbiter.

Albategnius: 11° 12' 0" S, 4° 6' 0" E (lunar)

Klein: 12° 0' 0" S, 2° 36' 0" E (lunar)

(Continued on page 10)



*(Continued from page 9)*

Continuing with a lunar theme, Ray Bosshard sends in this image, and says:

“There seems to be a very tall arch near the lower left-hand corner of the moon due to the timing of the photograph and my darkening of the sky which may have also darkened out the area being perceived as the hole in the arch.”



Photo by Ray Bosshard

Date taken: May 9th, 2022 around sunset

Ray enlarged the area in question, seen here at right.

*For those keeping score, the crater in question is Clavius—Ed.*

See Ray's sunset photo, taken the same day, on page 3



# The View From C.W. Sirius Observatory

## Supernova SN2022hrs



Photo: Bill Beers

63 million years ago, just after the dinosaurs died, a star exploded in NGC4647 galaxy. And in April we were lucky enough to see it through our telescopes. Supernova SN2022hrs, located very near Messier 60 in Virgo, was first discovered by Japanese amateur astronomer Koichi Itagaki on April 16, when it was reported at 15 magnitude in brightness. Supernovae are huge explosions in space. They take place during the final stages of some stars' lives. When they erupt, one supernova can briefly shine brighter than a whole galaxy. There are different types of supernovae. SN2022hrs is a Type 1a supernova. Type 1a's are also known as thermonuclear supernovae. This type of explosion does not take place when the core of a massive star collapses. They instead occur in a binary (or double) star system. To trigger a type 1a supernova, one of the two stars must be a white

dwarf. The other star is often a low-mass star, like our Sun, or can be a red giant star. White dwarfs are very dense stars. They do not have much more mass than our Sun, but that mass has been squashed into an Earth-sized sphere. This means the surface of a white dwarf has very strong gravity. This gravity pulls in material from the nearby star onto the white dwarf. The white dwarf gets more and more massive as it pulls in material from its companion star. This process is known as accretion. During accretion, the mass of the white dwarf increases. If the white dwarf grows to over 1.44 times the mass of the Sun, the electrons are no longer strong enough to prevent the star from collapsing. At this point, the star explodes as a type 1a supernova. Also, type 1 supernova lack

*(Continued on page 12)*

(Continued from page 11)

the presence of hydrogen in their spectra. The International Astronomical Union's Central Bureau for Astronomical Telegrams uses a Base 26 letter/number code system to number each supernova in a given year. Thus, SN2022hrs, "hrs" is the 5895th supernova to be discovered in 2022. NGC4647 galaxy where the supernova occurred is 63 million light-years away in the constellation Virgo. Messier 60, the large elliptical galaxy right next to it is 57 million light-years away. So those 2 galaxies are fairly close to each other.

Back in late April, (thanks to Joe McBride for suggesting it), a few of us were lucky enough to view the supernova through our telescopes up at Cadillac West when it was a whopping 12.5 magnitude. So I decid-

ed to image the event. As you can see from my photo, there is some faint bluish color to the supernova, which suggests it is "blue shifting", or coming toward us. This image is 2 hours of integration time using the 11" SCT, f/7, and a ZWO 071 one shot color camera. As of this writing, the last report claimed a magnitude of 13.2, which means it is getting dimmer. If you have a larger telescope, 8" or bigger, point it towards Messier 60 up in Virgo. You should still be able to see the bright star between M60 and inside nearby galaxy NGC4647. Then, after you have viewed the SN and the 2 galaxies, slowly move your scope around the area, and you will enjoy all of the other cool galaxies located around that same area. SN2022hrs is so bright, can you imagine living on a nearby planet in that galaxy! Get out the suntan lotion.



### About CW Sirius Observatory:

C.W. (Cadillac West) Sirius Observatory is located 15 west of Cadillac Michigan. Owned and operated by WAS member Bill Beers. The dome is an 8' Clear Skies Inc dome which houses an 11" f/10 SCT telescope, a 102mm f/7 refractor telescope, Celestron CGEM DX mount, and uses an ASI ZWO 071 color CMOS camera, as well as a QHY8L color CCD camera. The telescope can be remotely operated from inside Bills house. Anyone interested in learning about astrophotography, or any questions regarding equipment, or how to take astrophotos using your iPhones, or any related questions, can contact Bill at: [BEEZOLL@AOL.COM](mailto:BEEZOLL@AOL.COM)



## Join the Astronomical League!



The mission of the Astronomical League is to promote the science of Astronomy. The major benefit of belonging to this organization is receiving the quarterly newsletter, The Reflector, which keeps you in touch with amateur activities all over the country.

Also:

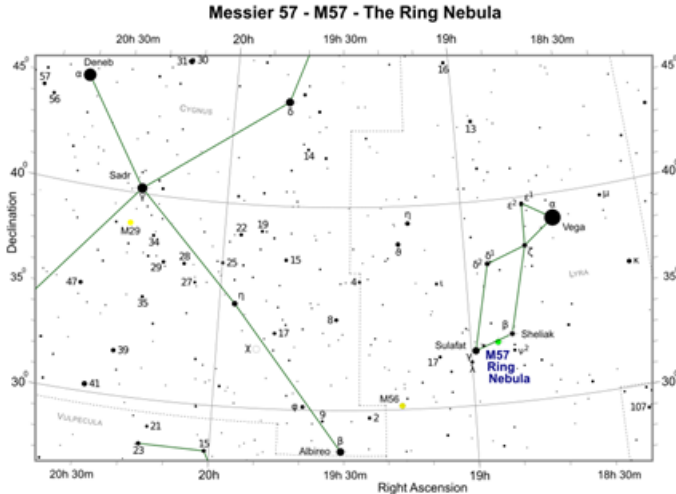
- Participate in the Observing Program
- Avail yourself of the League Store
- Astronomy Books at a discount
- Attend Astronomical League Conventions

Only \$7.50 annually,  
(Membership starts July 1)

[alcor@warrenastro.org](mailto:alcor@warrenastro.org)

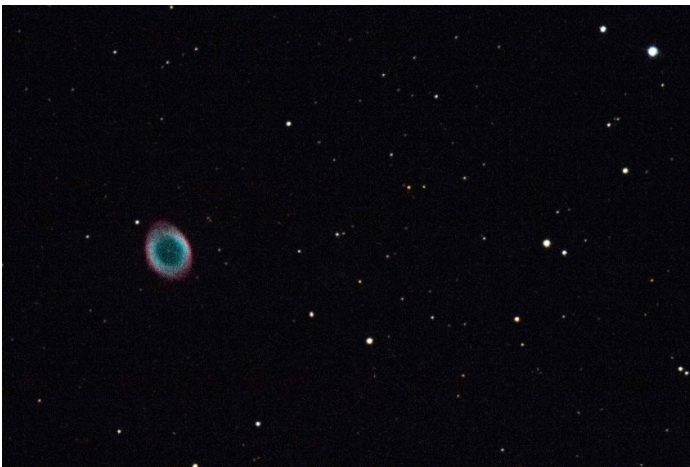
# Notes from the Apache-Sitgreaves Observatory

Entry number 57 in the Catalog of Nebulae and Star Clusters by French astronomer Charles Messier, aka M57 or Ring Nebula, is an early evening treat during June, located in the constellation Lyra, named after the musical instrument the Lyre. Visible in a 50mm refractor, obviously better with more aperture, it is exciting to see what appears as a smoke ring hanging in space.



The bright star, Vega, is a somewhat easy to find in the northeastern sky even in urban areas, and with darker skies the parallelogram of fainter stars become evident. The southern two of those make centering M57 in a telescope a snap. Classified as a Planetary nebula, this type of object start as normal, low-mass stars, like our Sun, that have grown older and having lived long lives they will towards the end have ejected material into their surroundings many times, and the star has exited the Main Sequence to become a White Dwarf star. Being highly energetic in the Ultraviolet region of the spectrum, this causes the surrounding gasses to fluoresce, glow like a Neon lamp. There may be Neon present, but certainly Hydrogen and Oxygen, and many other elements glow to make this nebula visible.

Observing M57 visually in the 36" telescope, at 152x magnification with an O-III filter, enough photons are focused to begin to see the older, outer shells of material I call 'petals' where the Ring Nebula takes on an appearance more like a flower.



*The Ring Nebula; a 2.5-second DSLR image using the 36-inch telescope. Photo credit; Apache-Sitgreaves Observatory*



*Photo credit; Calar Alto Observatory*



## About the Apache-Sitgreaves Observatory

The Apache-Sitgreaves Observatory is located on the eastern edge of Overgaard, Arizona, a small town at just under 7000-foot elevation bordering the Apache-Sitgreaves National Forest in northern Arizona. The main telescope at ASO is a 36" f/4.5 Newtonian on a computer-controlled Alt-Az mount. Viewing through the 36" telescope is available to the public by appointment, as are the DSLR Workshop and Solar programs. Current astronomical research projects include the Supernovae Search Patrol of Abell Galaxy Clusters using short integrations reaching 18+ magnitude. ASO is operated by the Apache-Sitgreaves Research Center Inc. which is owned by WAS member, and former WAS president, Steven Aggas.



# Presentations

**Monday, June 6, 2022**

## Virtual Presentations

Main Talk:



**By Peter K. G. Williams**

The WorldWide Telescope project enables the visualization and sharing of scientific data from major telescopes, observatories, and institutions among students and researchers. With installable and web-based versions, the app is used by science museums and full-dome immersive planetariums, and in scholarly publications. Our own Bob Trembley has recently been including WorldWide Telescope links to some celestial objects that he discusses in his posts.

Work on WWT is supported by the American Astronomical Society, the US National Science Foundation, and other generous project supporters.

### About the Speaker:

Peter is the Innovation Scientist of the Center for Astrophysics and the American Astronomical Society. He is also Director of the AAS WorldWide Telescope project. His astrophysical research focuses on the magnetism of other stars and planets, large surveys, and the techniques of radio interferometry.



As Innovation Scientist, his job is to make other astronomers' jobs easier. The new technologies of the 21st century present an enormous opportunity to improve all aspects of the research enterprise — but working scientists don't have the time to chase every new fad that comes out of Silicon Valley. He tries to promote and build tools that help astronomers do their research faster and better.

*(Continued on page 15)*

**Thursday, June 16, 2022**

## Virtual Presentation

Feature Talk:



**By Deirdre Kelleghan**

We may focus quite a bit on astrophotography, but sketching still has a place in our observing. Dierdre shows us how we can incorporate sketching in our observing sessions—or making art out of the night sky—Imagine what Van Gogh might have painted had he seen M42 through a big aperture scope.

### About the Speaker:

Deirdre Kelleghan is a very active amateur astronomer and frequently posts her astronomical artwork online. From 2005-2009 she was President of The Irish Astronomical Society. Also in 2009, she was the National Coordinator for Sidewalk Astronomy for 100 Hours of Astronomy. From 2004 - to date she is a member of The Saturn Observation Campaign - Informal Outreach Education for JPL/NASA. Her list of activities goes on and on. She works with young children and encourages them to create astronomical artwork.



Her author account on the Vatican Observatory's website is one of the first that Br. Guy had Bob Trembley create.



(Continued from page 14)

### Short Talk:



**By Bob Trembley**

Description: At the request of NASA, every 10 years a report called the planetary science decadal survey is prepared by the National Academy of Sciences, Engineering, and Medicine. This report provides a framework for all debates about funding priorities in NASA, the White House, and Congress. The current decadal survey was released in April of 2022, and is named: "Origins, Worlds, and Life: A Decadal Strategy for Planetary Science and Astrobiology 2023-2032." In this first lecture in a series, Bob Trembley will give an overview of the contents of this latest decadal survey.

### About the Speaker:

Bob Trembley, currently first VP of WAS, Outreach Director for a total of 5 terms, is fantastically interested in asteroids, Near Earth objects (NEOs), and meteorites. Bob is a HUGE fan of educational space-related PC software such as: NASA's Eyes on the Solar System, Universe Sandbox, SpaceEngine and Kerbal Space Program. Bob and his wife Constance, a middle-school science teacher and also a Solar System Ambassador, run an after-school astronomy and space science club at Connie's school called the "Endeavour Space Academy."



## Saw a Fireball?

Report it to the American Meteor Society!



[www.amsmeteors.org/members/fireball/report-a-fireball](http://www.amsmeteors.org/members/fireball/report-a-fireball)

## WAS PRESENTATIONS

If you would like to present either a short talk (10-15 minutes) or a full-length talk (45-60 minutes) at a future meeting, please email Bob Trembley at:

[firstvp@warrenastro.org](mailto:firstvp@warrenastro.org)



If you're shopping on Amazon, make sure to use Amazon Smile. It costs you nothing, and if you select us as your charity, Amazon will donate 0.5% of every purchase you make to the Warren Astronomical Society.

## Asteroid 7335 Flyby Captured



Click on link below to see an animated GIF of the flyby on May 25, 2022:

[Flyby GIF at Spaceweather.com Gallery](#)

Asteroid	Date(UT)	Miss Distance	Velocity (km/s)	Diameter (m)	Miss Distance (MILES)	Velocity (MPH)	Diameter (FT)
<a href="#">7335</a>	2022-May-27	10.5 LD	13.1	1078	2,520,000	29,304	3,537

Info in yellow is from <https://www.spaceweather.com/>

So, a rock 2/3 of mile in diameter at Mach 38 passing 2 1/2 million miles away





Nothing in the night sky quite beats a total eclipse of the Moon. Other than a shooting star, eclipses prove to all who watch them that the sky is a changing place. During the several hours of a lunar eclipse, we can actually watch as the Moon slowly orbits the Earth, and as it passes through the shadow of the Earth we can enjoy its changing illumination.

Last Sunday evening, May 15, 2022, there was a total eclipse of the Moon. It was perfectly timed for observers throughout most of North America. On the east coast, the eclipse began in mid-evening. For those of us who live in Arizona, in the great American southwest, the eclipse began just as the Moon was rising, and it ended late in the hours of the evening.

As the Moon marched its way eastward, the penumbral shadow manifested itself as a shading, slowly dimming the Moon's light as it spread across. Gradually the eastward facing limb, or edge, of the Moon grew darker and darker. About 90 minutes into the event, the full and profound darkness of the umbra, the central shadow of the Earth, struck the Moon's leading edge. Over the next hour or so the Moon lost much of its light.

Seeing an eclipse of the Moon is not the same as experiencing it. To do that, you need also to notice the sky. At Moonrise the sky was very bright, with moonlight swamping everything except the brighter stars. But as the eclipse progressed that night, the sky began to darken gradually, then more obviously as fainter stars appeared, and finally, from a dark site, the Milky Way could be seen. On a personal note, one of the variable stars I observe, TV Corvi (Clyde Tombaugh's star), cannot be viewed through a telescope when the Moon is near its full phase. But on this night the darkened Moon let the sky get so dark that I easily got a reading of the field of that star. It was yet another aspect of the magic.

The other part of experiencing the eclipse, a completely unexpected part of it, is to learn just how dark the Moon gets during the total phase. There is a scale, the Danjon scale, which ranges from  $L=4$ , where the eclipsed Moon is so bright that you barely notice that there is an eclipse going on at all, all the way down to  $L=0$ , during which the Moon is barely visible. If the Earth has suffered a serious volcanic eruption in the months preceding an eclipse, the volcanic dust still remaining high in the Earth's atmosphere can seriously darken the shadow. I saw one such eclipse on the morning of December 30, 1963. Thanks to the eruption in February 1963 of Indonesia's Mount Agung volcano, at mid-totality the Moon simply disappeared. Observing from a rural site, my friend Constantine Papacosmas said that the eclipsed Moon was no brighter than a 5th magnitude star.

A few months ago, Mt Hunga Tonga-Hunga Ha'apai, a gigantic undersea volcano about 60 miles north of Tongatapu, Tonga's main island, and it spewed lots of dust into the upper stratosphere. For this reason, I estimated this eclipsed Moon's luminosity as  $L=1.5$ . It was the darkest eclipse I have seen since 1963, and Wendee and I thoroughly enjoyed sitting in our observatory watching the wonderful spectacle.

We get to do this all over again in November when a second total eclipse of the Moon will be visible from the Americas. (Because the Moon must pass directly through the Earth's shadow to be eclipsed, these events can happen only at full Moon. May the sky be clear with the Moon as inviting as it always is. Then you will have another chance to watch the sky in motion, and to watch the world move along not with the trivia and rush of the daily news, but with the slow and solemn, long term march of cosmic time.



*Wendee took this picture of the start of the lunar eclipse as the Moon was rising over a young saguaro cactus plant in our backyard.*

*Photograph via iPhone by Wendee Wallach-Levy.*





# The Objects That Changed Astronomy

(And How to Observe Them)

-Brad Young, Astronomy Club of Tulsa

## Part Three: Daguerre to Sputnik

The invention of photography (usually attributed to Daguerre) was not only a technological breakthrough for human civilization, but a powerful addition to the toolkit of astronomers. The human eye, though a miraculous organ, does not have the ability to gather photons over time like photography or imaging can. It also sees only a narrow band of the electromagnetic spectrum which we call visible light. Photography can integrate photons over time and “see” in different wavelengths above and below the frequencies available to our eyes.

### New Tools Require New Thinking (Again)

*“Young man, I am afraid you are wasting your time. If there were any more planets, they would have been found long before this”* – as told to Clyde Tombaugh

The first astrophotograph was taken in 1840, of the moon. The usefulness of this method was seen immediately, but it took decades of improvements to the process to reach its full potential. Early adopters such as E.E. Barnard found the extent of known nebula (both bright and dark) throughout the sky increased dramatically using long exposures. Photographs also provided a record that could be checked against older images, leading to blinking methods



Horsehead Nebula. Image by Author

### Observing These Wonders

If you have imaging equipment or access to any of the remote imaging services, you can recreate the power that photography brought to astronomy. For instance, you may have struggled all your observing life to visually observe the Horsehead Nebula (Barnard 33) in Orion or spent hundreds on a H-beta filter. A 60 second exposure with no filter on a rental scope will give you an amazing view of the nebula to rival those seen in your astronomy books.

You can also use imaging to track variable stars, although many can also be tracked visually. There are many Cepheid variables that can be observed either way, and your observations used to calculate the distance to a star based on its period and apparent luminosity. Check the [AAVSO website](http://www.aavso.org) (American Association of Variable Star Observers) to understand how this is done.

Blinking images to search for asteroids or near-earth objects is still done via the various sky surveys such as Pan-STARRS and the Catalina Sky Survey. If you would like to be involved in this, you can request to be on a team via the [IASC](http://www.iasc.org) (International Asteroid Search Committee) and blink images provided to you by those surveys.

### Imaging Relativity

*“Spacetime tells matter how to move; matter tells spacetime how to curve.”* -John Archibald Wheeler

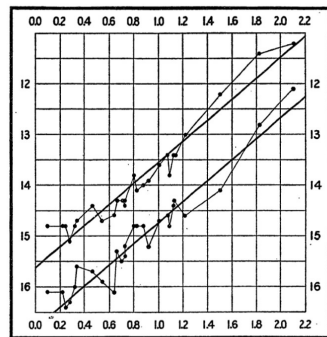


FIG. 2.

for identifying planets and asteroids such as Pluto.

### Brightness vs. Period Relationship

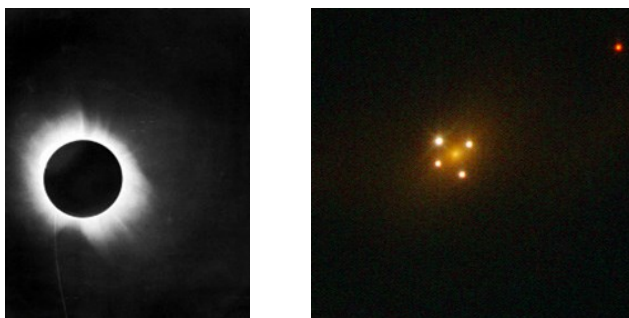
Photography also provided a much easier way of recording variable stars. The “standard candles” identified by Henrietta Leavitt (Cepheid variables) led to the *period-luminosity relationship* method of providing stellar and later galactic distances far beyond the reach of simple parallax.

(Continued on page 18)

(Continued from page 17)

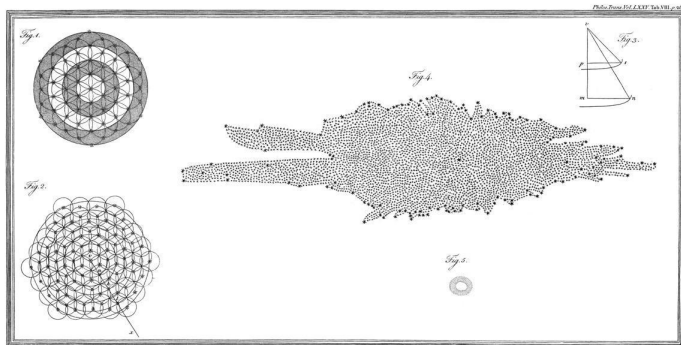
Another benefit of astrophotography was scale and adaptability. One of the effects of gravity predicted by Einstein's theory of relativity was that starlight passing near a massive object such as the sun would be bent by its gravity. This would seem to be a hard thing to prove, but at the 1919 solar eclipse, Sir Arthur Eddington took the famous photograph below that was used to prove the theory. Stars in the image (not visible at this scale) were compared to images of those same stars in Taurus without the sun in the field. The exact replication available using photography and very careful, precise measurement proved that the light from the stars near the sun had been displaced slightly by the gravity of the Sun during the eclipse.

I'm not sure you're going to be able to replicate this famous use of imaging yourself, but it stands as one of the best early uses of photography to prove a fundamental theory about our universe. If you have a very large scope or highly sophisticated imaging setup, there are other examples, such as gravitational lensing. An Einstein Cross, such as Huchra's Lens, also pictured below (by Hubble Space Telescope), is a famous example. Four images of the same distant quasar (plus one in the center, too dim to see) appear in the middle of the foreground galaxy due to strong gravitational lensing.



## Island Universes

One thing you can admire every clear night are the galaxies in the universe, either the one that we inhabit or all the other ones in the sky. Before photography, these nebulous patches were thought to be clouds of gas within our own, singular Galaxy. William Herschel famously sketched our Milky Way as a flattened disc based on his visual observations:



In the 20<sup>th</sup> century, Hubble, Friedmann, and Lemaitre used general relativity and spectrography to show that these nebulae were other galaxies and were receding away from us in all directions. The spectrum of all but the nearest galaxies shifted to the red end of the spectrum, an example of the Doppler effect. This was a fundamental change in the way the universe was understood; we were no longer alone as a single galaxy, but one in a universe of millions of galaxies, all racing away from each other. These discoveries led to the Big Bang theory of the formation of the universe.

If you have a spectrograph available, you can replicate this discovery yourself. Barring this, just go out and admire our Milky Way or another galaxy some night either visually or with imaging and realize that it's been barely a century since we first understood what these islands of other stars were.



Image by Author

To determine the distance to other galaxies, supernovae are imaged and typified as either Type I or II. The light curve determined by observation identifies the type, and the apparent brightness can be used to approximate distance. This allowed Hubble and others to note that the further from Earth a galaxy was, the faster it was receding from us – now known as Hubble's Law

$$v = H \times D$$

or recessional velocity of a galaxy from us is proportional to its distance from us. The constant H (Hubble's Constant) is a measure of the "expansion factor" of the universe. This constant has been highly controversial as it determines whether the universe is "open" (will expand forever) or "closed" (will ultimately crash back into a Big Crunch).

(Continued on page 19)



(Continued from page 18)

## Observing Extragalactic Supernovae

You can approximate the distance to a galaxy by observing extragalactic supernovae, such as SN2022hrs in NGC 4647. This galaxy happens to appear to be next to Messier 60, a bright galaxy in Virgo. [See my article on it](#) to find its location. Once the light curve is complete, astronomers will use the data reported to AAVSO to review their current distance (63 million light years away) listed for NGC 4647.



SN 2022hrs

Image by Author

Check sites such as [Latest Supernova](#) to find opportunities to image or visually observe these amazing sights. Until we finally have one here again in the Milky Way, these are the supernovae we can see.

## Radio and Other Wavelengths

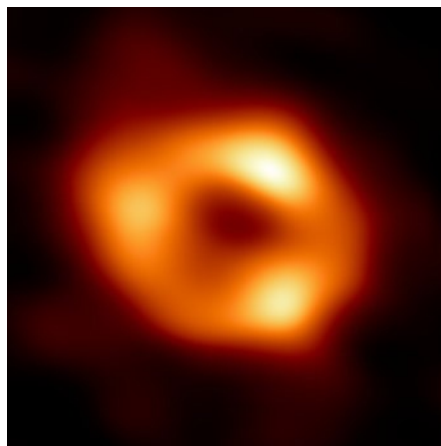
*"Decide yourself if radio's gonna stay - reason it could polish up the gray" "Radio Free Europe" by R.E.M.*

Though not specifically tied to astrophotography and imaging, understanding that there were other wavelengths of light that could be studied led to other useful tools. Radio astronomy has proven to be essential to understanding how objects such as pulsars (neutron stars spinning and pulsing light in our direction) work. The background radiation left over from the Big Bang was discovered in the microwave region of the spectrum. Unfortunately, some of the wavelengths of light are blocked by our atmosphere and their use would have to wait for space-based observatories (see next article). On the other hand, I think it's okay that ultraviolet light from the sun is not allowed at full power directly to our skin.

Radio astronomers keep making news, even during the writing of this article. To quote Wikipedia:

On May 12, 2022, astronomers, using the Event Horizon Telescope, released a photograph of Sagittarius A\* produced using data from radio observations in April 2017, confirming the ob-

ject to be a black hole. This is the second confirmed image of a black hole, after Messier 87's supermassive black hole in 2019.



Sagittarius A\* the black hole at center of Milky Way

Radio astronomy is available to amateurs via DIY setups that can be put together with a little effort and expense. Examples include the SuperSID receiver (left) to monitor solar activity, and the Radio Jove setup (antennae on right, separate receiver) to monitor storms on Jupiter.



With special permission, you can even use radio scopes remotely, such as the 20-meter Green Bank radio scope. I observed many objects using that setup a few years ago, including this [record of radio source 3C123](#).

(Continued on page 20)



But one thing you can observe with no expense at all is the background radiation discussed above. Just turn your old (analog) TV to a station that doesn't broadcast and look at the snow on the screen. A few of those pixels are lit up by the microwave radiation left over from the beginning of the universe!



### A Picture is Worth a Thousand...Hours of Processing?

*"I got a Nikon camera; I love to take a photograph"-  
"Kodachrome" by Paul Simon*



*"Dreamy" Jupiter drawn by Trouvelot, 1880's*



*"Official" Jupiter image released by NASA et al, 2017*

Astrophotography and later digital imaging have changed both the professional and amateur astronomical communities in enormous ways. Professional astronomy now relies exclusively on the use of imaging. The availability of the entire electromagnetic spectrum has made investigating our universe much easier and has provided the basis for our current astrophysical theories.

Amateur astronomy has also been changed by photography but has not entirely switched over to imaging only. Hopefully, the visceral experience of visual observing will survive, and imaging will be synergistic, not supplanting eyes at a telescope.

The next article, Part Four, will complete this survey of the objects that changed astronomy by looking at the Space Age, and all the unparalleled discoveries made possible by space-based observatories and probes.

### Credits:

- Wikipedia
- NASA
- Leavitt, Henrietta S; Pickering, Edward C "Periods of 25 Variable Stars in the Small Magellanic Cloud" Harvard College Observatory Circular, vol. 173, Public Domain, retrieved May 12, 2022, at <https://commons.wikimedia.org/w/index.php?curid=34747012>
- <https://www.aavso.org/cosmic-distance-ladder>
- <http://iasc.cosmosearch.org/>
- <http://www.warrenastro.org/was/newsletter/WASP-2022-05.pdf>
- <https://www.rochesteerastronomy.org/supernova.html>
- EHT Collaboration - Astronomers reveal first image of the black hole at the heart of our galaxy (Image link), CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=117932040>
- [https://www.gb.nrao.edu/20m/peak/3C123/SkyNET\\_57458\\_3C123\\_17889\\_18894.htm](https://www.gb.nrao.edu/20m/peak/3C123/SkyNET_57458_3C123_17889_18894.htm)
- <https://www.theatlantic.com/science/archive/2017/11/juno-jupiter-pictures/546146/>
- <https://digitalcollections.nypl.org/items/510d47dd-e821-a3d9-e040-e00a18064a99>

## W.A.S.P. Photo and Article Submissions

We'd like to see your photos and articles in the W.A.S.P. Your contribution is ESSENTIAL!  
Send items to: [publications@warrenastro.org](mailto:publications@warrenastro.org)

Documents can be submitted in Microsoft Word (.doc or .docx), Open Office (.ods), or Text (.txt) formats, or put into the body of an email. Photos can be embedded in the document or attached to the email and should be under 2MB in size. Please include a caption for your photos, along with dates taken, and the way you'd like your name to appear.



## High Noon

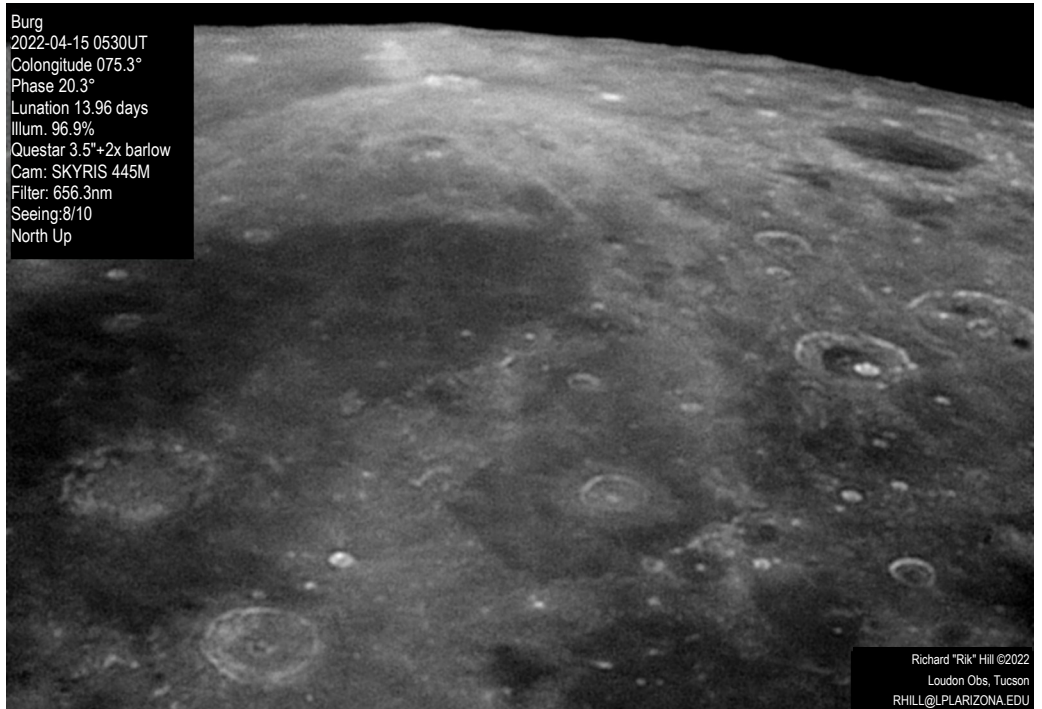
While doing some imaging with the Questar this week under high sun on the moon, this region caught my eye. First was the large dark pool on the right side of this image, the great Endymion (129km dia.) crater some 3.9-4.5 billion years old. I can find no information on when this was flooded with lava but the flat dark floor makes this easy to spot.

Then I noticed the bright crater to the left and wondered the origin of the ray system. There are two craters in that vicinity, Strabo (56km) and Thales (32km).

After some detective work I discovered that the rays do not come from Strabo but rather the smaller Thales adjacent to the south. This is similar to several other spots on the moon where a small undistinguished crater on the terminator blossoms into a spectacular spray under high sun.

Below Endymion is a good sized crater with a small bright crater on its floor. This is Hercules (71km) with Hercules G (13km) on the floor.

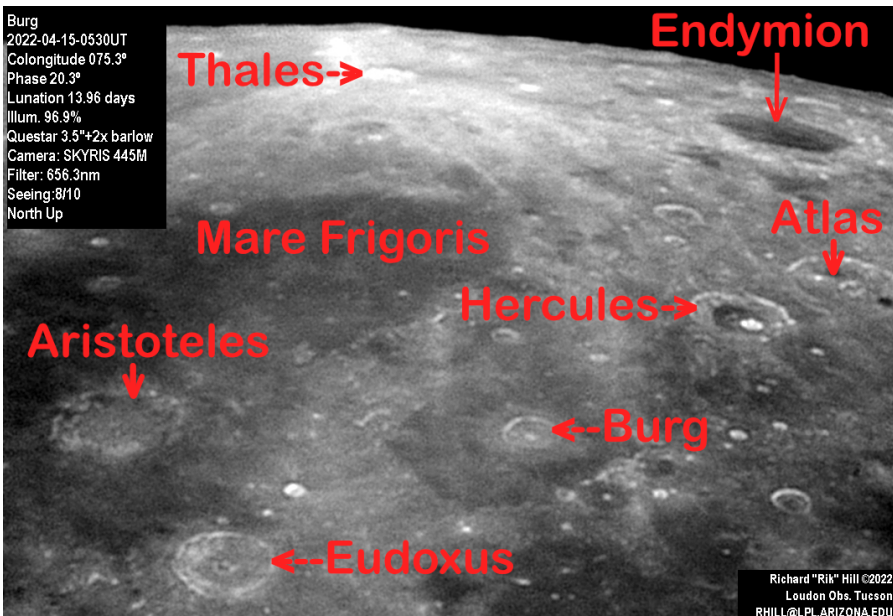
To the right is a slightly larger crater Atlas (90km). Notice the small dark regions on the floors of both



Burg  
2022-04-15 0530UT  
Colongitude 075.3°  
Phase 20.3°  
Lunation 13.96 days  
Illum. 96.9%  
Questar 3.5"+2x barlow  
Cam: SKYRIS 445M  
Filter: 656.3nm  
Seeing: 8"/10  
North Up

Richard "Rik" Hill ©2022  
Loudon Obs, Tucson  
RHILL@LPLARIZONA.EDU

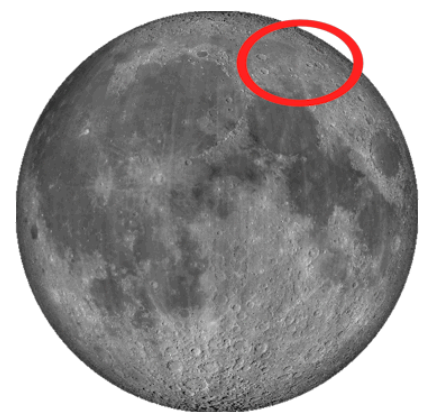
these craters. Below center in this image is the crater Burg (41km) sitting in the middle of an almost complete hexagon, Lacus Mortis (155km). Above Lacus Mortis is a large mare region. This is the eastern reaches of Mare Frigoris that goes on to meander west for nearly 80-degrees of longitude. Then we have two more large craters in the lower left corner. The bottom most crater is Eudoxus (70km) with Aristoteles (90km) above it. I'm so used to seeing the grand splash pattern around the latter crater when it's on the terminator. These features all look different under high noon sun, "pardner"!



Burg  
2022-04-15-0530UT  
Colongitude 075.3°  
Phase 20.3°  
Lunation 13.96 days  
Illum. 96.9%  
Questar 3.5"+2x barlow  
Camera: SKYRIS 445M  
Filter: 656.3nm  
Seeing: 8"/10  
North Up

Richard "Rik" Hill ©2022  
Loudon Obs, Tucson  
RHILL@LPLARIZONA.EDU

This image was made from one 1800 frame AVI stacked with AVIStack2 (IDL) and then further processed with GIMP and IrfanView.



Location maps by Ralph DeCew





# Lunar Eclipse, May 2022

Lunar Eclipse (composite)  
Taken: 2022 05 16 UT  
Canon Rebel w/ 150mm lens



Rik Hill says:

I went to my church parking lot to shoot the eclipse because of the great eastern horizon with the Rincon Mtns. I couldn't decide on just one image from my over 100 images so I put together a composite of the whole thing (not to scale!).

*Editor's note:*

*Intrigued by the occultation about to happen in Steve's image (at 10 o'clock on the moon's edge), I asked if we could put it in the WASP. He agreed and, when I saw a replay on Explore Scientific's Global Star Party where a fellow caught the occultation in action, I became curious about what star this might be.*

*I loaded Stellarium, set the time to the eclipse, zoomed in on the moon and stepped through the time advance. I soon found the three stars in a row that the Star Party chap mentioned and clicked on the one he saw occulted: HIP 76106.*

*From my location in Pensacola, FL, this occultation never happened, the moon merrily skirting just below it. So, seeing Steve's shot was a real treat.*

**The Star's various IDs:**  
HIP 76106

HR 5762  
HD 138413  
SAO 159330  
**Constellation:** Libra  
**Mag** 5.5  
**RA/Dec:** 15h32m38.07s/-19°40'19.4"  
For those unfamiliar with catalogue abbreviations:  
HIP- Hipparcos catalogue  
HR- Bright Star Catalogue (originally Harvard Revised Photometry Catalogue)  
HD- Henry Draper Catalogue  
SAO- Smithsonian Astrophysical Observatory Star Catalog

And this fellow, Jose Luis Flores Cervantes, imaged HIP 76106 emerging from behind the moon: <https://www.facebook.com/groups/18394160295/permalink/10166483259280296/>  
(Never know what you might come up with when doing a search on a star catalogue number.—Ed.)

From Steve Aggas:

Here's the Total Lunar Eclipse from Overgaard, in Northern Arizona. Canon 60D with a 300mm f/4 lens.





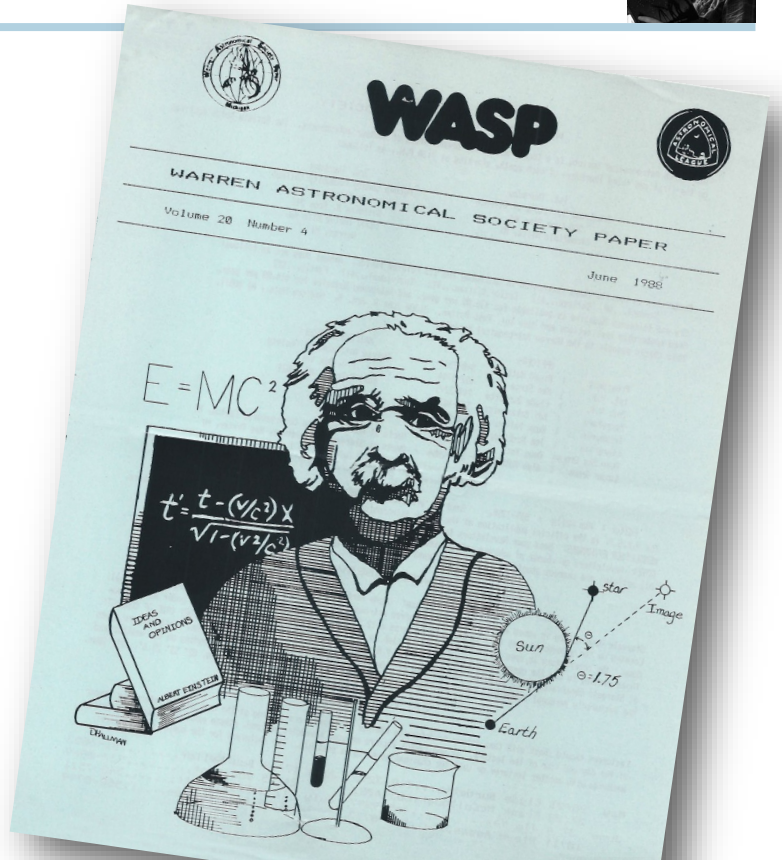


## June 1988

The cover of this issue honors Einstein with a drawing by D. Hallman. Inside, an Observatory Report chronicles a work project out at Stargate by Clyde Burdette, Observatory Chairman. Michael O'Dowd gives us the results of a survey concerning knowledge and opinions on things relating to cosmology.

Then the issue really gets interesting: Remember that issue we looked at back in May ([May 1988](#)), where Ken Kelly did a book review on *The Truth About the Heavens?* It escalated rather quickly with a response from the author, WAS member Mike Cyrek, labeling Ken's review a "diatribe". Ken wasted no time and responded in the same issue. Fascinating reading.

I have a copy of the book, umm, somewhere around here, and had shown it to another club member who demonstrated he found the theories (truths?) expounded in the book, well, jaw-dropping. In the presentation, 50 years of the WASP, the exchange between Mike and Ken were mentioned and during the Q&A, we discovered Mike's niece was in attendance. She assured us that Mike was indeed that opinionated and argumentative.



## June 1998

In this issue, the WASP noted the passing of Angie Judd, beloved member and mother of Fred Judd. On a happier note, we get a feature this editor/historian-of-sorts wishes there was more of: "Focus on Riyadh Matti" by Ceil Brooks, a biographical sketch of one of our members. I don't know offhand how many of these there were, but clearly too few. I need a cub reporter to take up the slack...

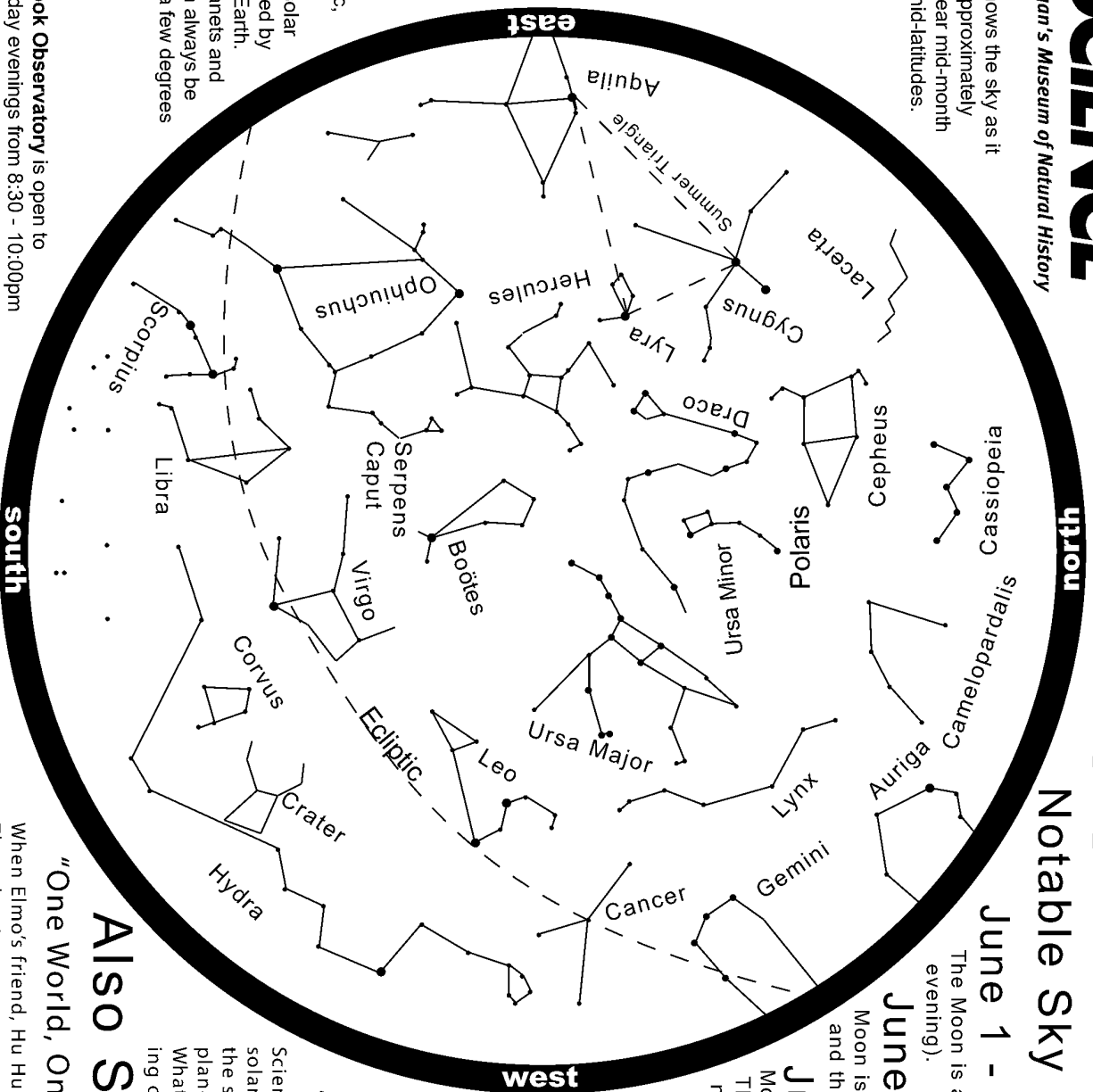
We do have "Computer Chatter" by Larry Kalinowski, where, among other comments, He covered David Levy's appearance and talk at Kensington Astronomy at the Beach.

Finally, "Just What is Averted Vision, Anyway?" is asked by Jeff Medkeff. Read on to see if there was an answer.

Dale Thieme,  
Chief scanner



This chart shows the sky as it appears at approximately 10pm EDT near mid-month at northern mid-latitudes.



What is that dashed line? It's the ecliptic, the reference plane of the solar system, defined by the Sun and Earth. The major planets and the Moon can always be found within a few degrees of this plane.

The Cranbrook Observatory is open to the public Friday evenings from 8:30 - 10:00pm EDT, and the first Sunday of the month from 1:00 - 4:00pm for solar viewing. Come have a look through our telescopes! For observatory information visit <http://science.cranbrook.edu/expllore/observatory>

# JUNE 2022

## Notable Sky Happenings

June 1 - 7

The Moon is at the upper right of Regulus on the 5th (WSW evening).

June 8 - 14

Moon is at the upper right of Spica on the 9th (S eve. and the upper right of Antares on the 12th (SSE eve.).

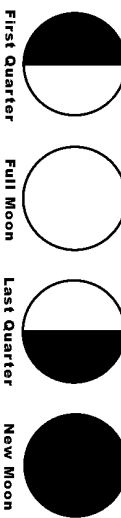
June 15 - 21

Moon is below Saturn on the 18th (SSE predawn). The June solstice is at 5:15am on the 21st. Summer begins in the N. Hemisphere; winter in the S. Hemisphere. The Moon is at the lower right of Jupiter on the 21st (ESE predawn).

June 22 - 30

Moon is to the right of Mars on the 22nd (ESE predawn) and to the left of Venus on the 26th (ENE predawn)

Jun. 7      Jun. 14      Jun. 20      Jun. 28



## Now Showing

### "Birth of Planet Earth"

Scientists now believe that our galaxy is filled with solar systems, including up to a billion planets roughly the size of our own. How did Earth become a living planet in the wake of our solar system's violent birth? What does its history tell us about our chances of finding other worlds that are truly Earth-like?

## Also Showing

### "One World, One Sky: Big Bird's Adventure"

When Elmo's friend, Hu Hu Zhu, visits from China. Big Bird, Elmo and Hu Hu Zhu take viewers on an exciting discovery of the Sun, Moon, and stars. They learn about the Big Dipper and the North Star and take an imaginary trip to the Moon where they learn that the Moon is a very different place.

For astronomy information visit <http://science.cranbrook.edu>







Paul Goelz - North American & Pelican Nebula

*June 2022*

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1  Moon at Apogee: 406191km	2	3	4
5	6  Cranbrook	7	8	9	10	11
12	13	14  Moon at Perigee: 357434km Flag Day	15	16  Mercury at Greatest Elong: 23.2°W Macomb	17	18
19  Juneteenth Father's Day	20  'Juneteenth' observed	21	22	23	24	25  Stargate Open House
26	27	28	29  Moon at Apogee: 406581km	30  NEW MOON		





# Stargate Observatory

## Monthly Free Astronomy Open House and Star Party

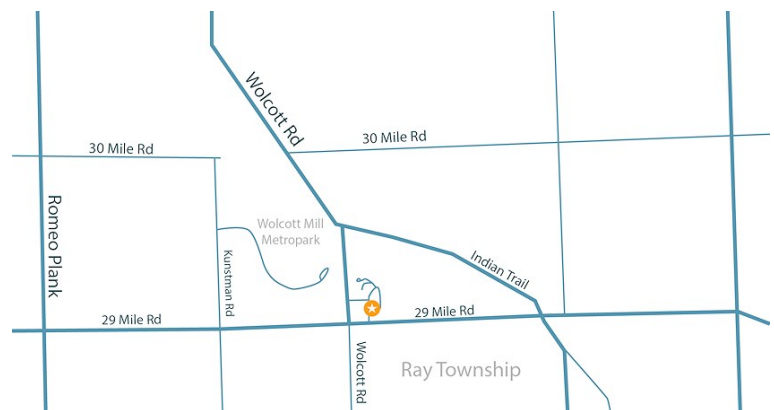
#:30 PM, 4th Saturday of the month!  
Wolcott Mill Metropark - Camp Rotary entrance

**Advisory:** Concerns are circulating in the amateur astronomy community about a possibility of COVID-19 being passed from one person to another via contact of different persons' eyes with a telescope eyepiece. Sharing telescopes may be considered by some to be high-risk due to the possibility of eyes touching eyepieces. Masks are encouraged, mandatory for children.

- Sky tours.
- See different telescope types in operation.
- Get help with your telescope.
- We can schedule special presentations and outings for scouts, student or community groups.

Contact: [outreach@warrenastro.org](mailto:outreach@warrenastro.org)

Find us on [MeetUp.com](https://www.meetup.com)



20505 29 Mile Rd (1.8 miles east of Romeo Plank Rd) Ray, MI 48096  
82° 55'04" West Longitude, 42° 45'29" North Latitude

### Observatory Rules:

- Closing time depends on weather, etc.
- May be closed one hour after opening time if no members arrive within the first hour.
- Contact the 2nd VP for other arrangements, such as late arrival time. Call 586-909-2052.
- An alternate person may be appointed to open.
- Members may arrive before or stay after the scheduled open house time.
- Dates are subject to change or cancellation depending on weather or staff availability.
- Postings to the Yahoo Group and/or email no later than 2 hours before starting time in case of date change or cancellation.
- It is best to call or email the 2nd VP at least 2 hours before the posted opening with any questions. Later emails may not be receivable ([secondvp@warrenastro.org](mailto:secondvp@warrenastro.org)).
- Generally, only strong rain or snow will prevent the open house... the plan is to be there even if it is clouded over. Often, the weather is cloudy, but it clears up as the evening progresses.

# Stargate Report

## Stargate Observatory Report for May 28, 2022

The observatory was opened at 7:33 pm. The sky was cloudy and did not improve.

Over 20 people of the general public attended, some of them are interested in joining the WAS.

Most of the activities consisted of showing the equipment and answering questions about the WAS, the equipment, observing, and astronomy questions.

The new 2X54 mm ultra-widefield binoculars and the new ZWO Atmospheric Dispersion Corrector have been placed in the observatory safe.

The open house was closed at 11:12 pm after all attendees left.

Next open house is schedule for June 25, 2022 starting at 7:30 pm

Riyad I. Matti  
2022 WAS 2nd VP, Observatory Chairperson

## Treasurer's Report

### Treasurer's Report for May 31, 2022

#### BOA account:

Balance:	\$31,791.68
Deposits:	\$9,113.00
Withdrawals:	\$424.39

#### PayPal Account:

Balance:	\$1,399.28
Received (PayPal giving):	\$.80
Money in (memberships) :	\$98.00
Money out (GLAAC closing, Webex, fee)	\$ 126.80
Reimbursement (Stargate equipment)	\$297.59

Total Paid Memberships 109

We welcome new member, Suzanne Devers; and the renewing members, Kelly LeTourneau, James Ehlers, John Schmidt, Mark O'Malley, and David Brueschoft.

#### News from the Treasury:

June is the deadline for joining the Astronomical League if you are considering it. The membership

## Astronomical Events for June 2022

Add one hour for Daylight Savings Time

Source:

<http://astropixels.com/almanac/almanac21/almanac2022est.html>

Day	EST (h:m)	Event
01	20:14	Moon at Apogee: 406191 km
03	00:42	Pollux 2.1°N of Moon
07	09:48	FIRST QUARTER MOON
12	05:02	Moon at Descending Node
13	08:26	Antares 3.1°S of Moon
14	06:52	FULL MOON
14	18:21	Moon at Perigee: 357434 km
16	10:00	Mercury at Greatest Elong: 23.2°W
18	07:22	Saturn 4.3°N of Moon
20	22:11	LAST QUARTER MOON
21	04:14	Summer Solstice
21	08:00	Mars at Perihelion: 1.38130 AU
21	08:32	Jupiter 2.7°N of Moon
22	13:08	Mercury 2.8°N of Aldebaran
22	13:16	Mars 0.9°N of Moon: Occn.
25	02:10	Moon at Ascending Node
25	16:27	Pleiades 3.5°N of Moon
26	03:11	Venus 2.7°S of Moon
27	03:19	Mercury 3.9°S of Moon
28	21:52	NEW MOON
29	01:08	Moon at Apogee: 406581 km
30	06:46	Pollux 2.2°N of Moon
30	21:45	Venus 4.0°N of Aldebaran

starts July, if you wait until July, it will be 11 months before it kicks in.

The process for ordering a physical copy of Sky & Telescope has changed, and prices have gone up above \$40 per year for a member of an astronomy club. Please let me know via email at [treasurer@warrenastro.org](mailto:treasurer@warrenastro.org) if you would like more information.

Adrian Bradley,  
Treasurer



# Outreach Report

## Belle Isle, May 7 report by Adrian Bradley

Around 190 people in total showed up at the Belle Isle Nature Center to observe the moon between 8:00am and 10:30pm. Many were there looking through a telescope for the first time.

I assisted with getting one of the small equatorial telescopes on the moon, and it took a while. Jack Brisbin of the Lowbrows, another W.A.S. member (I forgot his name!!) and the Wayne State Astronomy club were also there to participate. There were 4 or 5 instruments for people to view the moon, including my spotting scope which was able to get a close-in view of the moon.



I demonstrated 'shooting the moon' to many people as well as shared some images that I had taken very recently in Alcona County. We answered questions from the general public as well, pointing out what the names of the few stars we saw as the sun set. The moon image I included was one of the shots I took handheld with camera equipment. It drew a few oohs and aahs from the crowd when they saw me zoom in on the back of the camera, showing crater detail. Unfortunately I don't have an image of the event, which would have been nice!!

In addition to the moon, one of the scopes pointed at double star Castor. Activity sheets were handed out.

A good time seemed to be had by all, and Jack can attest to the story of a photographer who talked with us about how he used to grind telescope mirrors in the 60s. It's still a small world out there!

## Keep the Dates: Sept 16/17

### Fellow astronomy enthusiasts at WAS,

The biggest astronomy outreach event of the year is coming up September 16 and 17. A waning half moon will not rise until 11.05PM; Saturn will be well visible in the east after sunset and Jupiter will follow in an hour. The last year (2019) that we were at the beach we had an outstanding turnout of your telescopes and of enthusiastic visitors. We expect eager participation this year, and our planning committee keeps up-to-the-minute on safety protocols recommended by national and local health authorities. Appropriate safety requirements will be in place and will be announced in advance.

The location is the Island Lake State Recreation Area in Brighton – the "Island Lake picnic grounds" on Google Maps. You'll need a recreation passport on your license plate to enter (or pay the \$15 daily fee). Our hosts, the DNR, are eager to host AATB and the park staff will assist with parking, including reserved areas for astronomers and assistance with transportation.

We need you, your telescope and your passion for sharing the night sky. Please put Sept 16-17 on your calendar.

-Brian Ottum

## Call for Calendar Images

We are getting ready to assemble our WAS 2023 Calendar. We need your astro-images, artwork, and sketches for the calendar. Please send a high resolution JPG or TIFF to [publications@warrenastro.org](mailto:publications@warrenastro.org) for consideration by the calendar committee. Deadline is August 31st.



*Sample images from prior years*

# Meeting Minutes

## WARREN ASTRONOMICAL SOCIETY

### MINUTES OF BOARD MEETING

**MAY 2, 2022 @ 6:30PM**

Meeting called to order @ 6:40PM. Officers in attendance: Diane Hall – Bob Trembley - Riyad Matti (WebEx) – Mark Kedzior – Adrian Bradley - Kevin McLaughlin – Dale Thieme (WebEx) - (Quorum present).

#### OFFICER REPORTS:

President Diane Hall welcomed the board back to our in- person format. The Cranbrook in person meeting will follow the board meeting, and a survey will be taken to assess how the meeting went in this hybrid format (in person and live streaming). She also asked that a sign-up sheet be passed around to solicit volunteers with telescopes for the Cranbrook May 15-16 Total Lunar Eclipse event.

1<sup>st</sup> VP Bob Trembley announced the presenters and their topics for our upcoming meetings in June.

2<sup>nd</sup> VP Riyad Matti (via WebEx) reported on the April 23<sup>rd</sup> Open House with 35 people in attendance. Also on April 29, a Scout Troop and their guides visited the Stargate Observatory, with assistance from Steve Stuart and Adrian Bradley. The May Open House will be held on May 28<sup>th</sup>.

Secretary Mark Kedzior reported the April meeting minutes are in the May issue of the WASP. He also will have a drawing at the Cranbrook meeting following this board meeting for a late arriving door prize from the American Astronomical Society (Sky & Telescope) – a copy of “Binocular Highlights” by Gary Seronik.

Treasurer Adrian Bradley gave the account balances of the WAS account, the finalization of the transfer of the GLAAC Account to the GLAAC. He also reported that the WAS received a check for \$9,000 from the estate of Jon Root.

Outreach Chair Kevin McLaughlin reported on the June 10<sup>th</sup> Scout event at Wolcott Mill for tour of observatory and observing. He also reported on the initial meeting of the Website Committee to begin discussions on the updating of the WAS website and platform that will be used.

Publications Chair Dale Thieme (via WebEx) reports the May issue of the WASP is online.

#### OLD BUSINESS:

Discussion on the Jon Root Bequest to the WAS – Adrian Bradley reported that the Jon Root Family would like the WAS to name a star/constellation that either rises or sets on Jon’s birthday

(January 3<sup>rd</sup>) in his memory. Bob Trembley and Adrian Badley will select a naked eye star that rises in the east on January 3<sup>rd</sup>, and will report to the WAS Board and the Jon Root family on their recommendation and selection. In regard to the amount of the \$9,000 amount bequeathed to the WAS from the estate, discussion took place and was decided that the amount be earmarked for the construction of a roll-off warming/observing room at Stargate. Riyad Matti will contact the Metro Park management to discuss the feasibility of this project on behalf of the WAS Board.

#### NEW BUSINESS:

It was discussed and decided that the Macomb meetings will still be held virtually until at least September, when it will be revisited to determine when in person meetings will resume. Plans were received on how to construct meteor cameras from the Global Meteor Network. Diane Hall and Bob Trembley will represent the WAS for an upcoming Dark Sky Site meeting, facilitated by Sally Oey, with the goal of designating Belle Isle as a Dark Sky Site. Discussion on the revival of the Radio (Telescope) Observation subgroup from individuals from the McMath-Hulbert Observatory.

Motion by Dale Thieme to adjourn meeting – second by Adrian Bradley.

Meeting adjourned at 7:20PM by President Diane Hall.

Respectfully submitted,  
Mark Kedzior  
Secretary  
Warren Astronomical Society

## WARREN ASTRONOMICAL SOCIETY

### CRANBROOK MEETING

(w/Live Streaming)

**MAY 2, 2022 7:30PM**

Meeting called to order of our first in person meeting in over two years at 7:30PM by President Diane Hall. Number of persons in attendance - 26 (WebEx attendance – 10 & YouTube – 8 @ 8:30PM).

#### OFFICER REPORTS

Diane reported the Macomb meetings will still be virtual until at least September, then will be reviewed for feasibility of returning to in person at that venue. She also reported on a couple of donations to the WAS – an antique star atlas and

*(Continued on page 30)*



(Continued from page 29)

pair of Galileo bookends. She also reported that the WAS received the funds from the Jon Root estate, and the WAS Board has decided to dedicate those funds for construction of a roll-off observing/warming room at Stargate – Metro Park officials will be contacted for the feasibility of this project.

1<sup>st</sup> VP Bob Trembley reported on the upcoming speaker schedule for the June meetings, and expressed a need for presenters for upcoming meetings.

The 2<sup>nd</sup> VP report of Riyad Matti was read by Diane Hall to the membership.

Secretary Mark Kedzior held a drawing to select the winner of a late arriving Banquet door prize – “Binocular Highlights” by Gary Seronik, donated by the American Astronomical Society (Sky and Telescope) – the winner in attendance was Robert Rooney.

Treasurer Adrian Bradley gave the account balance of the WAS and reported on the Jon Root Bequest recently received and the request from the family regarding naming a star in Jon’s honor.

Outreach Chair Kevin McLaughlin reported that volunteers with telescopes are needed for the May 15/16 Cranbrook Total Lunar Eclipse event and will be passing around a sign-up sheet for volunteers.

Publications Chair Dale Thieme reported (via WebEx) the May issue of the WASP is up online

**SPECIAL INTEREST GROUPS** – Solar – Marty Kunz will be working on the installation of a H Alpha telescope to our K2 refractor at Stargate. The GLAAC is planning on an in-person AATB event on September 16-17.

**OBSERVING REPORTS:** No in-person reports (due to technical difficulties) – virtual reports will be heard at Macomb May meeting.

### SHORT PRESENTATION:

Diane Hall introduced (with bio) Bob Trembley, with his presentation and demonstration of “Universe Sandbox – Solar System Simulation Software”, explaining all the features of this program and upgrades. Questions and discussion followed his presentation.

### MAIN PRESENTATION:

Bob Trembley introduced (with bio) Dr. Patrick Wilcox of St. Clair Community College, with his presentation of “Very High Energy Gamma-Ray Astronomy and Cosmic Particle Accelerators”.

Questions and discussion followed his very informative presentation.

To see both presentations in their entirety, go to:

<https://www.youtube.com/warrenastro>

Meeting ended at 9:55 PM.

Mark Kedzior

## WARREN ASTRONOMICAL SOCIETY

### MACOMB (VIRTUAL) MEETING

MAY 19, 2022 7:30PM

Meeting called to order at 7:30 PM by 1<sup>st</sup> VP Bob Trembley (WebEx attendance – 16 & YouTube – 5 @ 8:15 PM).

President Diane Hall’s report (read by 1<sup>st</sup> VP Bob Trembley) stated the Cranbrook in person was successful but Macomb meetings will still be virtual until at least September. Also asked for volunteers to host the resumption of the Discussion Group meetings.

1<sup>st</sup> VP Bob Trembley gave list of upcoming presentations at future meetings.

2<sup>nd</sup> VP Riyad Matti reported on the April 23<sup>rd</sup> and 29<sup>th</sup> Stargate events, the procurement of new equipment for the observatory, and the next Open house scheduled for May 28<sup>th</sup>.

Treasurer Adrian Bradley gave WAS account balance, and individual A/L dues renewal is fast approaching. No reports from Secretary, Outreach or Publications.

### SPECIAL INTEREST GROUPS:

History – Dale Thieme reports that 10 years ago the decision was made to purchase the 8” f/12 D&G refractor for the Stargate Observatory, and 20 years ago, both Doug and Robin Bock were made Lifetime members of the WAS.

Solar – Images were shown of the recent activity of sunspots and prominences.

Astrophotography – Adrian Bradley shared image of Total Lunar Eclipse from Las Vegas.

Ken Bertin will be presenting “The Life and Death of Stars” at an upcoming Detroit Library event.

**OBSERVING REPORTS:** Adrian Bradley shared image of Milky Way Sagittarius -Scorpius region taken in the Upper Peninsula.

**ASK AN ASTRONOMER A QUESTION:** Discussion on lack of telescopes from astronomical vendor websites.

### MAIN PRESENTATION:

Bob Trembley introduced (with bio) Dr. Dale Partin, with his presentation “Ultra-Wide Angle Binoculars”. In his very informative presentation, Dr. Partin described in detail his experiences and findings in evaluating low magnification binoculars to enhance observing of wide field views of the night sky. Question and discussion followed his excellent presentation.

To see his presentation in its entirety, go to:

<https://www.youtube.com/warrenastro>

Meeting ended at 9:30PM.

Mark Kedzior  
Secretary

## The Warren Astronomical Society is a Proud Member of the Great Lakes Association of Astronomy Clubs (GLAAC)

GLAAC is an association of amateur astronomy clubs in Southeastern Michigan who have banded together to provide enjoyable, family-oriented activities that focus on astronomy and space sciences.

### GLAAC Club and Society Meeting Times

Club Name & Website	City	Meeting Times
<a href="#">Astronomy Club at Eastern Michigan University</a>	Ypsilanti/EMU	Every Thursday at 7:30PM in 402 Sherzer
Capital Area Astronomy Club	MSU/Abrams Planetarium	First Wednesday of each month 7:30 PM
<a href="#">Farmington Community Stargazers</a>	Farmington Hills	Members: Last Tuesday of the month Public observing: 2nd Tuesday of the month
<a href="#">Ford Amateur Astronomy Club</a>	Dearborn	Fourth Thursday of every month (except November and December) at 7:00 PM
<a href="#">McMath-Hulbert Astronomy Society</a>	Lake Angelus	Board and paid members-First Sunday of the month Public open house—first Saturday at 11 am
<a href="#">Oakland Astronomy Club</a>	Rochester	Second Sunday of every month (except May)
<a href="#">Seven Ponds Astronomy Club</a>	Dryden	Monthly: generally the Saturday closest to new Moon
<a href="#">Sunset Astronomical Society</a>	Bay City/Delta College Planetarium	Second Friday of every month
<a href="#">University Lowbrow Astronomers</a>	Ann Arbor	Third Friday of every month
<a href="#">Warren Astronomical Society</a>	Bloomfield Hills/ Cranbrook & Warren/ MCC	First Monday & third Thursday of every month 7:30 PM

### GLAAC Club and Society Newsletters

<b>Warren Astronomical Society:</b>	<a href="http://www.warrenastro.org/was/newsletter/">http://www.warrenastro.org/was/newsletter/</a>
<b>Oakland Astronomy Club:</b>	<a href="http://oaklandastronomy.net/">http://oaklandastronomy.net/</a>
<b>McMath-Hulbert Astronomy Club</b>	<a href="http://www.mcmathhulbert.org/solar/newsletter/">http://www.mcmathhulbert.org/solar/newsletter/</a>
<b>Ford Amateur Astronomy Club:</b>	<a href="http://www.fordastronomyclub.com/starstuff/index.html">http://www.fordastronomyclub.com/starstuff/index.html</a>
<b>University Lowbrow Astronomers:</b>	<a href="http://www.umich.edu/~lowbrows/reflections/">http://www.umich.edu/~lowbrows/reflections/</a>

### WAS Member Websites

Jon Blum: <a href="#">Astronomy at JonRosie</a>	Bob Trembley: <a href="#">Balrog's Lair</a>
Bill Beers: <a href="#">Sirius Astro Products</a>	Bob Trembley: <a href="#">Vatican Observatory Foundation Blog</a>
Jeff MacLeod: <a href="#">A Life Of Entropy</a>	
Doug Bock:	
Facebook: Northern Cross Observatory <a href="https://www.facebook.com/NorthernCrossObservatory">https://www.facebook.com/NorthernCrossObservatory</a>	
Boon Hill and NCO Discussion <a href="https://www.facebook.com/groups/369811479741758">https://www.facebook.com/groups/369811479741758</a>	
YouTube channel: <a href="https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w">https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w</a>	





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.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more!

## Solstice Shadows

**David Prosper**

**Solstices** mark the changing of seasons, occur twice a year, and feature the year's shortest and longest daylight hours - depending on your hemisphere. These extremes in the length of day and night make solstice days more noticeable to many observers than the subtle equality of day and night experienced during equinoxes. Solstices were some of our earliest astronomical observations, celebrated throughout history via many summer and winter celebrations.

Solstices occur twice yearly, and in 2022 they arrive on June 21 at 5:13 am EDT (9:13 UTC), and December 21 at 4:48pm EST (21:48 UTC). The June solstice marks the moment when the Sun is at its northernmost position in relation to Earth's equator, and the December solstice marks its southernmost position. The summer solstice occurs on the day when the Sun reaches its highest point at solar noon for regions outside of the tropics, and those observers experience the longest amount of daylight for the year. Conversely, during the winter solstice, the Sun is at its lowest point at solar noon for the year and observers outside of the tropics experience the least amount of daylight- and the longest night - of the year. The June solstice marks the beginning of summer for folks in the Northern Hemisphere and winter for Southern Hemisphere folks, and in December the opposite is true, as a result of the tilt of Earth's axis of rotation. For example, this means that the Northern Hemisphere receives more direct light from the Sun than the Southern Hemisphere during the June solstice. Earth's tilt is enough that northern polar regions experience 24-hour sunlight during the June solstice, while southern polar regions experience 24-hour night, deep in Earth's shadow. That same tilt means that the Earth's polar regions also experience a reversal of light and shadow half a year later in December, with 24 hours of night in the north and 24 hours of daylight in the south. Depending on how close you are to the poles, these extreme lighting conditions can last for many months, their duration deepening the closer you are to the poles.

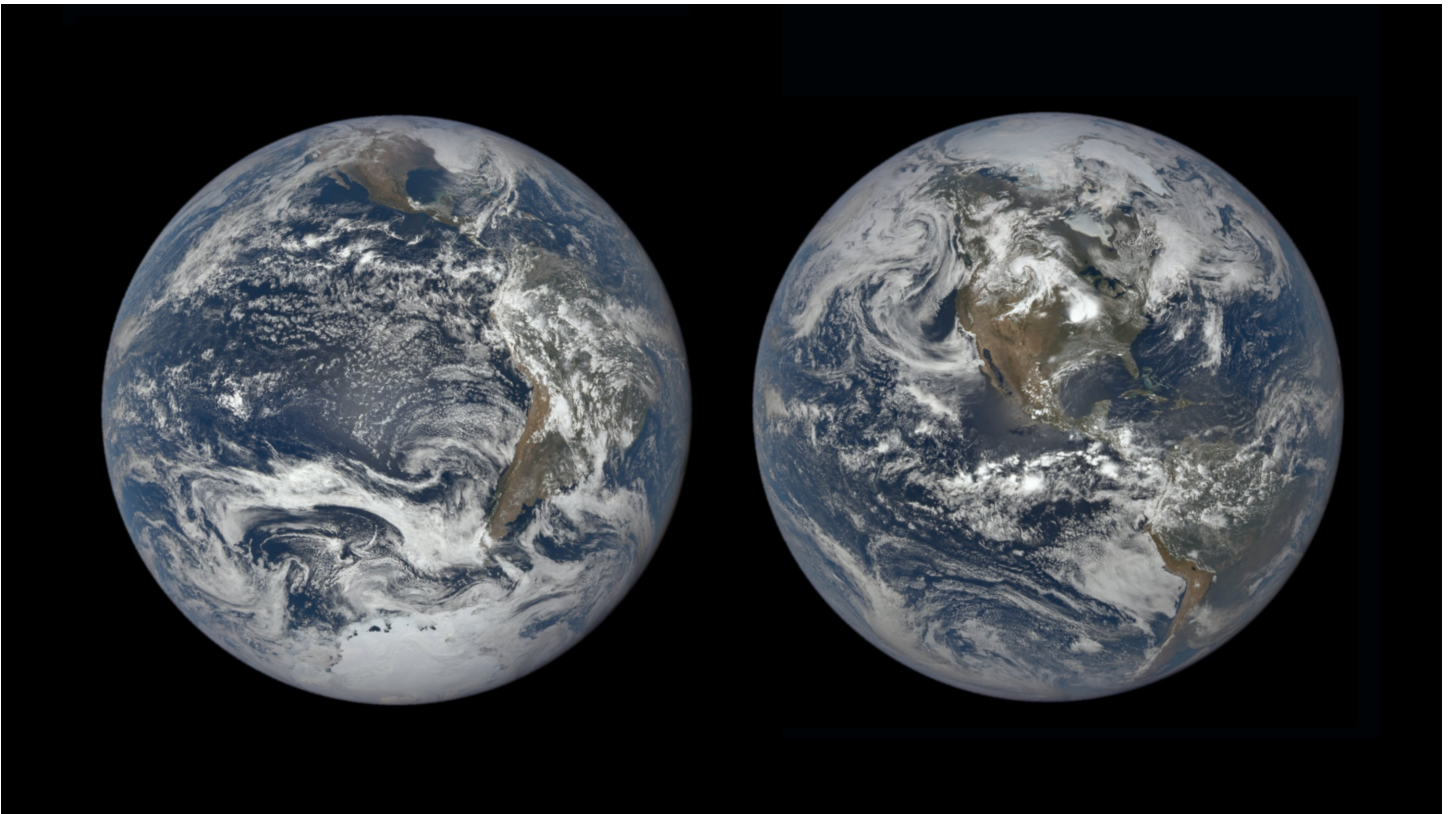
While solstice days are very noticeable to observers in mid to high latitudes, that's not the case for observers in the tropics - areas of Earth found between the Tropic of Cancer and the Tropic of Capricorn. Instead, individuals experience two "zero shadow" days per year. On these days, with the sun directly overhead at solar noon, objects cast a minimal shadow compared to the rest of the year. If you want to see your own shadow at that moment, you have to jump! The exact date for zero shadow days depends on latitude; observers on the Tropic of Cancer (23.5° north of the equator) experience a zero shadow day on the June solstice, and observers on the Tropic of Capricorn (23.5° south of the equator) get their zero shadow day on December's solstice. Observers on the equator experience two zero shadow days, being exactly in between these two lines of latitude; equatorial zero shadow days fall on the March and September equinoxes.

There is some serious science that can be done by carefully observing solstice shadows. In approximately 200 BC, Eratosthenes is said to have observed sunlight shining straight down the shaft of a well during high noon on the solstice, near the modern-day Egyptian city of Aswan. Inspired, he compared measurements of solstice shadows between that location and measurements taken north, in the city of Alexandria. By calculating the difference in the lengths of these shadows, along with the distance between the two cities, Eratosthenes calculated a rough early estimate for the circumference of Earth - and also provided further evidence that the Earth is a sphere!

Are you having difficulty visualizing solstice lighting and geometry? You can build a "Suntrack" model that helps demonstrate the path the Sun takes through the sky during the seasons; find instructions at [stanford.io/3FY4mBm](https://stanford.io/3FY4mBm). You can find more fun activities and resources like this model on NASA Wavelength: [science.nasa.gov/learners/wavelength](https://science.nasa.gov/learners/wavelength). And of course, discover the latest NASA science at [nasa.gov](https://nasa.gov).

*(Continued on page 33)*

(Continued from page 32)



These images from NASA's DSCOVR mission shows the Sun-facing side of Earth during the December 2018 solstice (left) and June 2019 solstice (right). Notice how much of each hemisphere is visible in each photo; December's solstice heavily favors the Southern Hemisphere and shows all of South America and much of Antarctica and the South Pole, but only some of North America. June's solstice, in contrast, heavily favors the Northern Hemisphere and shows the North Pole and the entirety of North America, but only some of South America.

Credit: NASA/DSCOVR EPIC Source: <https://www.nasa.gov/image-feature/goddard/2021/summer-solstice-in-the-northern-hemisphere>



A presenter from the San Antonio Astronomy Club in Puerto Rico demonstrating some Earth-Sun geometry to a group during a "Zero Shadow Day" event. As Puerto Rico lies a few degrees south of the Tropic of Cancer, their two zero shadow days arrive just a few weeks before and after the June solstice. Globes are a handy and practical way to help visualize solstices and equinoxes for large outdoor groups, especially outdoors during sunny days!

Credit & Source: Juan Velázquez / San Antonio Astronomy Club