



The W.A.S.P.

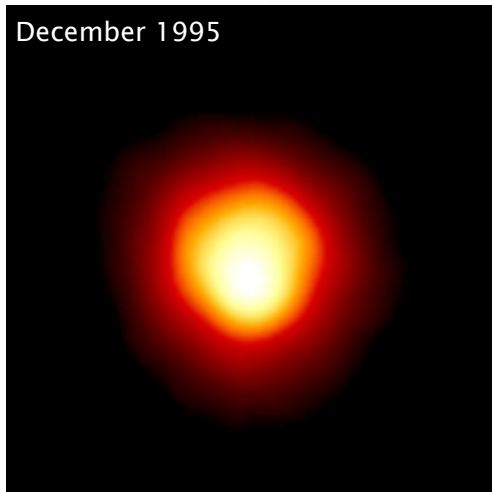


Vol. 52, no. 3

March, 2020

The Warren Astronomical Society Paper

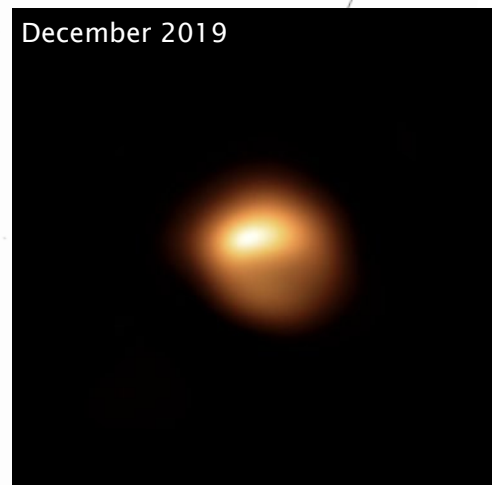
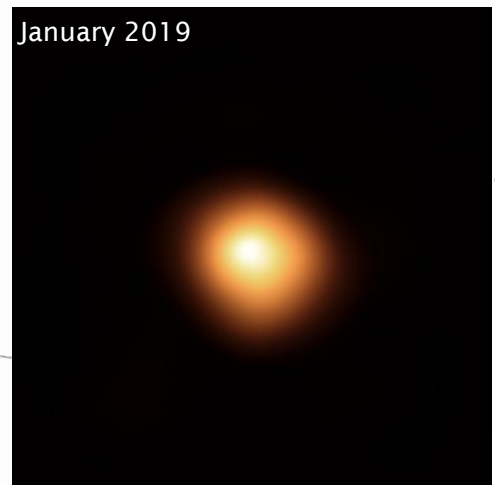
Twinkle, Twinkle, Great Big Star...



December 1995
This is the first direct image of a star other than the Sun, made with the Hubble Space Telescope.

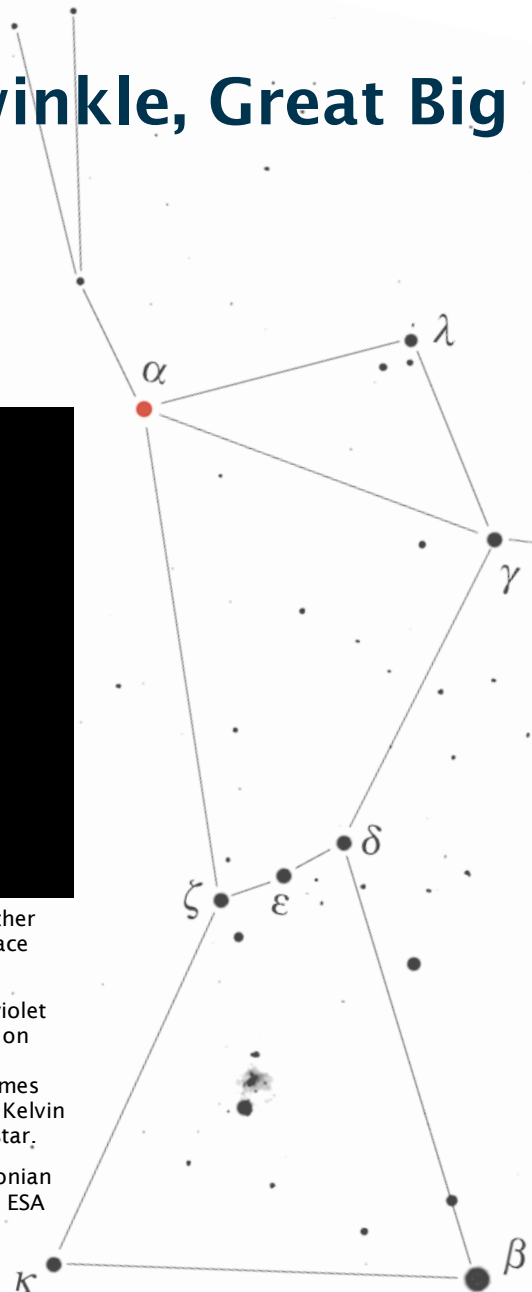
The Hubble image reveals a huge ultraviolet atmosphere with a mysterious hot spot on the stellar behemoth's surface. The enormous bright spot, more than ten times the diameter of Earth, is at least 2,000 Kelvin degrees hotter than the surface of the star.

Credit: Andrea Dupree (Harvard-Smithsonian CfA), Ronald Gilliland (STScI), NASA and ESA



January 2019
December 2019
The red supergiant star Betelgeuse, in the constellation of Orion, has been undergoing unprecedented dimming. When compared with the image taken in January 2019, it shows how much the star has faded and how its apparent shape has changed.

Credit: ESO/M. Montargès et al.



...How We Wonder What You Are (up to)

The WASP



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Warren Astronomical Society, Inc.
P.O. Box 1505
Warren, Michigan 48090-1505

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:	Third Thursday meeting:
Cranbrook: Institute of Science	Macomb Community College
1221 North Woodward Ave	South campus, Bldg. J, Room J221
Bloomfield Hills, Michigan	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)

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 Paper (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)

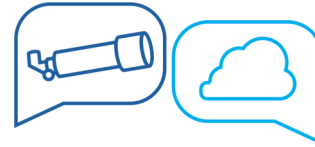
Disclaimer: The articles presented herein represent the opinion of their authors and are not necessarily the opinion of the Warren Astronomical Society or this editor. The WASP reserves the right to edit or deny publication of any submission.

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

March 2	Cranbrook	Jerry Dunifer
March 19	Macomb	John Dumar
April 6	Cranbrook	Jeff MacLeod
April 16	Macomb	Bob Trembley

If you are unable to bring the snacks on your scheduled day, or if you need to reschedule, please email the board at board@warrenastro.org as soon as you are able so that other arrangements can be made.



Discussion Group Meeting

Come on over, and talk astronomy, space news, and whatnot!

The Discussion Group will meet (date TBD) at 7pm in the Wayne State Planetarium. Watch your email for the date.

The planetarium is located in room 0209, on the lower level of the Old Main building. Enter Old Main through the Cass Avenue entrance, go down the stairs, and walk straight ahead. The doors to the Planetarium will be on your right.

WSU Planetarium
Rm 0209 Old Main Bldg.
4841 Cass Ave.
Wayne State University
Detroit, Michigan 48201

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Telescope Support Systems



FAAC Astronomy Conference & Swap Meet

Saturday, March 21, 2020 9:00 am - 3:00 pm

General Astronomy

- 9:30 am: **Imaging A Rocket Launch** – John McGill
- 10:45 am: **3D Printing for Astronomy** – Liam Finn
- 12 N **Cosmic Harmony & Eccentricity** – Michael LoPresto
- 1:30 pm: **Interstellar Comets & Asteroids** - Jonathan Kade

Technical Talks

- 9:30 am: **Starlink Internet +** - Jeff Thrush
- 10:45 am: **Backyard Narrowband** – Dr Axel Mellinger
- 12 N **Portable Power** – Sean Pickard
- 1:30 pm: **Maximizing CMOS Imaging** - Jason Guenzel

Planetarium Shows

10:00am, 11:30am & 1:00pm FAAC Members

Swap Meet

All Day...Earn Cash by Selling Those Items Sitting Around Collecting Dust! Telescopes, Eye-pieces, Cameras, Binoculars, Mounts, Software, Books, and Accessories, etc.

Participating Vendors

Telescope Support Systems, Sirius Astro Products, and LX200 Electronics Exchange

Admission: \$5.00 (children 15 and younger – Free / must be accompanied by an adult)

Sales Table: \$15 in advance, or \$20 at the door as available, (one admission ticket included).

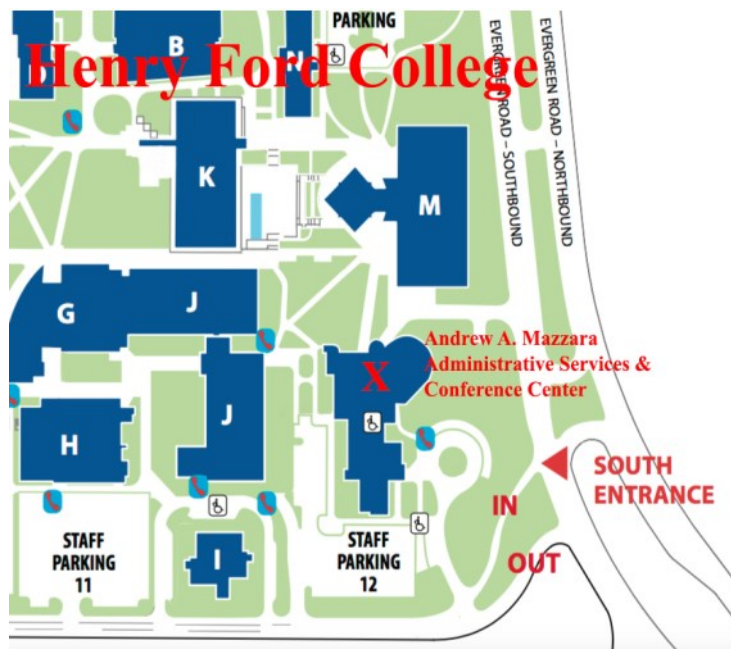
Advanced Table Registration ends Mar 1, 2020

Doors Open: 8:00am for setup.

Make Checks Payable: to **FAAC** for advance table registration.

Send payment to: Ford Amateur Astronomy Club, P.O. Box 7527, Dearborn, MI 48121-7527

Location: Henry Ford College, 5101 Evergreen Rd, Dearborn, MI 48128 (Andrew A. Mazzara Admin. & Conference Center... See **X** on map, Staff Parking Lots 11 & 12 will be open)



For More Information: Contact Jim via email: w8tu@comcast.net or call (734) 751-6280

In Memoriam: Pat Brown



We regret to announce that Pat Brown, a dear member of the W.A.S. community and dedicated veteran of outreach, passed away unexpectedly in his sleep on Wednesday the 19th of February.

It was a joy to do any outreach event with Pat, as he handled all tasks and all comers with kindness and enthusiasm, whether we were enduring a chilly evening at Stargate or riding out a summer squall down at Crosswinds Marsh. Pat was the unanimous choice of the 2017 W.A.S. Board for the Blaine McCullough award; we dubbed him our "Ace of Outreach" for his indefatigable commitment for sharing astronomy with the public. This is how we celebrated him at the 2017 banquet:

Pat Brown is an exemplary model for anyone looking to do outreach, as he dove into outreach not long after joining the club and quickly became a regular at WAS events. Not only has Pat been a generous donor of his time at Stargate events-- sometimes at a moment's notice-- he has also donated personal items to be used by the club and its members. A former aerobatic pilot, he personally took on the Stargate hornets this fall, spraying them down day after day with the same dedication he brings to outreach.

He will be sorely missed.

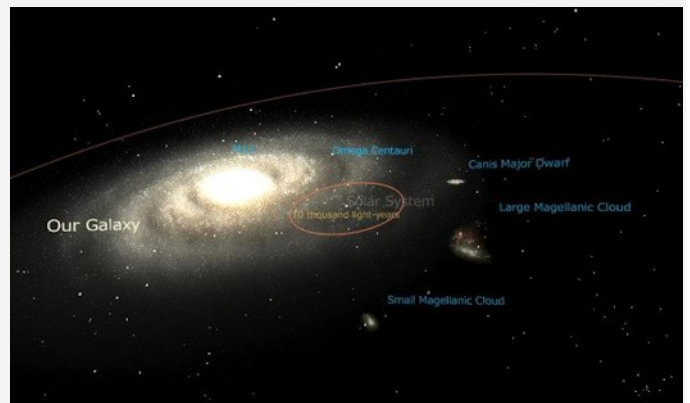


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PRESENTS

Imaginary Trip Through the Universe

Sunday, March 15, 2020
2:00-3:00 p.m.



Space is BIG! Through the use of an amazing 3D visualization software, experienced planetarium specialist Jenny Pon will take us on an imaginary trip from the Earth to the edges of the known universe. Travelers will leave with a better sense of the grand scale of the universe. Along the way, we'll zoom in on Jupiter, Saturn, and a gigantic black hole at the center of our Milky Way Galaxy.

Call 313-481-1409 for more information during branch hours.

Please register: <https://dpl-3d-tour-universe.eventbrite.com>

Limited parking is available in the staff parking lot off Putnam Street, a one-way street accessible from Cass Ave.

Main Library
5201 Woodward Avenue
Detroit, MI 48202

313/481-1391

www.detroitpubliclibrary.org



President's Field of View

I get to chat with a former President of this august society on a regular basis (full disclosure— we're married) and we agree on the single worst part of being President of the Warren Astronomical Society. It's not wrangling the busy schedule of events, or fielding unsolicited calls and emails from crackpots, or bearing the sense of responsibility that comes with the position. It's not even the stress of managing interpersonal conflicts in the club, although that's certainly one of the less pleasant parts of being President.

It's writing obituaries.

It's the phone call from an unfamiliar number that turns out to be the spouse, or sibling, or child of one of your dear comrades. It's the realization that, while you were broadcasting your radio show or off enjoying a dark-sky weekend, that some irreplaceable member of this club entered the pages of W.A.S. history. It's the moment when you try to retroactively crystallize *The Last Time You Saw* them, or you look up that last email to place a piece of unfinished business, or you glance at their handwriting on an outreach clipboard and realize it's not going to happen. Ever. Again.

It's the seat in the Cranbrook auditorium that won't ever be filled by the regular who's "owned" it for so long, the chair at the Redcoat Tavern that doesn't need to be stolen from a neighboring table because there's one place fewer at ours, the familiar telescope that never takes the field at Stargate or Astronomy at the Beach again.

It's the void of a blank page in a word-processing document that needs to somehow pay tribute to the departed.

A President has the duty to write or delegate that baleful process of writing the obituary, of ensuring the proper commemoration goes out in the W.A.S. Sometimes the President and other officers get to channel the loss into something productive, or even cathartic, like acquiring a telescope for the collection at Stargate or renaming an award on behalf of the dearly departed... but that's not much comfort, really.

I'll say this, though. When I learned of Pat Brown's passing last week, I found that his family was able to track me down and break the news through the Blaine McCullough award we'd given him in 2017. If there was any solace in writing Pat's obituary, it was in collecting photos and recollections from the accolade this society paid him for his phenomenal dedication while he was still with us.

The W.A.S. gives out service awards every year. Each board does its best to turn unsung heroes of the club into sung heroes, but sometimes the board needs help in spotting these heroes. Pat Brown, for one, didn't think what he was doing for the club was above and beyond; he certainly wasn't going to nominate himself for an award that he absolutely deserved. Members, comrades, dear and present friends— let your officers know whose contributions may be overlooked. Let's celebrate our fellow astronomers when they're among us on Planet Earth. It's so much more fulfilling, as your President, to present a well-deserved award rather than write an obituary.

Diane Hall
President



Last Light



Letters

DISPATCH FROM THE CONTINENTAL RIM

8 February, instant. Hot off the press! -- burned down in attempt to halt publication.

Martin Nathan Mill has observed Kemble's Cascade at request of comrade-in-arms G. M. Ross, member of many astronomical societies. His location was in the "Clairmont Mesa" district of San Diego, just after astronomical twilight. M. knows and cares *nada* about computers.

-G. M. Ross

FAILURE, DEBACLE, HUMILIATION (the usual)

Attempt to observe the occultation of Mars by waning crescent this morning (19th Feb.) met with a notable lack of success. "Once Handsome Joe" McBride and I were planning to observe the event of which he was kind enough to remind me. Repairing to the OBSERVER'S HANDBOOK, I looked only at the occultation elements for Chicago to the nearest minute. At first light I was at the Veen Observatory on other business, and saw the very low Moon climbing through southern trees.

But we know of my affection for "small apertures". More over there was reluctance to deal with possible interference from trees. I decided on farm country S.W. of the Observatory, to observe with un-gyro-stabilised 7X binoculars, on a wood and steel military tripod, and NO STINKIN' COMPUTER. Not to be. Around sun-rise I was out there with motor-car half on the road because of an agri-drainage ditch, with this wicked looking mutation of astronomical instrument. *Nada*, zip, ca-ca! I thought: Mars is simply too dim. Should have toughed it out at the Veen with the west dome 10 cm. refractor, trees be damned.

Freezing from all this *chozerai* which started before astro. Twilight on the "hill" with variable stars, I went back to bed to assume a foetal position. Even-

tually the telephone rang.

Joe, at work. The Mars occultation was twenty-four hours . . . earlier. He had miscalculated. I had not fact checked. I told Joe "my gods have feet of clay". I would give up astronomy but have no fall-back science, because an ancient submission to the MICHIGAN ACADEMICIAN on the Rotifera of the Grand River had *finally* been rejected by a chivalrous editor at Calvin College. Bugger the natural sciences. Take me back to the musical stage... .

-G. M. ROSS, Greatest Observer in Michigan



The historic McMath Hulbert Solar Observatory is a solar observatory in Lake Angelus, Michigan, USA. It was established in 1929 as a private observatory by father and son Francis Charles McMath and Robert Reynolds McMath and their friend, Judge Henry Hulbert. In 1932 the observatory was

deeded to the University of Michigan which operated it until 1979, at which time it was sold into private ownership again.

The McMath-Hulbert Solar Observatory is currently under private ownership but is run by a small non-for-profit organization of amateur astronomers.

(Excerpts from the website home page)

McMath-Hulbert Observatory Facebook Page:

<https://www.facebook.com/MHObservatory/>

McMath-Hulbert Observatory website:

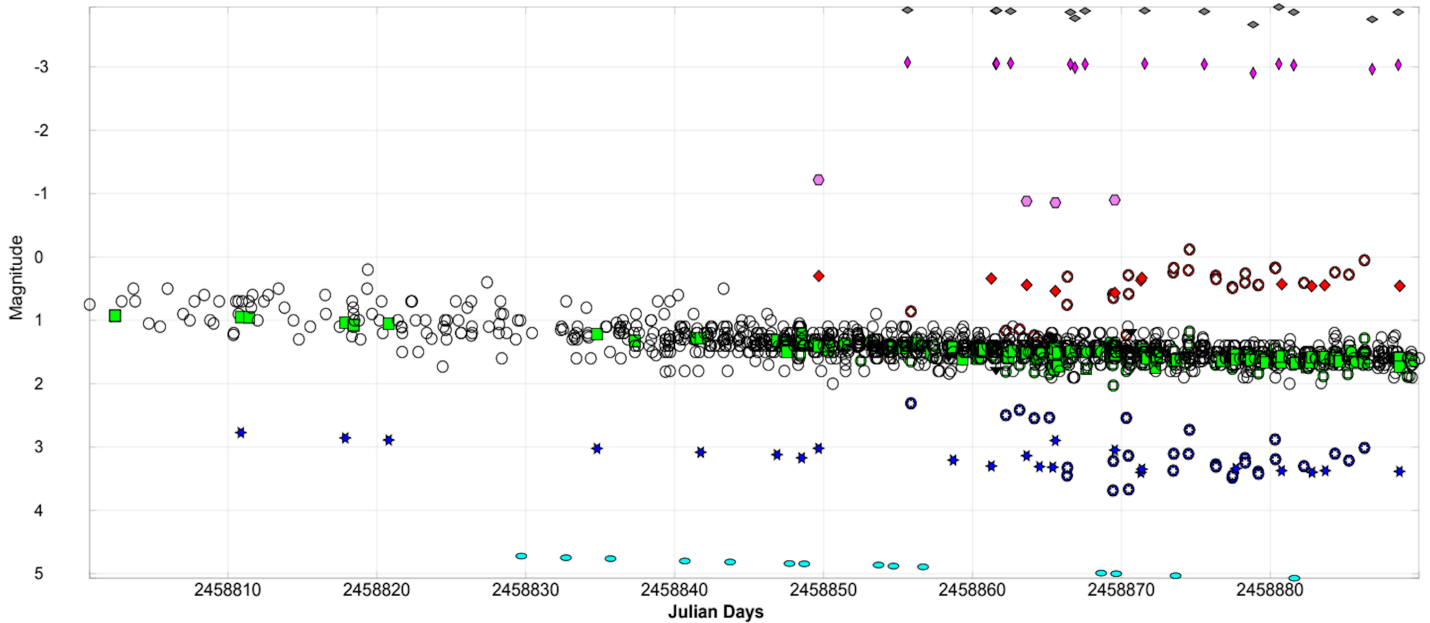
<http://www.mcmathhulbert.org/solar/>

Check the Facebook page and website for open house announcements.

Charting Betelgeuse

AAVSO Light Curve: BETELGEUSE 2019/11/12 to 2020/02/10

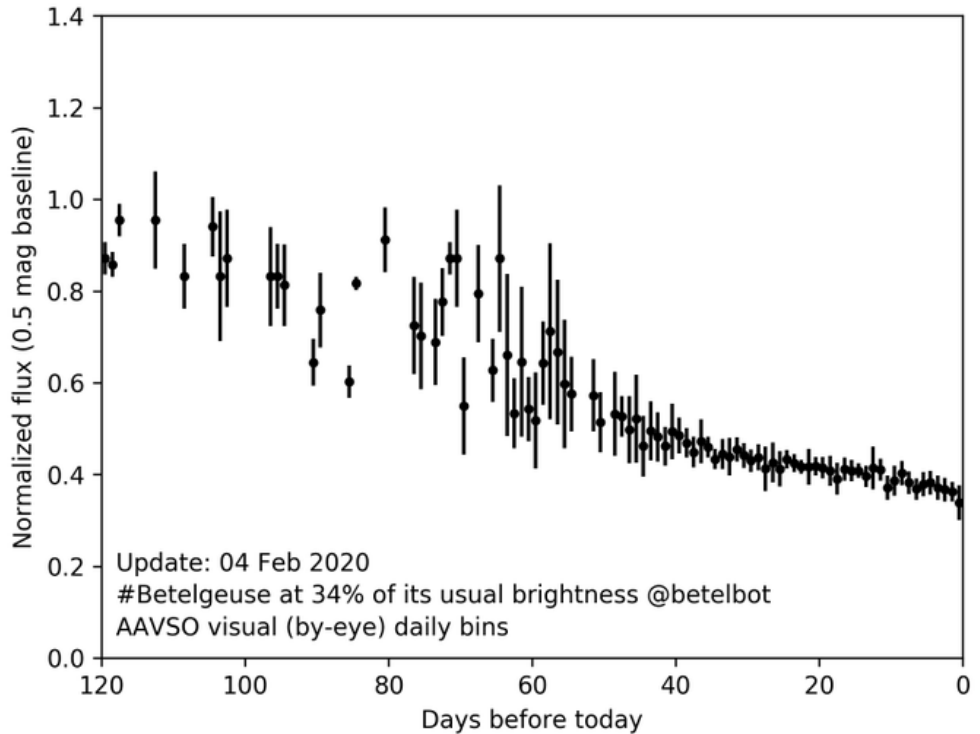
Vis \circ B \star V \blacksquare R \blacklozenge I \blacklozenge U \bullet J \blacklozenge H \blacklozenge CV \star TB \star TG \square TR \square



Gary Ross reported to us that "Gerald Christopher Persha at the Persha Observatory, La Luz, New Mexico, has been studying ALPHA ORIONIS in two infrared wave-lengths. He reports modest changes, not commensurate with the recent dramatic dimming in "V" currently under discussion."

Gary then directed the WASP's attention to the AAVSO website, particularly the light curve generator where he instructed us to plug in the Julian dates: 2458800 (beginning), 2458890 (end). The above chart is the result. As Gary pointed out, "Jerry's data are at extreme top ~ - 4.3 to 4.9 mag. They stand alone in **two W/ L (J and H -ed)**).

Gary also sent along the charting done by Kevin G. Bullerman, Grand Rapids Astronomical Association, in the visual light for comparison, seen at right.



The View From C.W. Sirius Observatory

Messier 63 or **M63**, also known as the **Sunflower Galaxy** and **NGC 5055**, is a spiral galaxy in the northern constellation of Canes Venatici. Messier 63 is known for its appearance, for which it was named Sunflower, with a bright yellow central disc and a number of short spiral arm segments dotted with starburst regions and dust lanes. M63 was first discovered by the French astronomer Pierre Méchain then later verified by his colleague Charles Messier on June 14, 1779. The galaxy became listed as object 63 in the Messier Catalogue. In the mid-19th century, Anglo-Irish astronomer Lord Rosse identified spiral structures within the galaxy, making this one of the first galaxies in which such structure was identified. M63 is called a flocculent spiral. Unlike grand-design spiral galaxies, flocculent spiral galaxies do not have well defined spiral arms. Instead, they appear to have many discontinuous arms. Although it only has two arms, many appear to be winding around its yellow core. The galaxy is enormous in size, spanning roughly 130,000 light years across, an area roughly equal to the size of the Milky Way Galaxy. It is home to more than 400 billion stars.

With an apparent magnitude of 9.3, it is located approximately 29 million light-years from earth. M63 is part of the M51 Group, a group of galaxies



that also includes M51 (the 'Whirlpool Galaxy').

In 1971, a supernova with a magnitude of 11.8 appeared in one of the arms of M63. It was discovered May 24, 1971 and reached peak light around May 26.

The Sunflower Galaxy is best observed in May, when it is high in the sky. Small telescopes reveal a faint fuzzy, while medium size telescopes will start to show some structure. Larger scopes, (15" and larger), in good dark skies will show defined structure and 2 large dust lanes. M63 is a great astrophotography target through medium size and larger telescopes.



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.





I've continued to image Comet C/2017 T2 through the clear nights we've had in February. It's closest approach to Earth was December 29, 2019 @ 1.52 AU's. Below is a 5 panel Mosaic of it on February 14, 16, 20, 22, and 23rd of 2020, taken through the 10" f/8 RC with the ZWO asi071mc PRO camera. Each panel recorded was 5 x 60 second light frames.

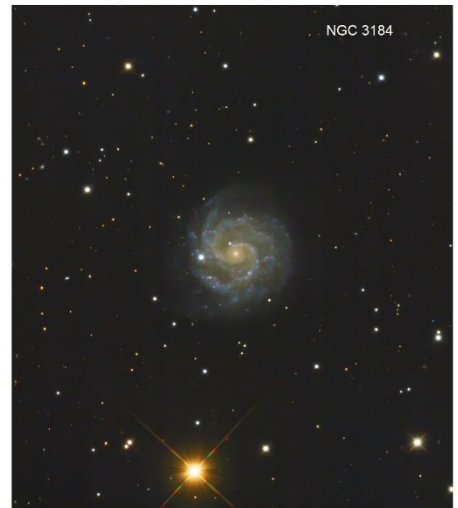
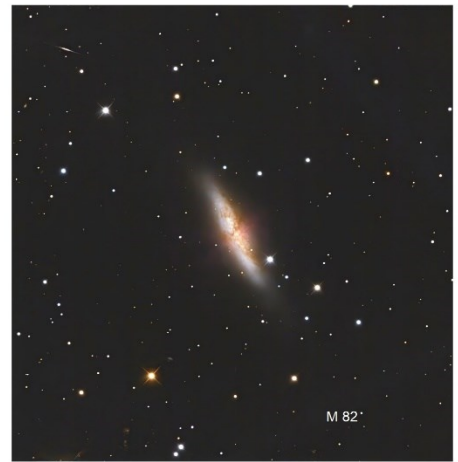


A single panel from February 22.



In addition, galaxy season is starting, so with the marvelous clear weather in February, I managed to gather up a few galaxies, before spring is upon us. March, April and May, are prime time galaxy months, with the Leo, Virgo, Coma Berenices and Ursa Major "lane" coming into view.

(Continued on page 10)



Messier 81 is a grand design spiral galaxy about 12 million light-years away, with a diameter of 90,000 light years, about half the size of the Milky Way, in the constellation Ursa Major.

Messier 82 (also known as NGC 3034, Cigar Galaxy or M82) is a starburst galaxy approximately 12 million light-years away in the constellation Ursa Major. A member of the M81 Group

NGC 3184 is a spiral galaxy approximately 40 million light-years away in the constellation Ursa Major.

Hickson 44 (HCG 44) is a group of galaxies in the constellation Leo. As Arp 316, a part of this group is also designated as group of galaxies in the Atlas of Peculiar Galaxies. NGC 3187, 3189, 3190, 3193, 3185

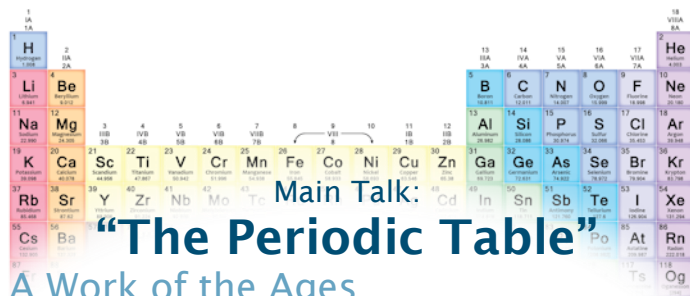
Messier 100 is a grand design intermediate spiral galaxy located within the southern part of constellation Coma Berenices.

NGC 2683 is a field spiral galaxy discovered by William Herschel on February 5, 1788.

Doug Bock

Presentations

Monday, March 2, 2020 Cranbrook Presentations

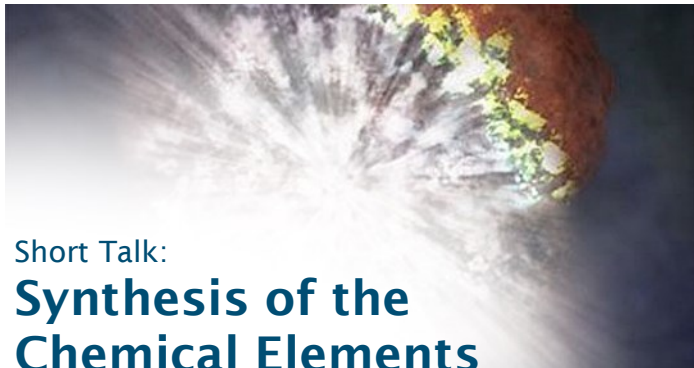


Main Talk: "The Periodic Table" A Work of the Ages

By Theodore Gray

The periodic table has been an inspiration since its outlines were first published 150 years ago. At first an inspiration for scientists to fill in its missing pieces. Then an inspiration for students to learn about the rich patterns and symmetries of chemistry. Now an inspiration to all of us as an example of what can be accomplished when a community of dedicated researchers works together over a span of seven generations to complete a task that only the last few could hope to see finished in their lifetime.

Theodore Gray is the co-founder of Wolfram Research, Inc, makers of Mathematica, and the author of The Elements, the internationally best-selling book and App on the beauty of the periodic table, translated into 25 languages. He is the creator of the BAFTA award-winning, 2013 iPad App of the Year Disney Animated, and proprietor of periodictable.com and mechanicalgifs.com. His most recent project is a book on the functional beauty of mechanical devices, published in the fall of 2019.



Short Talk: Synthesis of the Chemical Elements

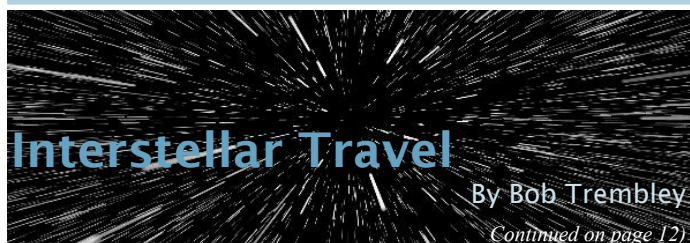
By Dale Partin

Dr. Dale Partin introduces us to the processes by which chemical elements are "cooked up" in astronomical processes - by fusion in stars, by supernovae, and more!

Dr. Dale Partin is an amateur astronomer and he teaches astronomy at Macomb Community College. He has B.S. and M.S. degrees in physics and a Ph.D. in electrical engineering. Until his partial retirement, he worked in advanced research in the auto industry. He has over 80 scientific publications and 38 patents, and is a fellow of the American Physical Society and a member of Sigma Xi and of the American Scientific Affiliation



Thursday, March 19, 2020 Macomb Presentation



Interstellar Travel

By Bob Trembley

Continued on page 12)

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

Dale Partin at:

firstvp@warrenastro.org.

(Continued from page 11)

Bob Trembley discusses the challenges of interstellar travel – from traversing the vast distances to the nearest stars, to keeping interstellar explorers functioning properly – be they human or robotic.

Bob Trembley has been an amateur astronomer and has loved astronomy and space his entire life; he is a volunteer NASA/JPL Solar System Ambassador, and the 2020 outreach officer for the Warren Astronomical Society. Bob works for the Vatican Observatory Foundation, writing astronomy and space science posts for the “Sacred Space Astronomy Blog” with Br. Guy Consolmagno and other astronomers. Bob also maintains the VOF website, does social media work, creates newsletters and media... and whatever else gets thrown at him.

Bob 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.”



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

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! — This is YOUR publication!

Send items to: 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.



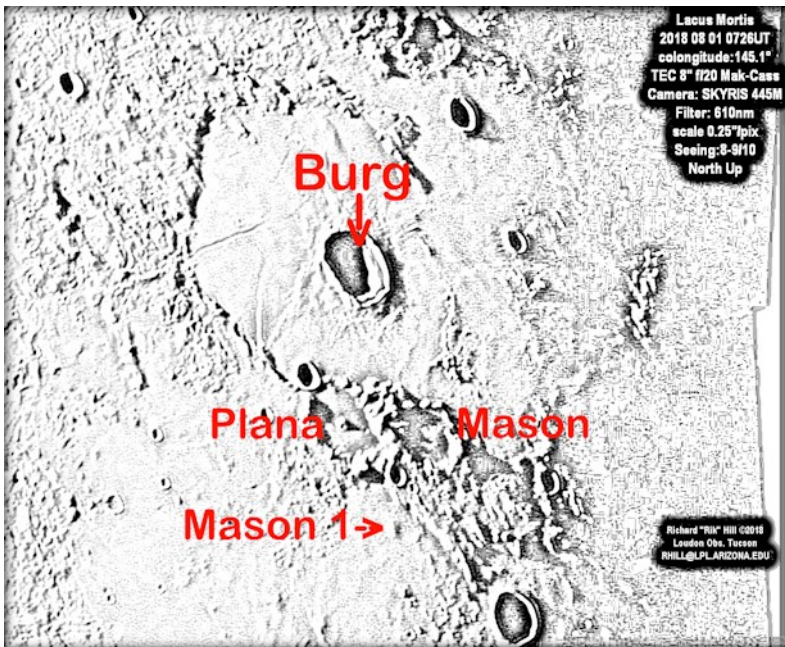
Over the Moon

With Rik Hill

Goodnight to the Lake of Death



The other day (see the [February WASP](#) -ed.) I promulgated an image covering from Aristoteles to Hercules in sunrise. Today I want to zoom in on a small area of that region this time at sunset. Just above center in this image is the crater Burg (41km dia.) in the center of the rough hexagon of Lacus Mortis (155km). The detail in the eastern wall of Burg is nicely displayed here along with several of the diverse rimae on the floor of this Lacus. Below Burg are two wonderful craters, the flat floored Mason (44km) on the right and Plana (46km) with the little central peak, with the 3km impact crater on the south side, is only the tip of



Mapping of objects' locations by Ralph DeCew.

what was once a much larger mountain but for the lava flooding of this crater that filled up the interior. The only feature on the floor of this crater seen here is a small (2.5km dia.) crater at the tip of the shadow from the central peak. South of these two is Lacus Somniorum of which you can only see a small northern portion here but interestingly just south of Plana you can see the dome Mason-1 which is well shown on the floor of the Lacus. This is always an added a treat when observing in this area!

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



History S.I.G.

March 1987

Cover: Image of the Pleiades, no credit given.



Steve Franks discusses his planetary observations in "A Summer Harvest" and the club gets the "1986 Community Service Award" from the Huron-Clinton Metropolitan Authority. An observing project: "Passages of the Moon Through the Pleiades Star Cluster" is shared with us by Dr. David W. Dunham, followed by "Pleiades Occultation Predictions for March 1987" and "Occultation Predictions for March 1987"

Two more charts round out this issue:

Positions for Comet Nishikawa (1987c) (calculated by Ken Kelly) source: SSB 1.3

Positions for Comet Terasako (1987d) (calculated by Ken Kelly)

March 1997

The 1997 issues are in both printed and web page (HTML) form.

Speaking of comets, here's a "Hale-Bopp Update" from info submitted by Ed Watson (*This editor remembers that comet, pointed it out one evening driving west on 10 Mile Rd to the wife and kids.*) "Computer Chatter" by Larry F. Kalinowski is a regular mainstay, of course. We are also treated to a small tidbit called "Astro-Facts" by Greg Milewski. Equally entertaining is this crossword puzzle "Man in Space" based on the manned space programs.

The minutes entry hasn't received much coverage in these SIG reports, but they are worth a look, case in point: This month's "Minutes of Meeting" by Glenn Wilkins, Secretary, yielded another entry for the Awards spreadsheet- 1996 Amateur Astronomer of the Year, Glenn Wilkins.

From the Scanning Room

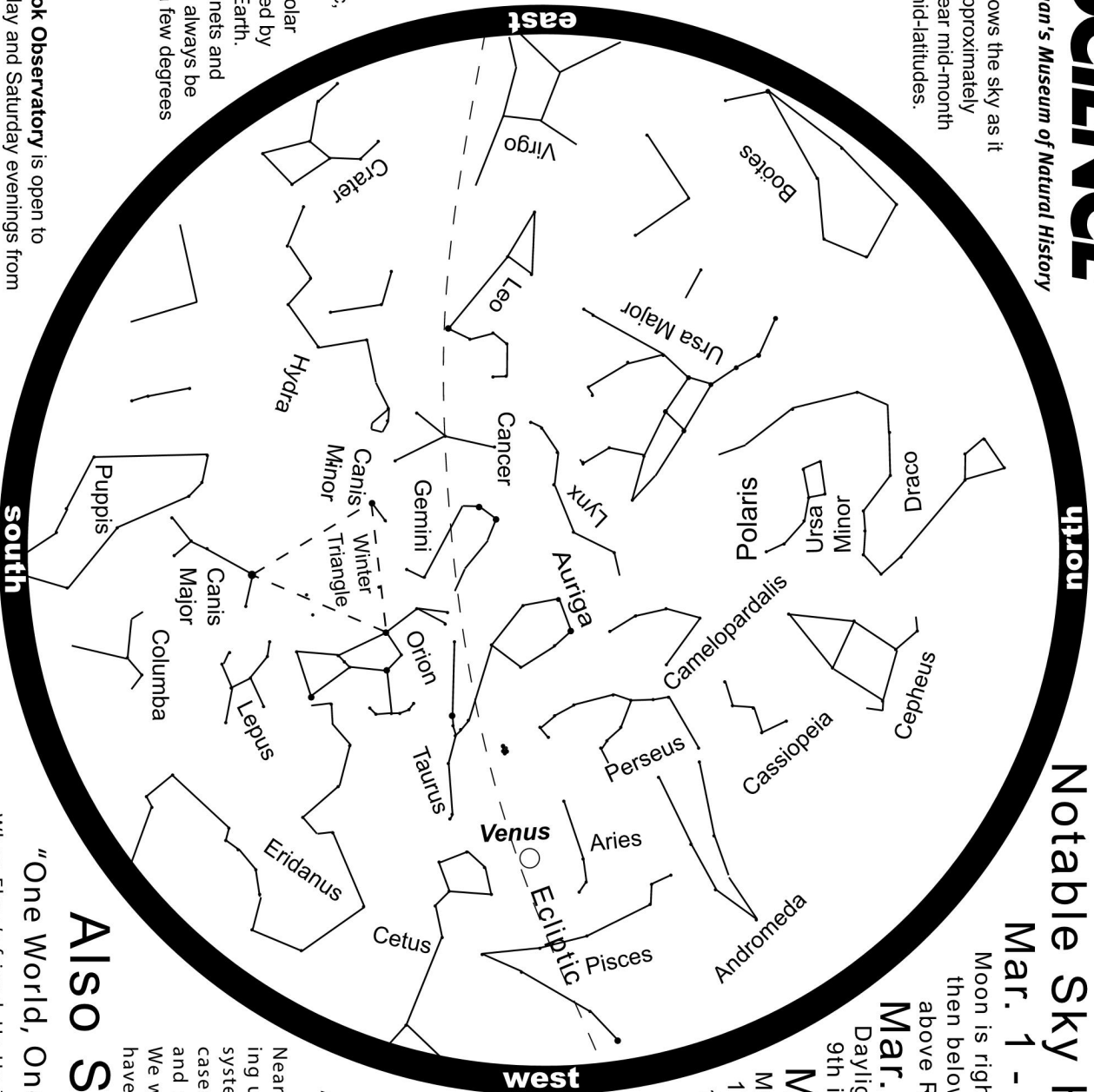
Since I had four copies of the Detroit Astronomical Society's newsletter from 1981 on hand, I decided to digitize them and add them to our archive. An interesting look into the workings of that august institution, with some familiar names cropping up.

[DAS archived copies](#)

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 and Saturday 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 6" telescope! For observatory information visit <http://science.cranbrook.edu/explore/observatory>

MARCH 2020

Notable Sky Happenings

Mar. 1 - 7

Moon is right of Aldebaran on the 1st (SW evening), then below Pollux on the 5th (SSE evening) and above Regulus on the 7th (ESE evening).

Mar. 8 - 14

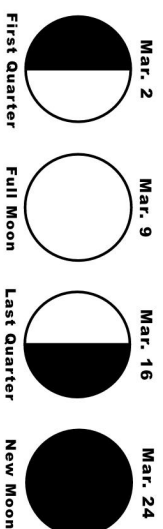
Daylight time begins on the 8th. Full Moon on the 9th is the 2nd of four "Super Moons" in 2020.

Mar. 15 - 21

Mars is right of Jupiter. Saturn is left on the 17th. Moon is below Mars and Jupiter on the 18th (SE predawn). March (Spring) Equinox is at 11:50pm EDT on the 19th.

Mar. 22 - 31

Venus is at Greatest Elongation on the 24th. Look toward the W after sunset. Waxing crescent Moon is to the left of Venus on the 28th.



Now Showing

"Robot Explorers"

Near the end of the twentieth century, we began launching unmanned probes into the far reaches of the solar system. What they discovered was amazing and in some cases unexpected. New space missions are underway, and many of these robust spacecraft are still operational. We will pay tribute to these robots and learn what they have taught us about our solar system.

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>





Stargate Observatory

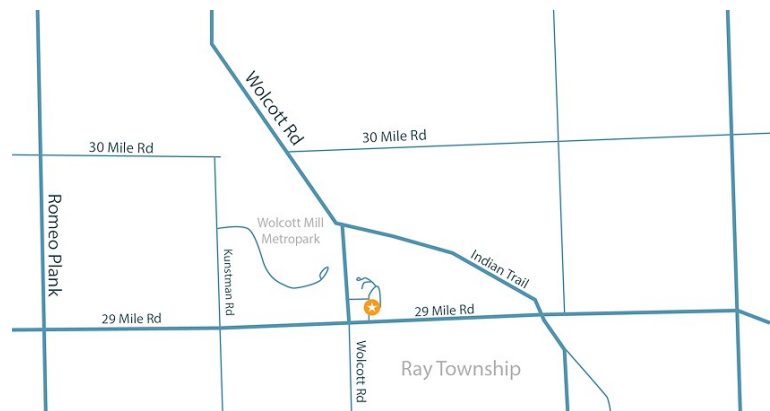
Monthly Free Astronomy Open House and Star Party

4th Saturday of the month!
Wolcott Mill Metropark - Camp Rotary entrance

- Sky tours.
- Look through several different telescopes.
- Get help with your telescope.
- We can schedule special presentations and outings for scouts, student or community groups

Contact: 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:

1. Closing time depends on weather, etc.
2. May be closed one hour after opening time if no members arrive within the first hour.
3. Contact the 2nd VP for other arrangements, such as late arrival time. Call (586) 634-6240 .
4. An alternate person may be appointed to open.
5. Members may arrive before or stay after the scheduled open house time.
6. Dates are subject to change or cancellation depending on weather or staff availability.
7. Postings to the Yahoo Group and/or email no later than 2 hours before starting time in case of date change or cancellation.
8. 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.
9. 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 Open House February 22, 2020

The Stargate observatory was opened at 6:10 pm and there were a few members setting up. The sky was clear until about 10 pm. Many members attended along with nonmembers and a few scouts which Bob Berta gave a presentation to. Objects observed through the 8" refractor included Venus, Uranus, deep sky objects, double stars, and Betelgeuse. A few telescopes were also set up outside the observatory looking at many objects. The observatory was closed at 10:45 pm after all observers left.

Next Open House Saturday, March 28 at 6 PM.

Sunset: 7:53pm
Astronomical Twilight ends: 9:30pm
Moonrise: 9:35am
Moonset: 12:11am-3/29

Please arrive just after sunset (or sooner if you plan to set up a scope or do solar observing). A friendly reminder to be courteous if you arrive after dark, dim your headlights upon entry to the park, and no white light flashlights please. If you are setting up a large scope or have a lot of equipment to set up then you are permitted to park on the observing field, with your vehicle lights pointed away from the observatory and other telescopes.

Remember to dress warm and in layers!

Hope to see everyone at the next open house.

Riyad I. Matti
2020 W.A.S. 2nd VP, Observatory Chairperson

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)

Astronomical Events for March 2019

Add one hour for Daylight Savings Time

Source:

<http://www.astropixels.com/ephemeris/astrocal/astrocal2020est.html>

Day	EST (h:m)	Event
02	10:16	Aldebaran 3.3°S of Moon
02	14:57	FIRST QUARTER MOON
04	09:58	Moon at Ascending Node
05	18:26	Pollux 5.2°N of Moon
06	16:08	Beehive 1.1°S of Moon
08	03:23	Regulus 3.8°S of Moon
08	07:00	Neptune in Conjunction with Sun
09	12:48	FULL MOON
10	01:33	Moon at Perigee: 357123 km
16	04:34	LAST QUARTER MOON
16	20:00	Moon at Descending Node
18	03:19	Mars 0.7°N of Moon: Occn.
18	05:18	Jupiter 1.5°N of Moon
18	19:04	Saturn 2.1°N of Moon
19	22:50	Vernal Equinox
19	23:00	Venus at Perihelion
21	12:48	Mercury 3.6°N of Moon
23	21:00	Mercury at Greatest Elong: 27.8°W
24	04:28	NEW MOON
24	10:23	Moon at Apogee: 406690 km
24	17:00	Venus at Greatest Elong: 46.1°E
27	00:00	Mercury at Aphelion
29	16:52	Aldebaran 3.6°S of Moon
31	11:51	Moon at Ascending Node

Outreach Report

Recently, I was walking out of school with my wife, and another teacher stopped us to tell us she was showing the movie Apollo 13 to her students - and they were loving it! Many commented that they *never knew any of that happened!* I'm saddened by the meaning *behind* that comment, and thrilled that the students are learning about Apollo 13 - and enjoying it!

I just finished the audiobook of "[Packing for Mars: The Curious Science of Life in the Void](#)," which goes into *exhaustive* detail about various aspects of research and testing during the early years of human spaceflight - I never knew most of *that* stuff happened! I told Br. Guy that I was listening to that book, and he said "When we have some time, I'll tell you a story about my time in Antarctica with Mary Roach (the author)." My world just keeps getting smaller and smaller...

Astronomy at the Beach Planning

GLAAC is requesting that member clubs provide some sort of hands-on activity to be hosted at their tables this year's event. Suggestions are welcome! GLAAC is looking into becoming a 501(c)(3) in their own right. I've included minutes from the Feb. 13 AATB planning meeting below.

March AATB Planning Meeting: Thursday March 12, 2020, at 8:00PM

- ***Everyone is Welcome!***

Island Lake Headquarters Building
12950 Grand River Ave, Brighton, MI 48116

- ***or online*** -

bluejeans.com/864376269

- ***or by phone*** -

888-240-2560

W.A.S. Calendar Entry: [\[LINK\]](#)

Even if you can't make it to the March planning meeting, you can join the groups.io site to get emails and updates from the planning committee.

<https://glaac.groups.io/g/main>.

Member Spotlight

Diane Hall gave her presentation on **Globular Clusters** at the **Detroit Public Library**

Sunday, February 16, 2020

Diane filled in for a presenter who could not attend.

Congratulations to **Geof Vasquez**, the new GLAAC Treasurer!

Thanks for stepping up to help GLAAC and the W.A.S. create another great Astronomy at the Beach!



THE DISCOVERY CENTER

of Macomb Located in Downtown Mount Clemens

**Coming
Soon**

Email: discoverymacomb@gmail.com

Website: <http://discoverymacomb.org>

Outreach Volunteers Needed

Speaker Needed at the **Detroit Public Library**
Sundays in 2020 2:00pm

The Library would like to have speakers on Sundays
- open dates are:

Contact: Jennifer Dye

<jdye@detroitpubliclibrary.org>

Girl Scout Mall Frenzy, Mission: Space at Lakeside Mall (Sterling Heights)

Saturday, March 21-22, 2020 10pm-3am.

The Girl Scouts have released new Space badges and will be working on them throughout the night. They would like the W.A.S. to help us out again. I've emailed the organizer asking that our table be located in or around a storefront with power. I also asked if they wished me to contact other astronomy clubs via the Great Lakes Association of Astronomy Clubs, and see if they can set up too.

Volunteers: Bob Trembley, Ken Bertin, Bob Berta, Angelo DiDonato, Jonathan Kade, Diane Hall

Contact: Caroline Feathers <Cfeathers@gsem.org>
(313) 870-2511

Astronomy Day at Stargate Observatory
Saturday, May 2, 2020

Planning Stage: I've emailed our Metropark contacts about organizing this event.

Need volunteers!

Astronomy Day at Cranbrook Institute of Science Saturday, May 2, 2020 1 – 4pm

Planning stage: Cranbrook has asked what we have an unspecified number of volunteers available for Astronomy Day.

Event on the W.A.S. Outreach Calendar: [\[LINK\]](#)

Volunteers: Jonathan Kade - *Could use more!*

Great Lakes Association of Astronomy Clubs Meeting Minutes 2020-02-13

1. Attendance

- a. Jeff Kopmanis (Lowbrows)
- b. Brian Ottum (Lowbrows)
- c. Adrian Bradley (Lowbrows)
- d. John Walbank (Lowbrows)
- e. Mike Ryan (Ford)
- f. Geof Vasquez (WAS) (retired, Royal Oak)
- g. Bridget Harwood, Park Supervisor,
- h. Call-in: Bob Trembley (WAS)
- i. Call-in: Tony Licata (WAS, FAAC, GM)
- j. Call-in: Diane Hall (WAS)
- k. Call-in: Mike Bruno (FAAC, past GLAAC Treasurer)

2. Came to order 7:01 pm

- a. 5 clubs now represented: Lowbrows, FAAC, WAS, GM, Park)

3. Old Business

- a. Status of tent rental
 - i. Going over quote - *looks like last year's*
 - ii. Without a speaker, do we need?
 1. Staging & skirting
 2. Reduced chair/tables counts (finalized around August)
 3. sidewalls
 4. 30x60 tent
 - iii. **Action:**
 1. Payment terms: require deposit; check for remainder on delivery; Invoice to President (Adrian)
 2. Contact Valley regarding flexibility and items
 3. Vote in March on changes; April, nail it down
 - iv. Pro-sound can be provided by Adrian, but for 1 tent only
 - v. Diane: Valley Tent is not from the area, but work with us for AATB, contact from the past, John Lines.
 - vi. Need someone to meet Valley on delivery date (John, Tony, Bridgett volunteered)-- will need check in hand
- b. Non-Lowbrow participation: **FIXED**
- c. Treasurer and bank account transfer
 - i. What needs to be done to transfer account from WAS
 1. WAS concern is around geographical issues so to be present as much as needed

ii. Bank choices

iii. Treasurer? **Geof, from WAS**

1. Motion: Adrian, John: 2nded, Unanimous vote

iv. 501c3 status

1. Will loss of 501c3 hurt us? w.r.t. Cranbrook, MI Sci Center.
 - a. Diane: *No. May actually help (case: Eaton and writing check to WAS)*
 - b. FAAC is a FERA (Ford Employee Recreation Association) club (different tax status, due to being part of FoMoCo)
 - c. WAS is 501c3
 - d. John: Will business donations be affected? *No. Trouble fundraising regardless of tax status*
2. Will need tax ID number, separate checking accounts.
3. **Action:**

John, Geof, Diane on 503 team

Diane: simple if not previously incorporated as a tax-exempt; vetted by an accountant or lawyer (pro-bono, if possible)

John: recommends tax accountant, due to more experience, John has a good tax accountant
Diane has the paper trail with the 1023c form, with help with John and Geof.; Diane has past history
Status to be updated in **March meeting**

4. New Business

a. Scope of event

- i. 2019: 500+ on Friday, 4000+ on Saturday
- ii. Participation from each club for a display in the tent
- iii. 2019 Scavenger Hunt:
 1. Labor intensive by Board
 2. Well-received by parents and kids
 3. Can be frustrating by kids if object list is too long
- iv. Brian: Priorities:
 1. Telescopes
 2. Interactive Demos
 3. Speakers (distant third)
- v. 2020 will be a good year for lots of cool stuff in the sky
- vi. Diane: WAS officers have found AATB is a 1-of-a-kind event in Michigan. Programming and for-free is what makes it special; telescopes are available elsewhere, but not all of the aspects.
- vii. John: Value in: Festival-like aspects are cool and the NUMBER of "nerds" available
- viii. Mike: 1 tent: will need to layout earlier on to make sure every club can get the space they need. *Space could be an issue with 1 tent.* Get commitment for participation before deciding on tent size.

- ix. Lowbrows: optics board demo; EAA demos
- x. Speakers are a positive if its entertaining or famous, but not a priority if we can't get that caliber of speaker
- xi. **Agenda** item for March: Feedback from clubs regarding demos and space needed. When asking club, find out if there are things clubs would like to see to entice them
- xii. **Future agenda**: Identify vendors, orgs that can present in tent
- xiii. **Future agenda**: Raffle for telescope volunteers and public
- b. **John**: will go over 2017 task lists with Brian to ensure that we stay on track
- c. Telescope field planning and management (including line manager concept)
 - i. Parking Lot
 1. Parking lot fence/baffles: very important
 2. Need more stakes to cover the entire parking lot near the telescope area
 3. **Bridgett**: Get estimates for expanded fence: **Agenda March**
 - ii. More signs, people advising not to use flashlights, cell flashlights
 - iii. **Agenda for future**: light management, youth groups to help with information
 - iv. Need Solar lights for paths
 - v. Astroimaging Demos?
 - vi. **Action**: Put light management on the web site
- d. **Agenda for future**: Considerations for big scope logistics and power
 - i. Need a field manager; will probably need to start earlier in the summer
 - ii. Field manager will deal with priority parking
 - iii. Motion to designate Mike Ryan for Field Manager: Adrian,
- e. **John**: Sponsors and Sponsor letters: **Agenda for March**
 - i. Letter from previous years
 - ii. Levels:
 1. \$2000 level "Exclusive" - good logo and announcements
 2. **Diane**: Effectively covers the big tent, but usually never materialized. "Aspirational". MI Science Center did it in-kind.
 3. \$500 level - Clubs, MI Sci Center
 4. \$100 level
 5. **John**: suggests adding a \$250 level
 6. Potential sponsors: Car dealers, Verizon, Comcast, Planewave, Telescope manufacturers and suppliers, Astronomy magazines
 7. **John**: smaller donors that give annually are often more valuable than a single infrequent big donor
 8. Shooting for end of March to get letters out
 9. Contact Liam Finn for sponsor lists
 - f. Information table: briefly discussed: **Agenda for Future**
 - g. Taking possession of all signs. **Tony** is in touch with Jim, who has them in his barn. Jim agreed to store them for us.
 - h. **Action**: Contact Pleiades Club: **Jeff**
- 5. John Causland Estate Sale
 - a. Inventory list will go out in about a week
 - b. Sale later in Ann Arbor
- 6. **Future Agenda**: Solar Observing at AATB
- 7. Motion to Adjourn: Brian, 2nd: Adrian, all in favor 8:42pm

Next Meeting: March 12, 2020 7pm-8:30pm at Island Lake State Park

Bob Trembley,
Outreach chair

Meeting Minutes

BOARD MEETING – February 3, 2020

Members present: Diane Hall, Dr. Dale Partin, Riyadh Matti, Glenn Wilkins, Mark Jakubisin and Jonathan Kade. Bob Trembley joined us on speaker phone. Diane called the meeting to order at 6:40 P.M.

Old Business

Diane reported that GLAAC still needs a permanent board representative as treasurer. This person could support weekday meetings via teleconference and avoid the burden of travel time. Riyadh reported that the observatory dome is currently watertight and functional but does need

modification to resolve safety issues resulting from the need to go onto the roof for opening & closure. Replacing the dome currently seems to be beyond the financial capability of the W.A.S. based on estimates to date. We either need to find a benefactor(s) or solicit ideas to resolve the ongoing repair/functional issues. Riyadh and the Board would welcome proposals/help from engineers and/or skilled trades members.

Scope & equipment sale: It has been recommended that we identify all equipment to be offered for sale at the March 21 Stargate open house. Riyadh needs some help developing a plan with pictures. What should we do with equipment

(Continued from page 20)

not being used that doesn't sell?

Dark Sky Outing: Diane spoke about legal, cost and insurance issues we could expect if we sponsor an event like this. It was suggested that we consider simply identifying a suitable site that would be willing to work with us in satisfying the needs of amateur astronomers. We could then develop a flyer with timing and all the details about reservations and camping/motel accommodations. Port Crescent was recommended as a possibility. Riyadh and Mark will continue the investigation. See Bob Trembley's Outreach report in the February WASP.

New Business

Dale remarked that Jim Foerch may be available as our banquet speaker. Comments/alternatives? Would members enjoy a presentation about amusing stories related to astronomy at the banquet?

Dale noted that there is still some confusion about speaker compensation including when our own members have to travel a significant distance. Possibilities were discussed.

CRANBROOK MEETING February 3, 2020

Diane called the meeting to order at 7:32. There were 45 members plus 3 guests registered.

Officer Reports

Dale reported that only about 3 speaker opportunities remain unscheduled for 2020.

Riyad reported that there were no visitors at the Stargate open house due to weather. It was noted that, in general, anyone arriving before 6:30 may have to wait in the parking area until Riyadh arrives to open the gate.

Mark reported that we currently have 65 members and that he will be pleased to receive dues during the break. The financial summary can be found in the WASP.

Diane reported that volunteers are needed for Astronomy Day, May 2 at both Cranbrook & Stargate. Also, there is a major Girl Scout event at Lakeside Mall on March 21/22 that needs support. See the Outreach Report in the WASP.

Marty Kunz reported that there are no sun spots currently but there have been a few lately.

Bill Beers repeated his offered assistance to anyone wanting to learn more about astrophotography.

Jonathan noted that he still has WAS items for sale, including 3 Fun-Dannas (Only \$5 each)

Short Presentation – Chasing Comets

Dr. Partin introduced Doug Bock, a past president, VP and WASP editor, who joined the WAS in

1973. Likely this makes Doug the longest active member of our society! Tonight, Doug shared his extensive and detailed observations of comets and asteroids. His Northern Cross Observatory near Fenton, MI has a roll-off roof and an impressive arrangement of photography equipment and electronics which allow automated and remote tracking from the comfort of his nearby home.

Snack Break at 8:30. The extensive assortment of drinks & snacks was provided by Ken Bertin.

Main Talk – A Celebration of Globular Clusters

Dr. Partin introduced our President, Diane Hall who shared her enthusiasm for these beautiful gems of the night sky. Some were hard to find but worth the effort. Others had the potential to take your breath away under the right conditions. Diane encouraged all of us to take another look at globular clusters, and take full advantage of any opportunities to check out those not well positioned for viewing from Michigan.

The meeting was adjourned at 9:48 with the usual invitation for members to continue discussions at the Red Coat Tavern on Woodward.

MACOMB MEETING February 20, 2020

President Diane Hall called the meeting to order at 7:34 for 26 members and 7 student guests.

Officer Reports

Riyad Matti reminded us that the monthly Stargate Open House will be this Saturday and the weather forecast is for clear skies and above-average temperatures!

Bob Trembley reported that there have been no new requests for presenters despite the past popularity of our outreach program.

Diane noted that volunteers are still needed for Astronomy Day, May 2, at both Cranbrook & Stargate. Also, more help is needed for the big Girl Scout program next month (see Cranbrook minutes above).

Diane announced that Geof Vasquez has agreed to be the regular Treasurer for GLAAC thus filling a very important post!

Jonathan Kade reported that the "old" newsletters from the Detroit Astronomical Society have now been scanned into our online archives.

Ken Bertin offered technical assistance for anyone needing help with presentations for WAS talks. He noted that Betelgeuse has continued to dim

(Continued from page 21)

and has now dropped from the 9th brightest star to 31st. which is well beyond normal variability for this star. Of course, this has sparked considerable speculation that we may be witnessing the countdown to a supernova! A star of this mass would be expected to completely collapse to a black hole

In The News/In The Sky – Jeff MacLeod saved the day by stepping in with very short notice to present these popular reports. Regular presenters are needed. All were advised to take notice of Venus in the early evening as it is showing off in the crisp winter skies.

Snack Break – provided by Gerry Voorheis. Diane added macadamia nuts directly from Hawaii, and Bob contributed a nice tray of fresh apple slices.

Main Presentations – Dr. Partin introduced Ken Bertin who put together several presentations by various members covering Top Stories from 2019 as follows:

Bob Trembley focused on the Great Red Spot of Jupiter as spectacular new images have become available.

Dale Partin spoke about asteroids and the Parker Solar Probe. NASA is collecting material from Osiris Rex to return to earth for analysis.

Diane Hall brought us up to date on various landers on the moon & Mars including those by Israel, India & Russia. Also, a medical report on the Kelly twins reflecting the effects of long-terms in space.

Mark O'Malley reported on the visit to Arrokoth last January by New Horizons. This unusual barbell-shaped object represents the most distant object ever studied at close range. He also updated us regarding finds by Opportunity, a Mars rover.

Ken Bertin reported that 20 new moons have been documented around Saturn which now officially has 82 moons and exceeds the Jovian system! He also declared that the first “picture” of a black hole could seriously be considered as the story of the year!

Diane concluded the meeting at 9:33 with the usual invitation to continue discussions informally at the Coney Island on Van Dyke, north of 12 Mile.

Glenn Wilkins
Secretary

Treasurer's Report

Treasurer's Report for 2/29/2020 MEMBERSHIP

We have 68 current members

INCOME AND EXPENDITURES (SUMMARY)

We took in \$1,257 and spent/transferred \$279 We have \$22,104 in the bank \$30 in checks and \$728 in cash, totaling \$22,862 as of 2/29/2020

INCOME	Sum of Credit
AL 2020	\$ 30.00
calendar 2020	\$ 150.00
donation	\$ 297.00
membership	\$ 126.00
merch	\$ 60.00
renewal	\$ 594.00
Grand Total	\$ 1,257.00

EXPENSES	Sum of Debt
Calendar Shipping Cost	\$ 30.35
Snack Reimbursement	\$ 70.00
Snack Supplies	\$ 2.12
Speaker expense	\$ 16.00
Speaker Expense, Driving	\$ 161.00
Grand Total	\$ 279.47

GLAAC REPORT 2/29/2020

Beginning Balance: \$2,237

INCOME

No activity

EXPENSES

No activity

Ending Balance: \$2,237

Mark Jakubisin
Treasurer



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.



Club Member Name Tags

Email publications@warrenastro.org for
your personalized name tag

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
Astronomy Club at Eastern Michigan University	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
Farmington Community Stargazers	Farmington Hills	Members: Last Tuesday of the month Public observing: 2nd Tuesday of the month
Ford Amateur Astronomy Club	Dearborn	Fourth Thursday of every month (except November and December) at 7:00 PM
Oakland Astronomy Club	Rochester	Second Sunday of every month (except May)
Seven Ponds Astronomy Club	Dryden	Monthly: generally the Saturday closest to new Moon
Sunset Astronomical Society	Bay City/Delta College Planetarium	Second Friday of every month
University Lowbrow Astronomers	Ann Arbor	Third Friday of every month
Warren Astronomical Society	Bloomfield Hills/ Cranbrook & Warren/ MCC	First Monday & third Thursday of every month 7:30 PM

GLAAC Club and Society Newsletters

Warren Astronomical Society: <http://www.warrenastro.org/was/newsletter/>
 Oakland Astronomy Club: <http://oaklandastronomy.net/newsletters/oacnews.html>
 Ford Amateur Astronomy Club: <http://www.fordastronomyclub.com/starstuff/index.html>
 Sunset Astronomical Society: <http://www.sunsetastronomicalsociety.com/>
 University Lowbrow Astronomers: <http://www.umich.edu/~lowbrows/reflections/>

WAS Member Websites

Jon Blum: [Astronomy at JonRosie](#) Bob Trembley: [Balrog's Lair](#)
 Bill Beers: [Sirius Astro Products](#) Bob Trembley: [Vatican Observatory Foundation Blog](#)
 Jeff MacLeod: [A Life Of Entropy](#)

Doug Bock: <https://boonhill.org>
 Facebook: Northern Cross Observatory <https://www.facebook.com/NorthernCrossObservatory>
 Boon Hill and NCO Discussion <https://www.facebook.com/groups/369811479741758>
 YouTube channel: <https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w>



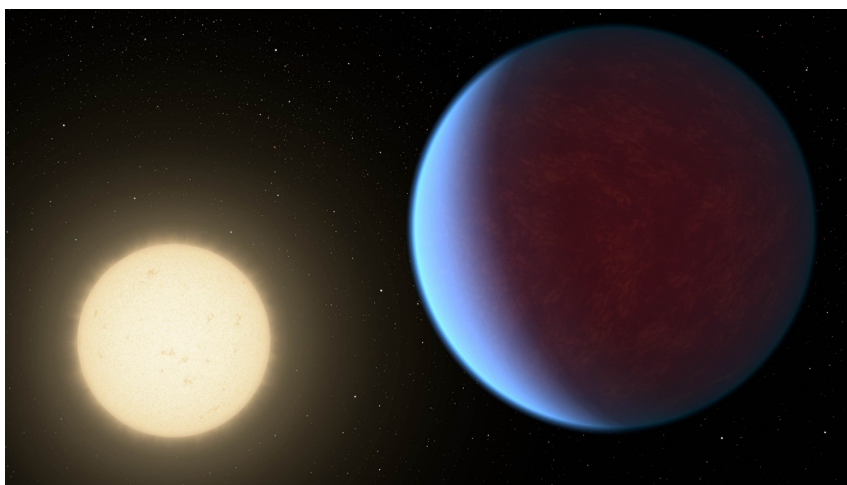
This article is distributed by NASA Night Sky Network

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!

Cancer the Crab is a dim constellation, yet it contains one of the most beautiful and easy-to-spot star clusters in our sky: the **Beehive Cluster**. Cancer also possesses one of the most studied exoplanets: the superhot super-Earth, **55 Cancri e**.

Find **Cancer's** dim stars by looking in between the brighter neighboring constellations of Gemini and Leo. Don't get frustrated if you can't find it at first, since Cancer isn't easily visible from moderately light polluted areas. Once you find Cancer, look for its most famous deep-sky object: the **Beehive Cluster**! It's a large open cluster of young stars, three times larger than our Moon in the sky. The Beehive is visible to unaided eyes under good sky conditions as a faint cloudy patch, but is stunning when viewed through binoculars or a wide-field telescope. It was one of the earliest deep-sky objects noticed by ancient astronomers, and so the Beehive has many other names, including Praesepe, Nubilum, M44, the Ghost, and Jishi qi. Take a look at it on a clear night through binoculars. Do these stars look like a hive of buzzing bees? Or do you see something else? There's no wrong answer, since this large star cluster has intrigued imaginative observers for thousands of years.

55 Cancri is a nearby binary star system, about 41 light years from us and faintly visible under excellent dark sky conditions. The larger star is orbited by at least five planets including **55 Cancri e**, (a.k.a. Janssen, named after one of the first telescope makers). Janssen is a "super-earth," a large rocky world 8 times the mass of our Earth, and orbits its star every 18 hours, giving it one of the shortest years of all



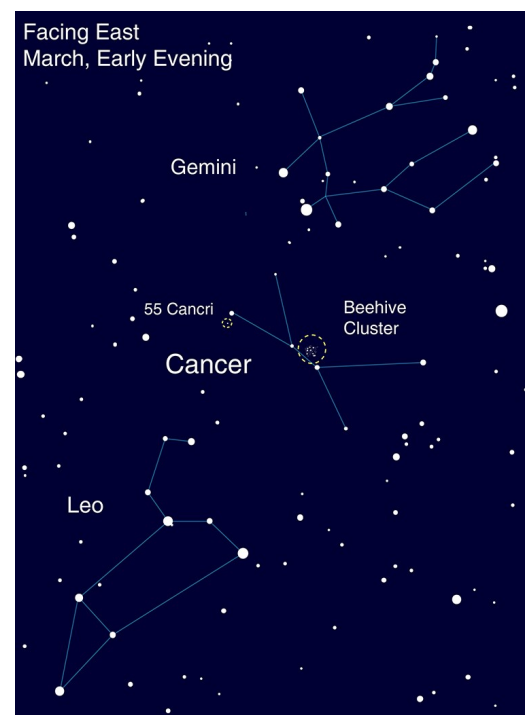
Artist concept of 55 Cancri e orbiting its nearby host star. Find details from the Spitzer Space Telescope's close study of its atmosphere at: bit.ly/spitzer55cancrie and the Hubble Space Telescope's observations at bit.ly/hubble55cancrie Credit: NASA/JPL-Caltech

known planets! Janssen was the first exoplanet to have its atmosphere successfully analyzed. Both the Hubble and recently-retired Spitzer space telescopes confirmed that the hot world is enveloped by an atmosphere of helium and hydrogen with traces of hydrogen cyanide: not a likely place to find life, especially since the surface is probably scorching hot rock. The NASA Exoplanet Catalog has more details about this and many other exoplanets at bit.ly/nasa55cancrie.

How do astronomers find planets around other star systems? The Night Sky Network's "How We Find Planets" activity helps demonstrate both the transit and wobble methods of exoplanet detection: bit.ly/findplanets. Notably, 55 Cancri e was discovered via the wobble method in 2004, and then the transit method confirmed the planet's orbital period in 2011!

Want to learn more about exoplanets? Get the latest NASA news about worlds beyond our solar system at nasa.gov.

Look for Cancer in between the "Sickle" or "Question Mark" of Leo and the bright twin stars of Gemini. You can't see the planets around 55 Cancri, but if skies are dark enough you can see the star itself. Can you see the Beehive Cluster?



Last Word

Astrophotography on a Paper Route Budget

Dear WASP readers,

You have, in these very pages, seen the astrophotography battle between the Cadillac West Sirius Observatory and the Northern Cross and Boon Hill Observatories get more and more heated over recent years. Doug Bock and Bill Beers have been continually improving their astrophotography games, and these pages are hosting astrophotography that looks more like it came from Hubble than from Fenton or Cadillac. This is the best sort of competition, and I'd love to see Brian Thieme, Joe Tocco, Bob Berta, Phil Martin, and others re-enter the battle.

But that's not what I'm here to talk to you about. I am here to talk to you about astrophotography you can do on the sort of budget that could be, in my childhood, easily earned with a paper route: i.e. less than \$60. Okay, well, it also assumes that you have a reasonably modern phone, but I've gotten good results since 2009 or so. It will get you amazing photos of the moon and the sun (assuming you have a hydrogen alpha scope), and recognizable photos of the Pleiades, Saturn, Jupiter and its moons, and if you're lucky, Mars.

Want to start? It's simple, and free: hold your phone a few millimeters away from the eyepiece. On this page, you'll see some of my proudest examples of that approach. I



Transit of Mercury

am the first to admit that I've gotten a lot better at doing this quickly and accurately over the 13 years I've been trying it, and even so I still sometimes struggle. But I'm good enough at it that at public moon observing events I regularly take photos of the moon with dozens of different phones.

Enter a major improvement both for my personal phone-based astrophotography and for assembly line photos at public events: the Celestron NexYZ. (A pun on the X-Y-Z of Cartesian coordinates.) It's a \$60 adapter that attaches to any kind of eyepiece, from small binoc-

ulars to 2" eyepieces, and allows you to accurately and effortlessly position the phone's camera in the eyepiece's light path. I haven't gotten to use it for astrophotographic applications much yet, but I have had amazing success with it for birdwatching, and I

am looking forward to trying it out with all of the planetary action awaiting us this year.

Whether you have professional astrophoto equipment, a DIY setup like mine, or you sketch what you see through the eyepiece, I hope you share your results with us at the WASP and with the club at large.

Jonathan Kade
Publisher

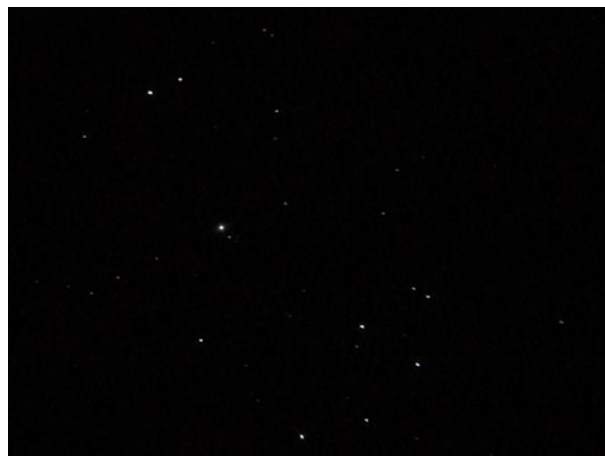
Product Review by Joe Tocco in [August 2019 WASP](#)



Smartphone not included



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The Warren Astronomical Society Paper



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