Vol. 52, no. 8

August, 2020

The W.A.S.P.

The Warren Astronomical Society Paper

Comet C/2020 F3 (NEOWISE)

Comet NEOWISE, named for NASA's Near-Earth Object Wide-field Infrared Survey Explorer (NEOWISE), the space telescope that first spotted the comet in March. Certainly a candidate for "The Comet of the Decade", the comet became a photography target in the pre-dawn sky, looping around the sun, it remained an evening target even as it receded form the sun.

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:
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
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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)

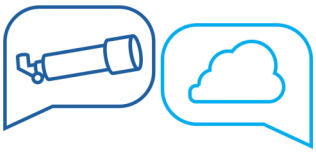
Disclaimer: The articles presented herein represent the opinion of their authors and are not necessarily the opinion of the Warren Astronomical Society or this editor. The WASP reserves the right to edit or deny publication of any submission.

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

Cranbrook
Macomb
Cranbrook
Macomb

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!

In This Issue:

President's Field of View

In the eyepiece: a glowing blue puff of cosmic vapor with a tight, bright core and a streamer of light flowing out of it, becoming ever more detailed as the late twilight faded to true darkness. Location: 44.8 degrees North, give or take a few seconds. Instrument: a legacy 24" Dobsonian reflector equipped with a 38-millimeter William Optics eyepiece. Guest list: zero.

My fellow astronomers have been saying for years that what we as a community really needed to get true, sustained excitement from the general public—something beyond the interest piqued by a Mars opposition or meteor shower or even a total eclipse—was a great comet. Something on par with the double-header of Hyakutake and Hale-Bopp in the late '90s, or West and Bennett in the 1970s. Something that wouldn't be a punchline like Kohoutek or a disappointment like the return of Halley in '86. It's been a long, long wait; Comet McNaught graced southern skies in 2007 with its multi-tailed glory, but for those of us up in the North, the better comets (Holmes, Lulin, Garrad) have been for the pleasure of astronomers only. Meanwhile the news archives are littered with overhyped comets that met their ends untimely, comets that bear the names not of patient "comet-ferret" astronomers but of the instruments and surveys that found them: Panstarrs, ISON, Atlas.

And then, in this perversely scripted year of 2020, right as Atlas proved itself another disappointment, came NEOWISE. We've experienced the call from the *Detroit News* (always a pleasure), the flood of inquiries in the WAS inbox, the parade of exquisite images taken by club members and fellow amateurs. While this year's club calendar may well be twelve splendid shots of NEOWISE, I think all of us are feeling a certain void in the midst of the excitement. There's no line of cars stretching out onto 29 Mile Road on a Saturday night, no 45-minute wait times at the eyepiece of the Big DOB. At best, we can dole out advice— to neighbors, to the electronic inquiries, to the passers-by wherever each of us set up our telescopes and observe on our own.

Still, NEOWISE has been a pleasure, and in this pandemic summer we must take our evanescent pleasures where we can find them. Leave it to history to decide the deeper significance of this almost-great comet suspended above one nation under a plague; enjoy that pale-blue snowball while we have it.

Comet NEOWISE by Adrian Bradley

Save the Date

Warren Astronomical Society Annual Picnic

Saturday, August 22

Stargate Observatory, Ray Twp., MI

Watch your inbox for final details

Service animals allowed, otherwise, no pets.
Rotary Park has a no alcohol policy.

From the Field

The Ross Report

EIGHTH OF JULY -- Beginning at approx. 04.00 U.T. Fine sky after heavy mid-day rain.

Jupiter at approx. 160X. Gnarled North Aequatorial Belt with large feature at Central Meridian. The southern hemisphere "hood" well presented, but w/ o discernable texture or features. Again, this feature extends to S.

Temperate Belt. NO analogue in N. hemisphere. (Q: does the turbulence in the N.E.B. inveigh against belt formation in higher northern latitude?)

Ganymete & Europa proximate, hence size difference OBVIOUS. Colour too, i.e.

Gany. yellowish, but the "ice moon" is anti-colour.

TENTH OF JULY -- (Early A.M. thunder-storm.) In to Obs'y late evening, very clear.

Seeing poor on Jupitat @ approx. 160X, 5" Newtonian. Very little to see on disc, save no unusual activity on N. Equat. Belt. Great Red Spot not present. Amazing display of satellites -- five in all! All objects to west of the ball + a star, possibly 8th mag. midway in the line up. Europa and Ganymede to one another (again) size difference of note. Europa seemed dull in non-lustre. Callisto not "blue".

(SUPPLEMENTAL: M-22 @ 65-70X. Scattering of bright Population II stars across the cluster, but seemingly a "wall" of them across it.)

FOURTEENTH OF JULY -- Very still and reasonably clear. Jupiter on meridian.

Seeing good ~ 160X in 5" telescope. North Aequatorial Belt dark and moderately active, but no prominent knots/ eruptions. S.E.B quiescent, but bifurcated in latitude. S. Temperate Belt well developed. Satellites quite a study. Io and Ganymede just to the E. of the planet, obvious size difference. Gany. = 5300 km while Io = 3600 km. The former a real "world", the other just a "moon". To the west a contrast of albedos. Callisto = 0.17, Europa = 0.67, which makes Eur. seem bigger than actual in relation to Callisto.

Mars strongly gibbous. S. polar cap/ region is huge. Below it and immediately to R. of terminator is the complex of Mare Erythraeum and Aurorae Sinus, all well presented. These features dominate the S. hemisphere, but no thing in the north.

All observations made by hand driven telescope with a hand-me-down eyepiece, gift from Once Handsome Joe McBride, not multi-coated, not air spaced with argon, not five elements. Although from the lawn of the James C. Veen Observatory, said field study could have been made from a purgatorial back yard in Roseville, or a back yard in purgatorial Farmington Hills, so long as the owner was not inside, more concerned why his live-streaming, 5G, satellite channel on all-wall flat screen showed nada but snow with Korean subtitles.

G.M. Ross

About the Cover:

Adrian Bradley captured this image at Lake Hudson, here is his story:

“Once news of the bright morning comet hit, I knew it would be a sleepless week. I decided I was going to go view and image the comet for myself. After an hour drive to Lake Hudson from my home, I got to the picnic area of the park and set up my equipment based on where I thought the comet would appear. I looked and didn’t see it with my eyes so I picked up my binoculars. There it was, hanging in the sky, tail and all! I put my binoculars down and then made out the comet, naked eye. I started taking photos of the comet including this one. This was taken back on July 9th. Since then I’ve continued to image the comet as it transitioned into a nighttime object. I recommend everyone to try and see this beautiful comet once, whether in binoculars or naked eye.”

W.A.S. Astro-Images

Comet C/2020 F3 (NEOWISE)

By Joe Tocco

They were both shot in Charlevoix, Michigan on the evening of July 17th. ~10:45 PM.

- Nikon D750, 70-200mm Nikkor lens (lighthouse shot at 70mm, comet photo at roughly 180mm)
- ISO 400
- F/4
- 30 Seconds
- iOptron SkyGuider Tracking Platform.

Moderate processing in Adobe Lightroom CC

The South Pier Charlevoix Light Station was installed in 1948 to replace the deteriorating North Pier light. Painted Daymark red, the light sits at 45°19'22"N, 85°16'11"W. Tower height-44 feet (13 meters). Lens 12-inch Tideland Signal acrylic lens (5th order Fresnel was the original, moved from the North Pier light)—so long as we're listing specs, Ed.

(Continued on page 6)

(Continued from page 5)

Another by Joe Tocco:

From Dale Hollenbaugh:

The View From C.W. Sirius Observatory

Comet NEOWISE (C/2020 F3)

By now I suspect every astronomer in North America has observed, and/or photographed the best comet that we have had in the last quarter century. Comet NEOWISE, which stands for Near Earth Orbit Widefield Infrared Survey Explorer space telescope, was discovered on March 27, 2020 by the NEOWISE team. The comet made its closest approach to the sun on July 3 but, and until now, was only visible in the sky before dawn. Now, for keen observers in the Northern Hemisphere, the comet has been getting higher in the evening sky, and can be seen in the northwest below the Big Dipper constellation. By July 2020, it was bright enough to be visible to the naked eye. It is one of the brightest comets in the northern hemisphere since Comet Hale-Bopp in 1997 and was widely observed as being clearly visible with the naked eye. Under dark skies, it can be clearly seen with the naked eye and might remain visible to the naked eye throughout most of July 2020, at least until July 23, the point of the comet's closest approach to Earth. As of July 18, the comet was about magnitude 3, but binoculars are required near urban areas to locate it. Its closest approach to Earth will occur on July 23, 2020, when it will be 64 million miles away. Comets, often nicknamed "cosmic snowballs," are icy, rocky objects made up of ice, rock and dust. These objects orbit the sun, and as they get closer to the sun, most comets heat up and start streaming two tails, one made of dust and gas and an "ion tail" made of electrically-charged gas molecules, or ions. One of the most

(Continued on page 8)

Comet NEOWISE (C/2020 F3) - Widefield

(Continued from page 7)

fascinating details about Comet NEOWISE is that it won't return to our skies for another 6,800 years. I took these photos on July 18 from the backyard at my observatory near Cadillac Michigan, using a Canon Rebel T7 DSLR camera mounted on a tripod. (You can also see an airplane trail in the upper right corner of the photo). Each photo is one, 30 second exposure at ISO 1600. So by the time you read this article, if you have not seen NEOWISE, you will probably still be able to see it through mid-August. Using binoculars, look northwest just below the Big Dipper around 11:00pm. I sure hope you had the opportunity to see it!

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

From the Desk of the Northern Cross Observatory

This month Comet C/2020 F3 came closest to Earth on July 23, 2020. I had to go mobile to get decent horizons over the month. This image is from July 23, 2020 @ the Boon Hill Observatory

Equipment used:

Canon T3i
75 mm @ f/4.5
ISO 1600
Ioptron SkyTracker on a tripod,
9 x 90 second subs stacked on the core of the comet.

The data was stacked and processed in PixInsight

Doug Bock

McMath-Hulbert Observatory

Lake Angelus, MI

The sun is still in a very inactive state as we're between solar cycles, but we're anticipating a lot of great solar viewing over the next few years.

Our next open houses as usual will be on the first Saturday of the month, August 1 and September 5, starting at 11 AM. Come on out for a visit!

The McMath-Hulbert Astronomical Society had a busy month again in July. Our monthly open house on the 4th was held and we had 7 visitors. Tours were given of all three of the main buildings. We participated in the Summer Ice Cream Social at the Oakland History Center site on Cesar Chavez Blvd. next door to Wisner Stadium. The event had to be held as a "drive-through" event because of the pandemic-people drove along a marked path that wound through all the various exhibits. We talked with hundreds of people from the public and met some "movers and shakers" in the local historical scene. The event was a big success for us!

Ken McKenzie, Austin Sabatino, Marty Kunz, and Tom Hagen have been working on the spectroheliograph in Tower 2 in preparation for resumption of solar imaging. MHAS member Dave Groski of the Mt. Cuba Astronomical Society in Hockessin Delaware kindly donated a new diffraction grating to replace an older grating that we had been using. This new grating should enable us to start solar imaging this summer. There have been a number of mechanical issues to be solved, including work on the North-South grating tilt screw drive. We're now back in full mechanical operation! We have collimated the diffraction grating optical path down in the well and the next step will be to start looking for absorption lines in the solar spectrum. Does any of this work sound interesting? Let's hear from you, as we need a LOT of technical help.

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 Raynolds 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.

Presentations

Monday, August 3, 2020
Cranbrook Presentations

Main Talk:

"The Moon is Not Boring"
And Other Lunar Misconceptions

By Jeff MacLeod

To the layperson it can be easy to take the Moon for granted, for the astronomer it can be easy to ignore the Moon entirely, as it can obscure "more interesting" objects. Isn't the Moon always the same? NO! The moon is much more dynamic than most give it credit for. In his presentation Jeff Macleod will unravel all these subtle details, as well as dispelling many common misconnections and illusions involving the Moon.

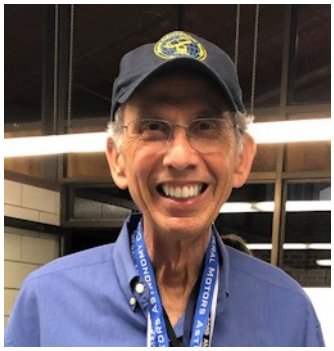
Jeff MacLeod is currently a physics and astronomy major at Wayne State University (<1 year to go!). He is also a former President of the Warren Astronomical Society. He is a presenter at the Wayne State Planetarium as well as a Solar System Ambassador for NASA. He has been obsessed with space nearly his entire life and finds no greater joy than sharing his obsession with the world.

Short Talk:

The Best Online (and Offline) Resources
-For Astronomers

By Jon Blum

A few months ago, a new WAS member asked the board for a presentation to cover nine specific categories of resources for beginner amateur astronomers. Jon Blum accepted this assignment. In this talk he will briefly cover astronomy phone apps, podcasts, software, books and other topics, with suggestions for each.



Jon Blum joined the WAS in order come to our observing events at Stargate, to learn how to use a telescope that his children bought him for a retirement present. Then he discovered that he needed to come to our indoor meetings to understand what he was seeing in the telescope. But the best thing he has learned in the past 18 years is that WAS members are smart, friendly and fun to be with. During the isolation of the current pandemic, he values his WAS friends more than ever, even if he can only see them on Zoom and WebEx.

Thursday, August 20, 2020
Macomb Presentation

Finding Life on Other Worlds

By Robert Naeye

Are we alone or do we share our solar system and galaxy with other forms of life? And how widespread are advanced civilizations with whom we could communicate? Robert will explore ways of answering these questions through launching robotic spacecraft, detecting chemical signatures in exoplanet atmospheres and various techniques for picking up signals of advanced technologies.

Robert Naeye is a freelance science journalist based in Hershey, Pennsylvania. He is a former editor in chief of Sky & Telescope, the world's most respected popular astronomy magazine. He also worked for NASA at its Goddard Space Flight Center in Maryland. During his 30-year career he has written hundreds of articles about astronomy and space science. He has authored two books and contributed to three others. Please visit his website at: www.robertnaeye.com.

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.

Of a comet, a cosmic beacon, and the possibility of extraterrestrial life

A few months ago, I wrote in this space about Comet Atlas (C/2019 Y4), a comet that at the time showed signs of becoming a bright comet visible without a telescope or binoculars with just one's eyes. I also repeated my maxim that "Comets are like cats; they both have tails, and they both do precisely what they want." This comet indeed did not live up to its billing, and neither did the next one, comet Swan (C/2020 F8).

The third Comet, however, did! Comet Neowise (C/2020 F3) put on a beautiful performance in the morning sky at the start of the Summer of 2020. (First picture.) It was a shining cosmic beacon amidst the terrible time we are all having this year. Over the course of July, this comet faded slightly as it moved into the evening sky, but it moved so far north that for a time it was visible in the night sky all night long. (Second picture.)

Image 1

Image 2

When I look at a comet, my thoughts often dwell on the role that comets have played in the origins of life, and in particular why and how I am here looking up at the sky to ask. For a long time, we have suspected that when a comet strikes a planet, it leaves behind four of its substances—carbon, hydrogen, oxygen, and nitrogen—CHON particles, the simple alphabet of life. For impacts in the oceans, long-lasting hydrothermal vents might have helped form prebiotic molecules which began to replicate themselves before evolving into proteins, amino acids, then RNA, and finally DNA.

Gene Shoemaker, the famous geologist, loved to say the "we are the progeny of comets." Comet Neowise itself had nothing to do with it. This comet was formed when the solar system was very young, and trillions of other comets formed at the same time. Some of these other comets might have. Certainly at least one of them did collide with the Earth well over three billion years ago. If the impact were in an ocean, it could have led to the start of one of those hydrothermal vents at the ocean bottom. So much time has elapsed, and we are still here somehow. We also have the opportunity to look at the sky and witness a cosmic cousin of the comet that did collide, that cousin being comet Neowise. In all its magnificence, this comet is visiting, to tell us its story, and ours.

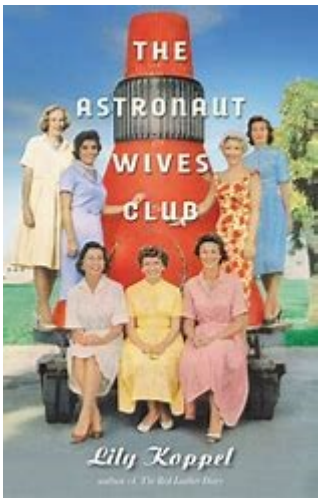
Movie Review with Diane Hall

Astronaut Wives Club

https://abc.com/shows/the-astronaut-wives-club

Episode 2: Protocol

We start off with Betty Grissom (JoAnna Garcia Swisher), whose nerves are a-flutter with the approach of husband Gus's launch in the second Mercury-Redstone mission. She goes on a shopping trip with sweet, stuttering Annie Glenn (Azure Parsons) and seeks advice on how to remain ice-cold under pressure from Louise Shepard (Dominique McElligott). The LIFE magazine guy (I refuse to give this obvious composite character a name) offers Betty his own advice on the perils of repression and avoidance, but she's not in the mood for that.



Meanwhile Marge Slayton's (Erin Cummings) past as a divorcee comes up in the form of a private eye who's looking for dirt. The pressure is on Annie to not stutter in public once husband John becomes the third American in space. Louise is having some bad chemistry with the LIFE Magazine Guy. And Trudy Cooper (Odette Annable) is upset that Gordo won't talk shop with her when he's home; her frustrations at not being able to fly spill over and she tells him to fold his own socks. Burn.

All the Wives, potluck specials in hand, crowd into the Grissom home for the Liberty Bell 7 launch, which is marred inside the house by some intra-Wives tension and in general by the perilous ending to the mission when Liberty Bell's hatch blows prematurely. Gus comes home safely this time, of course, but Space Race fans like me know all about the day that he won't, and so that bit of context provides a grim frame for the candy-colored antics on screen.

Anyway, the Grissoms find out being the Second Family of Space isn't much fun, the First Family of Space angst over being overshadowed by John Glenn's *orbital* flight, and Annie's attempt to make a perfect stutter-free appearance on the national stage is upended by a surprise house guest of *great* importance (his initials are L, B, and J). The Astronaut Wives get another feel-good moment of solidarity and this time the actual Astronauts get their own moment of shining brotherhood for a cause that isn't, er, hiding Cape Cookies from the Wives.

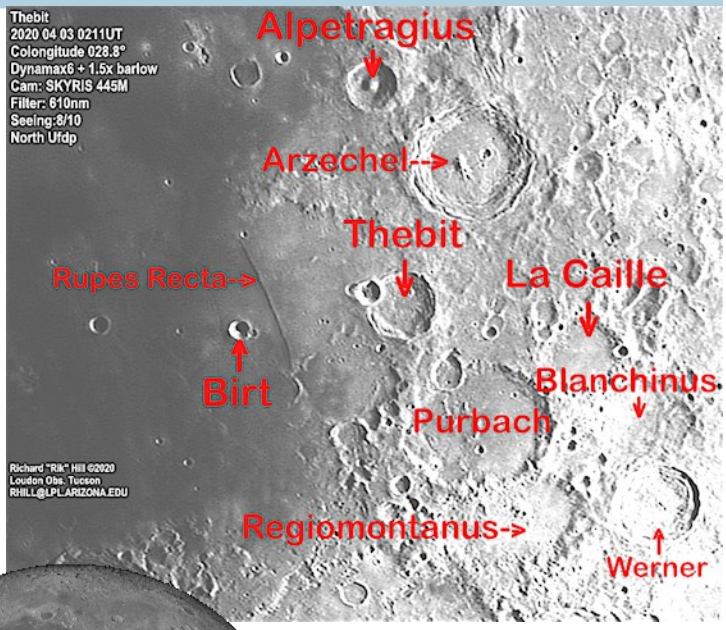
In conclusion, John Glenn is Best Astronaut Husband and Gordo Cooper is emphatically Worst. Also poor underused Jo Schirra (Zoe Boyle) shows off a steely streak in getting the others out of sticky situations; never underestimate a Navy Wife.

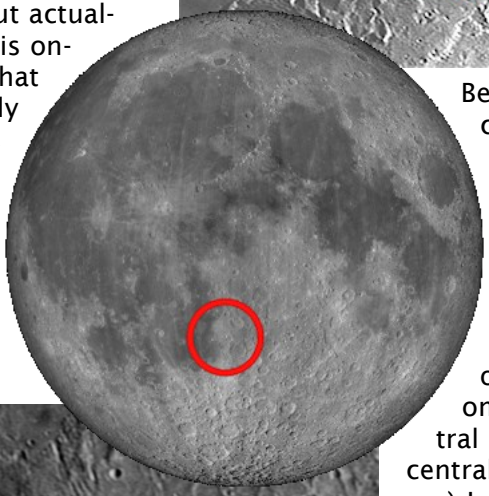
Three and a Half Moons out of five; some strong moments but a general sense of being, well, a part of an ongoing plot whose threads are being spooled out and I'm really not sure what the deal is with LIFE Magazine Guy. Needed more Peachy Keen Rene Carpenter.

Over the Moon with Rik Hill

A Bit of Thebit

Here we have a wonderful area on the Moon that bears a lot of study. Our crater then lends its name to this image, Thebit (60km diameter) is in the center with Thebit A (20km) breaching its upper left (northwest) wall. Above this crater and a little to the right (east) is the wonderfully terraced Arzachel (100km) with the nice rimae on its floor. A little to the northwest of this is the unusual crater Alpetragius (41km) with a broad round central peak. It has been appropriately likened to an egg in a basket. Due west of Thebit you'll see a dark slash. This is 114km long Rupes Recta or the "Straight Wall". It is not terribly straight and given a little more resolution than we have here you would see that. The wall looks like an abrupt cliff but actually is fairly sloped but as we see it here it is only about 1-1.5km wide. Consider what that is from your home. Most people can easily see a kilometer in some direction unless they live in a forest. West of this is the relatively young crater Birt (17km). A small rima extends to the northwest from the north wall of this crater. This is Rima Birt and it too is only about a kilometer wide!





Below Thebit is a large shallow crater, Purbach (121km) with a very unusual central peak, probably the remnants of a previous crater wall. To the east is a flat floored crater, LaCaille (70km) and south of it is Blanchinus (also 70km). Purbach lays on top of an even older crater to the south, Regiomontanus (129km) with a central peak that has a more-or-less central crater. (No, it is not a volcano.) Lastly we have that very circular crater with thin terraced walls in the lower right corner of the image. This is Werner (71km) with a fresh crater and white ejecta blanket on the north inner slope. We know it is fresh (relatively) because it is lighter colored. It's composed of the same material as the rest of the crater but when it's crushed and pulverized it takes on a higher albedo, or reflectivity and thus looks white.

This image was made from one 1800 frame AVI stacked with AVIStack2 (IDL) and finished off with GIMP and IrfanView.

Location maps by Ralph DeCew.

History S.I.G.

August 1983

This is the latest find from the Kim Dyer collection. In the listing, I've noted that it may be an incomplete issue as all I had to go by were the loose pages found in a stack of other material. If a stapled version surfaces, we will know for sure.

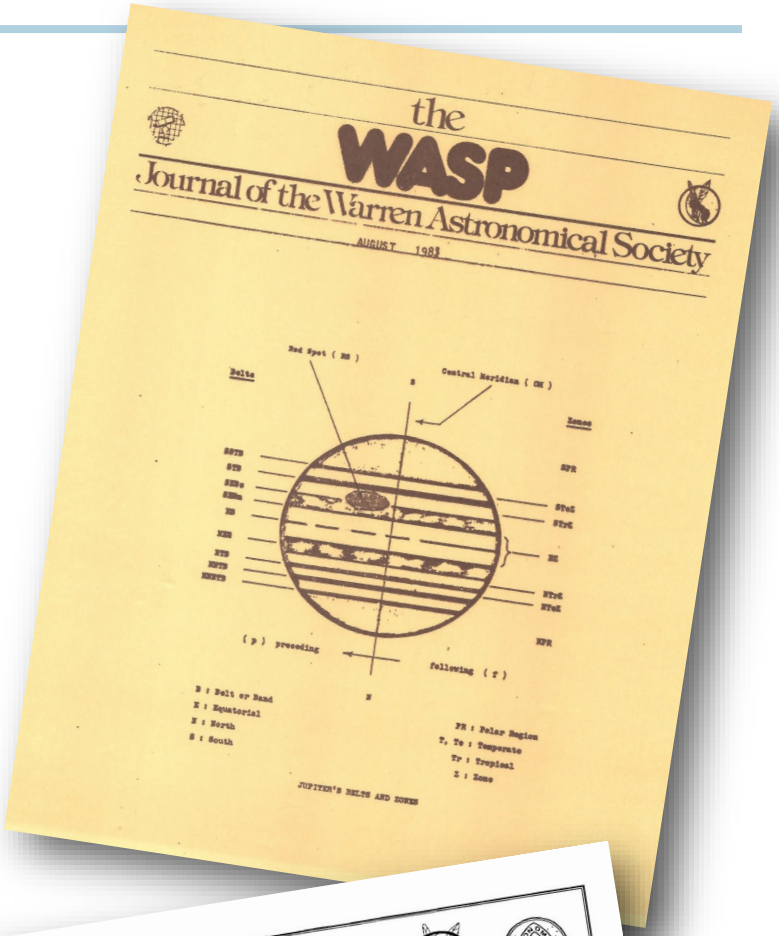
The Calculating Astronomer by Kenneth Wilson is the sole article.

August 1993

Computer Chatter by Larry F. Kalinowski is the only member contribution to this issue. With computer talk occupying just the first paragraph, his column is showing signs of becoming "Astro Chatter". The rest of the issue is filled with NASA contributions:

NASA Space Link: Mission Status (Galileo, Magellan, Mars Observer, Topex/Poseidon, Ulysses, Voyager 1 and 2); Scientists Locate New Radiation Belt Around Earth; Hubble Looks at the Heart of a Galaxy Collision; Magellan Aerobraking, Gravity Studies Underway; Voyager Spacecraft Find Clue to Another Solar System Mystery.

The "At the Telescope" feature is the final bit, but who wrote it is unknown- may be another newsfeed.



From the Scanning Room

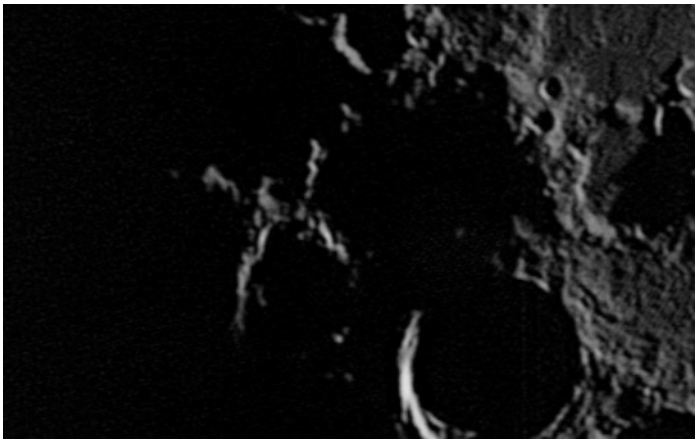
I finished the Detroit Astronomical Society's newsletter processing and all copies are posted on our website: http://www.warrenastro.org/was/newsletter/DAS.aspx. The issues added since the first round are marked.

Dale Thieme,
Chief scanner

Adventures in Armchair Astronomy

Colongitude

I thought I would take this opportunity to go over some lunar nomenclature. The inspiration for this month's topic came from Rik Hill's "Lunar 'X'" image in the June issue of the WASP. Rik mentioned that opportunity for seeing the "X" was limited. In all his images, he includes the colongitude (355.3˚), providing a reference point of sorts. That sparked an idea, but I'm getting ahead of myself.

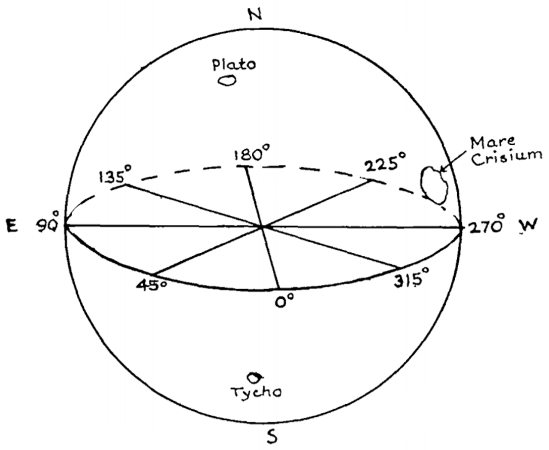


Lunar "X"

Photo credit: Rik Hill

"What is a colongitude?", you ask. The simplest way I can think of it is that it marks the location of the sunrise terminator in terms of lunar longitude. The simplest determination of colongitude is that it lies 90˚ from the Moon's zenith sun. Colongitude becomes useful in determining when you will next see the object with the same shadow pattern. I figured, great, now I can fast forward my "virtual Moon" program until the colongitude matches up again. Not so fast Sparky!

To better understand what we're facing here, I refer to two articles by the same name, "THE SUN'S SELENOGRAPHIC COLONGITUDE": 1) from the RASC Journal by Raymond R. Thompson and 2) by John Pazmino, NYSkies Astronomy Inc. Raymond explains the concept way better than I could and John dives into the nuts and bolts of the issue. Both are instructive reading and links are in the references below. Here is what we're up against: The moon's polar axis is tilted (not as much as Earth's, but enough to cause measurable effects); the moon's orbit is tilted and elliptical; all of which makes the Prime meridian on moon tilt back and forth. Add to this the cardinal directions (swapping east and west) for lunar cartography underwent a sea-change in the 60s when the IAU made the lunar mapping astronaut friendly, causing misleading reference material—some modern publications still use the older E-W (You really need to pay attention to which lunar



Mapping the colongitude on the Moon (old school-west on right)
Credit: R.Thompson's RASC article on the Sun's Selenographic Colongitude.

compass is in play). In *Luna Cognita*'s chapter on Observing the Moon we find that all of this adds up to the period between being able to see the exact same shadowing of a lunar object would be about 186 years. We need not despair; a close approximation will suffice but the simple 90˚ calculation will not be close enough—it could be off by hours.

The closest I could get to any formulas was in Pazmino's article: **(elongation)** - **(90 degrees)** - **(libration)** with the caveat that we use the reverse longitude scale of the chart below:

```
                    N
E/W (-----+-----+-----+-----+-----+-----) W/E
   90     60     30     0      330    300    270
     colongitude
```

He then goes on to illustrate with an example of using the formula to find the next viewable occasion of a lunar feature. It turned out to be much more complicated than plugging in three numbers, he applied a fair bit of finessing to get to a reasonable prediction. I won't go into all that he wrote on the exercise, the link to his article is listed below. But there is one thing of note: even if we determine the precise moment when the shadowing is right, the moon may be nowhere to be seen. In John's example, the first equation resulted in the moon below the horizon, so he showed how to proceed through the lunation cycles to get to an above horizon opportunity. This is also reflected over on an English Astronomy/Science Blog where Mary McIntyre posts charts each Decem-

(Continued on page 17)

Date	Start Time of X & V	Moonrise	Moonset	Visible From UK?
26th August	00:30 UT	15:35	23:45	N
24th September	13:00 UT	15:45	23:20	Y (Day)
24th October	01:30 UT	15:51	00:30	N
22nd November	14:30 UT	13:45	23:40	Y
22nd December	04:30 UT	12:45	01:00	N

Partial and slightly modified chart from Mary McIntyre's site, I have forgone the dates already past and left the UK visible opportunities in place (Your mileage may vary.)

(Continued from page 16)

ber showing when the Lunar "X" (and "V"—I had no idea "V" was a thing) will occur for British observers—The last column denotes when the moon is visible in British skies. I wondered if she had used a formula to determine the occasions but could not find a reference to any. She did say that she utilized NASA Visualization Studio's "Moon Phase and Libration, 2020" tool to help determine the event start times.

With that much already done, it is a simple matter to plug in the times with your own UTC offset (down here in my neck of the woods, -5 with CDT) and determine when it starts for your location. A quick jump over to the MoonCalc site to plug in location plus date/time and you can determine if there is any point in looking or that the moon is below the horizon. I applied it to the August 25 19:30 CDT (-5UT) instance for my location and MoonCalc shows the Moon just past zenith and the sun recently set, so it would be an easy opportunity. Well, it would entail getting out of the armchair.

Where did all this get us? I have to conclude that colongitude is useful in that it will get us in the right position for general purposes (the shadowing will be similar enough that we can see a repeat of the landscape) but for an event that lasts only hours, it will take more fine tuning to predict the timing. Happily, NASA did the legwork, mathematically speaking.

-Dale Thieme

References:

Title: The Sun's Selenographic Colongitude
Author: Thompson, R. R.
Journal: Journal of the Royal Astronomical Society of Canada, Vol. 59, p.25
Bibliographic Code: 1965JRASC..59...25T
http://articles.adsabs.harvard.edu/full/record/seri/JRASC/0059//1965JRASC..59...25T.html

Title: The Sun's Selenographic Colongitude
Author: John Pazmino
http://www.nyskies.org/articles/pazmino/colong.htm

Mary's Astronomy/Science Blogs
Friday, 20 December 2019
Lunar X and V Times for 2020
https://marysastronomyblogs.blogspot.com/2019/12/lunar-x-and-v-times-for-2020.html?m=1

Luna Cognita, Robert A. Garfinkle, ISBN-10: 1493916637

Resources:

Moon Phase and Libration, 2020
https://svs.gsfc.nasa.gov/4768

MoonCalc
https://www.mooncalc.org/

Virtual Moon Atlas
https://sourceforge.net/projects/virtualmoon/

Colongitude Calculator
https://www.twesley.com/~astro/colong.htm

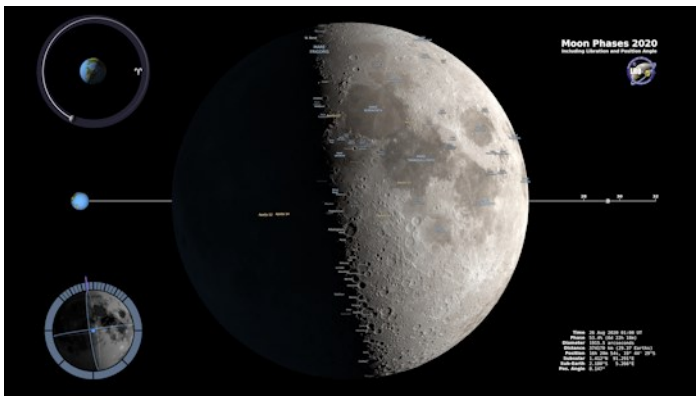


Image from the NASA Moon Phase and Libration page. Instructions on the page says to click on the image, once you have the date and time set, and it will create a TIFF image for download. This one is for August 26, 2020, 01:00 UT (Aug 25 here in the states). While this image is too small to discern the "X", it shows up quite nicely on the NASA web page.

50 Years at Stargate

Commemorating the first "Open House"

Then:

On August 26, 1970, the W.A.S. observatory was officially opened for inspection. The first group to pass through its doors were the many officers of the Rotary clubs in and around Macomb County. Unfortunately, the sky did not lend itself to observing and the visitors had to be satisfied with a sound -slide show brought along just in case the sky wouldn't co-operate. All were impressed with the building and its instrument and all indicated a desire to return to the observatory at their earliest convenience. In short, the opening was quite a success in spite of the weather.

-Larry Kalinowski
September/October WASP 1970

Now:

In August 2020, Stargate Observatory sits in the middle of the longest fallow period since it was finished 50 years ago. The dome sits silent, the telescopes collecting dust. It won't be this way forever. As we look forward to the end of this pandemic, we should think about the Stargate Observatory that could be. Are you interested in experimenting with astrophotography? The Kalinowski-Khula telescope is a perfect platform for terrific photography. Are you interested in operating one of the largest public telescopes in Michigan? Learn how to set up and use the Big Dob with assistance from the Stargate committee. Are you interested in trying out some different scopes? Test out one of many types of telescopes and see how it fits with your needs. Are you interested in building your own telescope? Stargate is full of ATM supplies we'd be happy to lend or give you. Let's start Stargate's next fifty years with some new blood and new ideas in action.

Stargate Observatory

Special Notice

Due to the measures taken during the Covid-19 pandemic On-site Star Parties and group events are cancelled.
During this time, you are encouraged, when the skies co-operate, to join the livestream with Northern Cross Observatory on the open house schedule (4th Saturday of the month)
Past livestream are available on the Warren Astronomical Society's YouTube channel:
https://www.youtube.com/channel/UC12jUX4Gmweg6fTtUuqa8CQ

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 586-909-2052.
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 (secondvp@warrenastro.org).
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.

Advisory: Concerns are circulating in the amateur astronomy community about COVID-19 being passed from one person to another via contact of different persons' eyes with a telescope eyepiece. While we are not medical experts, we thought we should pass on this concern. Sharing telescopes may be considered by some to be high-risk due to the possibility of eyes touching eyepieces.

Stargate Report

For July 17, 2020

Stargate observatory and the Dob shed along with all equipment are in good condition as of July 15 at 4:40 pm.

The observatory will remain closed until further notice due to the COVID-19 pandemic.

Treasurer's Report

Treasurer's Report for 7/31/2020

MEMBERSHIP

We have 90 current members

INCOME AND EXPENDITURES (SUMMARY)

We took in $1965 and spent/transferred $510 We have $22290 in the bank $22 in checks and $655 in cash, totaling $22,968 as of 7/31/2020

INCOME

AL 2020	$67.50
calendar 2020	$150.00
Donation	$348.88
Membership	$459.00
Merch	$84.00
Renewal	$831.00

EXPENSES

Calendar Shipping Cost	30.35
PO Box 2020	92.00
Snack Reimbursement	70.00
Snack Supplies	2.12
Speaker Expense, Dinner	54.23
Speaker Expense, Driving	261.00

GLAAC REPORT 7/31/2020

Beginning Balance: $2,237

INCOME

$788

EXPENSES

No activity

Ending Balance: $3,025

Mark Jakubisin
Treasurer

Astronomical Events for August 2020

Add one hour for Daylight Savings Time
Source:
http://www.astropixels.com/ephemeris/astrocal/astrocal2020est.html

Day	EST (h:m)	Event
01	15:14	Mercury 6.6°S of Pollux
01	18:30	Jupiter 1.5°N of Moon
02	08:17	Saturn 2.3°N of Moon
03	07:00	Mars at Perihelion
03	10:59	FULL MOON
05	23:00	Mercury at Perihelion
09	02:57	Mars 0.8°N of Moon: Occn.
09	08:51	Moon at Apogee: 404658 km
11	11:45	LAST QUARTER MOON
12	08	Perseid Meteor Shower
12	20:00	Venus at Greatest Elong: 45.8°W
13	05:06	Aldebaran 4.0°S of Moon
14	14:22	Moon at Ascending Node
15	08:01	Venus 4.0°S of Moon
16	14:10	Pollux 4.5°N of Moon
17	10:00	Mercury at Superior Conjunction
18	21:41	NEW MOON
21	05:59	Moon at Perigee: 363513 km
25	12:58	FIRST QUARTER MOON
25	23:04	Antares 6.2°S of Moon
27	06:52	Moon at Descending Node
28	20:33	Jupiter 1.4°N of Moon
29	11:40	Saturn 2.2°N of Moon

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.

Outreach Report

Member Spotlight

Dale Partin reports: Twice in the last week I've taken newbies up north in the thumb where it's pretty dark to see the comet. Plus, I used my telescope to show them many other things. The first of those trips had three people plus me, the second trip just one person and me. If the weather is halfway decent, I'll be taking another group of three up there too.

If you are giving presentations or doing other astronomy outreach, *please let me know!* Use this link to send me a quick email report.

Astronomy at the Beach 2020 Planning

For the public's safety, the GLAAC board has decided to host the 2020 Astronomy at the Beach event as an online / virtual event this year. The GLAAC board is looking for suggestions for pre-recorded presentations, as well as volunteers to give live presentations online.

Next AATB Planning Meeting: Thursday August 13 2020, at 7:00PM - ***Everyone is Welcome!***

Online at: https://umich.zoom.us/j/584733345 (Password: 0000)

W.A.S. Calendar Entry: [LINK]

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

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

GLAAC Board Meeting Minutes
July 9, 2020 - ONLINE, 7pm
https://umich.zoom.us/j/584733345

Call to order: 7:06 pm

Online:

- Adrian Bradley - GLAAC President, Lowbrows
- John Wallbank - GLAAC Vice President, Lowbrows
- Jeff Kopmanis - GLAAC Secretary, Lowbrows
- Brian Ottum - GLAAC Communication, Lowbrows
- Mike Ryan - GLAAC Board, Ford
- Bob Trembley - WAS
- Mark Sortzi - 7-Ponds
- Jeffrey Stark - Longway Planetarium, Flint, MI
- Tim Campbell - FAAS
- Mark Jeffrey - Oakland Astronomy Club
- Paulette Epstein - Michigan Science Center

Old Business:

Incorporation status - John
Directorship, not a Membership
Board of Directors make decisions, shares liability
Membership makes decisions, shares liability
Proposal for Vice President (John Wallbank) to sign incorporation documentation in physical absence of President (Adrian Bradley) and Secretary (Jeff Kopmanis). John Wallbank proposed; Adrian Bradley seconds the motion. Passed unanimously.
Non-profit organization is Michigan designation. 501c3 is a Federal designation and can accept tax-free donations
Event discussion:
Live Events
Google Calendar for scheduling
Stagger events

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(Continued from page 21)

Don't reinvent the wheel - see how others have conquered the live spectrum
Keep things short (<1hr), allow for jumping around by audience
Keep things moving, shoot for 10-15 minute segments
Kid-friendly, with kid attention spans
Special kid-only events
"Ask the Astronomer" Sessions - teachers (Norb, Doug Bock, David Levy, Brother Guy)
Call upon past speakers to participate in a live discussion
Kids: be careful about video broadcasting kids - ask for parental involvement
Security concerns
Tim Campbell - Spitz Planetarium
https://kahoot.it Trivia game online
Paulette - presentations, demos, etc. MiSciCtr
Jeff Stark - History of science talks, etc
Orange Can Astronomy Night Out - Jeff Kopmanis
Brian Ottum's NM Odyssey
Paulette can help tailor a presentation for kids
Rate presentations for kids, intermediate, advanced
Need contingency plans for unknowns
Have contact numbers for help or alternate programs
BE PREPARED
Have stories about whatever you're looking at through your scope
By August 13: List of events
categorized to age and/or experience level
Each presenter should have a moderator/assistant/co-host to control muting/unmuting, etc.

Pre-recorded
Past club presentations

Technical Issues
Red Hat Summit - thousands worldwide
Zoom runs on Oracle Cloud for speed, AWS for backup
Tim Campbell - diffraction grading setup
https://www.amazon.com/gp/product/B007G0MW2Q
Presenter upload speed is an issue
Virtual prizes? (Tim Campbell). MISciCenter tickets for prizes
Taking requests via the website

Brian: I'm committed to do:
Publicize the event via our email list.
Help Bob to promote via social media.
Do a live telescope demonstration 9:30pm-midnight both nights.

Motion to adjourn by AB, seconded by JW. Approved by unanimous vote.
Meeting Adjourned at 9:15pm.

JULY TASK LIST

JK: Get program of events compiled from clubs during July until next Meeting
JW: Incorporation and Bank Account
AB: Check with Comerica about bank account

We had a special AATB planning meeting on July 27th to work on the AATB schedule of events; during the meeting, I emailed both **David Levy** and **Br. Guy** asking them if they'd be interested in presenting during AATB - *they both accepted!* The next day, I asked **Dolores Hill**, of NASA's OSIRIS-REx Asteroid Sample Return Mission and *she accepted!* So, from zero to three guests in a few hours! :)

During September, GLAAC will try to run through technical testing for each presenter, so that we ensure that things come off smoothly on the nights of the event.

If you have presentations, live events or live viewing in mind for AATB, **August 13, 7pm** is the night to join us! The Board/Planning meeting will be a Zoom meeting: https://umich.zoom.us/meeting/584733345

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NOTE: there will be **NO** official in-person event at Island Lake State Park for this year's Astronomy at the Beach event, as GLAAC cannot guarantee the safety of the public nor the presenters in these pandemic conditions. There very well might be some observers out there individually, but they are not part of our planning. AATB 2020 will be an entirely virtual event.

Michigan Dark Sky Update

(Edited from email from Sally Oey)

July 21, 7pm: Ann Arbor City Planning Commission reviewed a draft Lighting Ordinance

July 9: Jerry Hasspacher, Heidi Trudell, and Sally Oey met with Adam Dalton at IDA to put out a feeler on nominating Belle Isle in Detroit an Urban Night Sky Place. Dalton was overall supportive, and noted that in spite of the many existing lights on Belle Isle, those outside the park jurisdiction, but still on the island, would not be held to account -- making the project much more feasible! Belle Isle would be by far the largest and most ambitious UNSP application received to date, which was considered a big plus. So we're good to go, and hoping to meet with Michigan DNR again soon. Jerry has done a ton of legwork, inventorying all the lights on the island.

Nicholas Poggioli is working with Karie Slavik to expand Biological Station programming to the dual degree program in SEAS and Ross School of Business, hopefully to include dark skies issues. Nicholas will also be light metering to gather longitudinal data for light pollution in SE Michigan. Please contact him if interested in helping: npoggioli@outlook.com

A2 Ward 5 residents, FYI: Erica Briggs, who is running for City Council on August 4, has been an integral member of the Lighting Ordinance Working Group.

Scio Township: Elaine Brock reports that the county will soon install a roundabout at Miller and Wagner that will have four floodlights. Please contact her if you share her concerns about wildlife and light pollution (brockelaine@gmail.com).

Marquette: Mary Adams shares an article from The Mining Journal about a years-long initiative by the Marquette Astronomical Society to get part of Presque Isle designated as an IDA Dark Sky Park. Unfortunately this effort seems to have stalled or died. Is anyone up for helping them reboot?

Reminder: Please review our Wish List of Action Items. If you can help move forward any items, please add your name and let us know, including adding new items. There's tons to do!

New people: Welcome! Please enter your name and info on the private Google page Dark Sky Group Members so we can see who we are and how best to leverage what we bring to the effort. Please browse and feel free to use the info in our Google docs, and to add to them.

-Bob Trembley

Meeting Minutes

CRANBROOK BOARD MEETING

July 6, 2020

Members present: Diane Hall, Dr. Dale Partin, Riyad Matti, Glenn Wilkins, Jonathan Kade, Bob Trembley and Dale Thieme. Diane called the meeting to order at 6:40

Old Business

Dale Partin reported that presenters have been booked for 2020 but are being accepted for next year. The proposal for "panel discussions" offers an interesting possibility. (See E-mail from Bob Trembley dated July 6). Format proposals and suggestions will be considered.

Riyad visited the observatory on June 17 and reported that it is good shape with no leaks. The Park cautioned that they are now closing the gate at dusk due to the presence of unauthorized campers.

Jonathan reported that the WASP is up and contains the minutes and treasury reports for June. He continues to seek suggestions for the 2019 Year in Review report.

Mark will visit our PO box this week. The new GLAAC check has been issued.

Glenn reported that no progress has been made toward updating beg letter addresses for requests that were returned last year. The investigation will commence this month. Gerry Voorheis has E-mailed software to me to assist with mail formatting and addressing. It was noted that virtual meetings have made it possible to take minutes even when the secretary is out-of-state .

New Business

Annual picnic – The Park is OK with this meeting on August 22 but all agree that attendance should be limited to astronomy club members and immediate families. Questions were raised about food contributions and distribution in light of Covid 19 concerns. It was also agreed that eye pieces should not be shared due to health risks. Alternatives were discussed.

Annual banquet – All agreed that the Ukrainian Cultural Center would be a good venue. However, the availability and feasibility of this approach is still TBD. A virtual back-up plan is needed, including raffle options. Bob reported that Brother Guy Consolmagno of the Vatican Observatory Foundation has formally indicated that he would be pleased and honored to give a virtual presentation. Jonathan reported that the National Film Board of Canada informed him that the Chasing the Eclipse documentary is under development, but it is not certain that the project will be complete in time to support our banquet.

Diane reported that the Sturgeon Full Moon event in Port Huron is looking for a volunteer willing to make a presentation on August 2. The Board was unwilling to accept the current risks related to this outreach event; members are of course free to attend as private individuals not representing the club.

Mark inquired if we should seriously consider the wisdom of making virtual presentations a permanent part of our options, even if just an alternative to in-person meetings? This approach may attract younger members, or those who find it difficult to attend. Others noted the need to resume in-person meetings as soon as feasible. All agreed that we should maintain our current good relationships with Cranbrook and the Macomb Community College .

CRANBROOK GENERAL MEETING

Diane called this virtual meeting to order at 7:30. 15 members continued to participate on WebEx and an additional 29 joined on You Tube.

In the News/Sky was presented by Dale Thieme

Subjects included:

LIGO recordings of the recent 23 solar mass black hole merger with a 2.6 SM neutron star continues to make news and spark debate.

The Sophie spectroscope (ground based) has detected exo-planets

The higher-than-expected levels of iron and titanium in our Moon have caused scientists to reconsider exactly how the Moon was formed.

The list of countries participating in Mars exploration now includes a joint venture between the UAE & Japan.

Current viewing recommendations include Comet Neowise which is now visible near dawn until after July 11 when it will become an evening object. Binoculars are recommended for now to locate it. Jupiter & Saturn make a nice pair now

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at opposition in July .

Officer/Viewing reports

Dale reported that Jeff McCloud will explain why the "Moon is not boring" on Aug. 3. Discussion Meetings are ongoing.

Bob Trembly reported GLAAC minutes are in the WASP.

Jonathan shared Gary Ross' colorful, detailed written reports on the July 4 Lunar penumbral eclipse, and supplemental Jupiter observations.

Mark reported 84 members and a bank balance of $22,913 at the end of June. Applications for memberships appear to have stalled during June. Recommended Mars observing now as it is possible to even see it during the day.

Adrian Bradley reported interesting prominences on the sun lately that can be enhanced with proper filtering.

Doug Bock made a presentation to Seven Ponds for 15 -18 people in June. He also shared excellent recent photos/composites with us of the Hercules Super Cluster of galaxies, Delta Lyra, Lagoon & Triffid nebulas, the Elephant's trunk, Veil nebula as well as M 3, 14, 16, 17, 27 & 92 .

Break – 8:16 to 8:30

Main Event – This was the long-awaited "debate" about the wisdom/capability of sending humans to Mars in the relatively near future. Jon Blum acted as moderator wearing his appropriate referee shirt. Those supporting the proposal were Dr. Dale Partin and Jim Shedlowsky. Those opposing were Ken Bertin and Bob Trembley.

The debate, as expected, was very spirited but no furniture was thrown since all participants were virtual. Persuasive arguments were made but many viewers found themselves unable to align completely with either team. However, the Yes team even had to admit that humans were not ready at this time to take the risk, even if the technical problems could be reduced to a safe level. The No team seemed to understand the irrepressible nature of the human spirit and the probability that it will happen sooner than common sense might lead us to believe !

The meeting was closed at 10:00

MACOMB "VIRTUAL" MEETING

July 16, 2020

Diane Hall called this meeting to order at 7:31 PM for 15 viewers on You Tube and 21 participants on Webex

IN-THE-NEWS/IN-THE-SKY presented by Dale Partin
News highlights included:

New research suggests that the age of the universe may be somewhat less than the current acceptable age of 13.8 billion years.

A new report from Harvard proposes that the long-sought planet 9 may be a primeval black hole and recommends that the new LSST scope be used to look for a black hole "signature".

The Hope Mars rover, from the UAE, is expected to be launched shortly on top of a Japanese rocket. This marks the 5th country to join the red planet club.

The James Webb space telescope launch has been delayed (again) to October 21, 2021. Since the original 1996 proposal, costs have risen from $0.5 billion to $9.6 billion!

Current interesting **objects** in the sky include:

The close encounters with Jupiter, Saturn & Mars continue to impress. However, the new main target is comet Neowise, named after the observatory that discovered it. It is transitioning from pre-dawn to early evening close to the horizon below the Big Dipper. It sports split dust and ion tails. Binoculars recommended .

OFFICER REPORTS – Diane

Diane once again thanked all those working so hard to keep amateur astronomy alive despite the loss of in-person meetings and normal summer outdoor events.

Diane reported for the Secretary & the Treasurer that complete June reports can be found in the WASP

Bob Trembley reported that a meeting will be held in Ann Arbor to discuss potential outside lighting changes to decrease light pollution. Also, that Belle Isle is being considered for development as a dark sky site. Ken Bertin reported that he recently made virtual presentations to the Low Brows and the Oakland club. Ken is preparing a written report regarding the estimated costs for various approaches to Mars exploration. Jim Shedlowsky reported that he also presented to the Low Brows. Marty Kunz reported that recent activity has brought optimism that our Sun may become an object of interest again.

Riyad Matti reported the observatory remains in good condition although wasps have taken up residence and are defending their hive. Action needed before our August picnic. Stargate continues to be closed to evening activities until further notice.

OBSERVING REPORTS

Bill Beers reported that good photographs of Neowise can be made with a simple DSL camera.

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Jonathan Kade noted that great comet viewing and photos can be realized in the bright skies of Dearborn.

Jonathan read the recent written report of Gary Ross regarding his observations of Jupiter and some of the Galilean moons.

Adrian Bradley shared his Neowise photo taken with a wide-angle lens.

David Levy reported that morning apparitions were best and then shared a Roman quote reflecting their belief that comets appeared to mark significant events for Princes.

BREAK – 8:11 for 10 minutes

MAIN PRESENTATION – Dale Partin introduced Jonathan Kade and his presentation of Interstellar Objects I Have (Sort of) Known.

Jonathan opened his talk by defining three different science positions about just where interstellar space begins. He then brought us the latest updates about 'Oumuamua which means Scout or First Distant Messenger in Hawaiian.

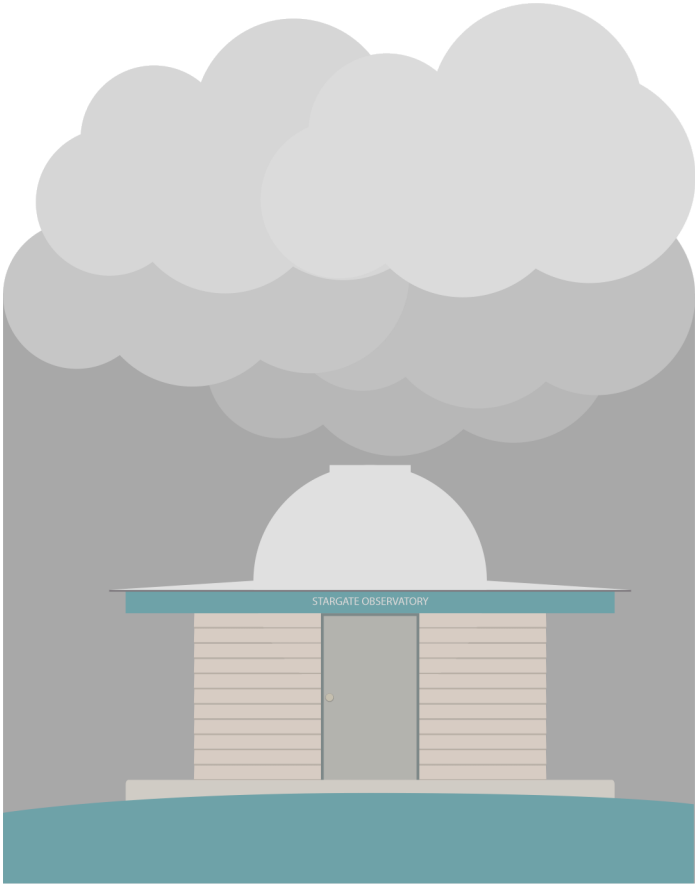
Next was Comet Borisov which was one of many discovered by Germody Borisov, a Russian engineer and scope builder. His observatory is located on land which extends out into the Black Sea. This comet is not well-known and is thought to have originated in the Keiper Belt. It moved at speeds up to 100,000 MPH and emitted a coma of 14 earth diameters!

The Comet Interceptor program was developed in Europe and is expected to be launched in 2028. Three devices will be placed in earth orbit and will be used to intercept interesting new comets for in-depth studies.

Project Lyra is a concept currently being considered by a think tank. Also, an Interstellar Probe has been proposed by John's Hopkins for launch about 2030 and may be capable of catching up with Voyager in 50 years!

Diane closed the meeting at 9:25 to allow prime-time comet viewing.

Glenn Wilkins
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
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/
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
Bill Beers: Sirius Astro Products
Jeff MacLeod: A Life Of Entropy
Bob Trembley: Balrog's Lair
Bob Trembley: Vatican Observatory Foundation Blog

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

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Summer Triangle Corner: Deneb

David Prosper

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

Deneb is the brightest star in Cygnus the Swan and is positioned next to a striking region of the Milky Way, almost as a guidepost. The ancient Chinese tale of the Cowherd (Niulang) and the Weaver Girl (Zhinü) - represented by the stars Altair and Vega - also features Deneb. In this tale the two lovers are cast apart to either side of the Milky Way, but once a year a magical bridge made of helpful magpies – marked by Deneb – allows the lovers to meet. Deneb has inspired many tales since and is a staple setting of many science fiction stories, including several notable episodes of *Star Trek.*

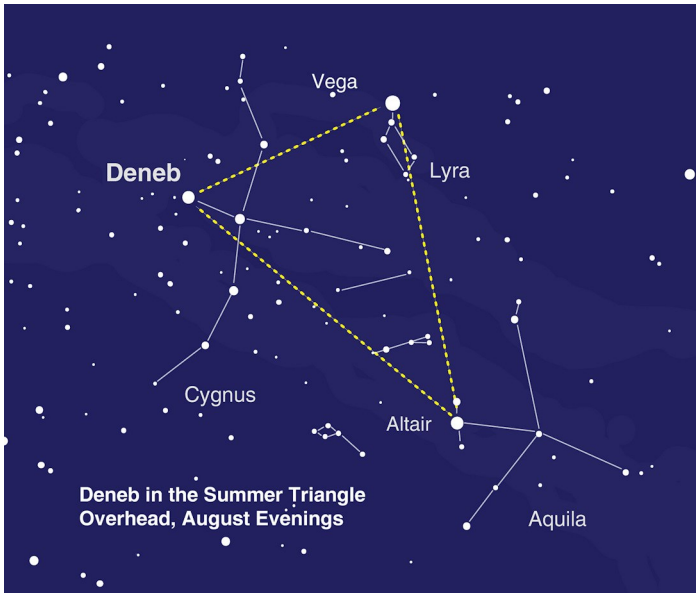
Astronomers have learned quite a bit about this star in recent years, though much is still not fully understood – in part because of its intense brightness. The distance to Deneb from our Sun was measured by the ESA's Hipparcos mission and estimated to be about 2,600 light years. Later analysis of the same data suggested Deneb may be much closer: about 1,500 light years away. However, the follow-up mission to Hipparcos, Gaia, is unable to make distance measurements to this star! Deneb, along with a handful of other especially brilliant stars, is too bright to be accurately measured by the satellite's ultra-sensitive instruments.

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

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

Long exposure shot of Deneb (brightest star, near center) in its richly populated Milky Way neighborhood. Photo credit: Flickr user jpstanley. Source: https://www.flickr.com/photos/jpstanley/1562619922 License: https://creativecommons.org/licenses/by-nc-sa/2.0/

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



Last Word

-Jonathan Kade, Publisher

Star Partying On Your Own

From April to October is the peak season for star parties here in Michigan. It's not looking too promising for anything resembling a normal large star party this year. The Great Lakes Star Gaze is not cancelled yet, but if it goes ahead it will be very different than normal. Astronomy at the Beach will be purely virtual this year. We're hoping to have a great, safe picnic on August 22 where we can observe alone together, but to a certain extent we will be playing it by ear. For those of us who get a lot of joy from being on a field full of astronomers, it's a hard time. For those of you who have never had the pleasure, I'm sorry, and I hope we get back together next year. I'm going to tell you how I recapture a little of the star party experience on my own.

First off, you need a good, solid base of operations. Any table will do, but you want it to be both sturdy and movable in case you need to adjust your horizon at some point in the night. This style of classic folding picnic table was a fixture at Cadillac West for a number of years, and seems to be generally

beloved among star partiers. You can find more modern tables in this design, including all-metal ones and ones with wood surfaces. The base of operations is what your star party will revolve around, and when set up properly, it will help you last all night. I should note that the seats on these tables are small, better suited for kids than adults. But as far as a stable and multi-surface design for holding your stuff over the course of the night, it's a great start.

So what do you need at your base of operations? Well, first off, obviously, you need your eyepiece case. Whether that's a duffel bag full of eyepiece boxes, a foam-lined metal case, or a beautiful custom Wood Wonders box, keeping all of your eyepieces covered and in one place will help you avoid "dew bankruptcy" (when all of your eyepieces are misty and you can't muster the energy to dry them all off and keep going). Keeping them easily accessible but securely covered when not in use make sure they'll be ready to use when you need them. I usually juggle two or three eyepieces when I'm looking for and observing an object, so those I keep at the telescope, but sometimes you need a different focal length for the job.

Your eyepiece and telescope aren't going to do you much good if you don't have a way to decide what you want to look at and how to find it, so save some room for charts, tablet computers, books, etc. Even if you primarily use apps like SkySafari to see what's up, it can be very helpful to have other references available, especially insightful ones like the Cambridge Deep-Sky Album by Newton and Teece that help you know what to expect to see. While you're probably not going to be doing deep reading at the scope, it can be very useful to have books like Sue French's Celestial Sampler to refer to so you're not racking your brain trying to remember what sounded interesting when you read that column last month...

Next, lighting. Of course, most important is your red flashlight collection. If you have a small electric lantern to spare, you can cover it with red film and leave it on at the lowest setting if it's not too close to where you're observing, to make sure you don't knock stuff over in the night. If you're observing somewhere with wildlife, particularly the kind of wildlife that's black and white and smelly all over - and let's be clear, that's EVERYWHERE in Michigan - it's a good idea to keep a white light flashlight close at hand to see if Flower is nearby. You don't want to discover he's there when you step on him, believe you me. Don't forget your laser pointers (if you're observing with your fellow quarantinees and want to be able to show them where stuff is).

Sometime in the night, whether it's 11 PM or 2 AM, you are probably going to need a little jolt of caffeine or a little snack to keep your energy up so you can keep going. It's a good idea to have a thermos or carafe of your (preferably caffeinated) beverage of choice and something reasonably healthy to snack on. Crackers and other crispy stuff are going to get melted by the dew, so I suggest a Bob Trembley-style

apple slice bowl or something similar. Whatever you do, you want to make sure it's physically impossible to empty the carafe into your eyepiece case. This is another advantage of the folding picnic table design - eyepieces and charts go up top, beverages go below, gravity is your friend.

Finally, electronics. You don't want to be looking at screens, so we'll keep it minimal. First, you want a hair dryer to take care of any excess dew that did make it onto your finder or eyepieces in case things get too sodden. Even with a dew heater, Michigan's 80% humidity can be tough to cope with. I saved the most important thing for last: some kind of music player. Whether it's a meditation device like the Buddha Box, some Enya to relax you, ambient music like Shearwater's Quarantine Music series (one track of which was named after a WAS presentation!), or some energetic (but I recommend quiet) classic rock or soul, music can help you make it through the inevitable bleariness and back to the eyepiece. Plus, at least in my experience, it makes you feel a little less alone, as well.

-Jonathan

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