



Celebrating Sixty Years of the Warren Astronomical Society



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The W.A.S.P.

The Warren Astronomical Society Publication

Robert Burnham, Jr.



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The WASP



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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.

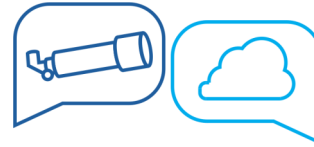
The Warren Astronomical Society Publication (WASP) is the official monthly publication of the Society. Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted in person, via US Mail, or by email (publications@warrenastro.org)

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

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

Snack Volunteer Schedule

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



Discussion Group Meeting

Come discuss astronomy, space news,



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President's Field of View

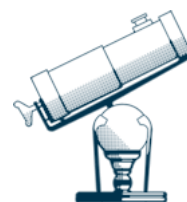
Jonathan and I were engaged in some opportunistic astronomy with our trusty 8" Dob, making use of a sliver of true dark between astronomical twilight and the rise of a gibbous moon. We spent some time on the great globular cluster M5, and I reflected that it'd been only three years since I'd peered into the eyepiece of a telescope large enough to reveal its fine structures and had fallen in love with this object I'd once neglected. Then Jonathan pointed out an asterism I'd never noticed among the modest stars where Serpens, Scorpius, and Ophiuchus mingle, a series of nested triangles, each progressively smaller. The following night, as we spent another brief window of darkness with Messier globulars we'd rarely studied, Jonathan noticed that M9 is accompanied by a pair of buddies from the NGC list, one of them bright enough on its own to make one wonder how old Charles M overlooked it. We managed to fit all three clusters into a single view— a satisfying sight that would be bleached to nothing in metropolitan skies, or would fail to make much of an impression on eyes not trained to truly see in the dark.

The last year and a half have been a time of astronomical intimacy, of dusting off old telescopes that don't have the power of this august society's mighty Big Dob or splendid Kalinowski-Khula refractor, of going off alone on nights where the star parties would've been. I've enjoyed the parade of glori-

ous astrophotos as some of you have honed your craft in the enforced solitude, and meanwhile I've enjoyed the little reminders that there is just so much to see up there that will never make the shortlist of old reliables to get that "wow" reaction at an open house night, objects just a little too faint for the skies over Ray Township or Brighton.

The Board is trying to chart a path back towards Open House nights and Stargate picnics, mindful that while many of us are vaccinated and feeling the draw toward "normal," for people with small children or immunocompromised family members, "normal" isn't here... and for the many who have suffered losses, normal isn't going to happen. As we fumble toward normalcy (tip of the hat to Warren G. Harding), we ask for your patience and kindness. We have more than a few nights ahead of us yet, alone or in twos and threes, with the modest objects only astronomers can really see. Treasure them as they come.

-Diane Hall,
President



Save the Date

Warren Astronomical Society

Annual Picnic

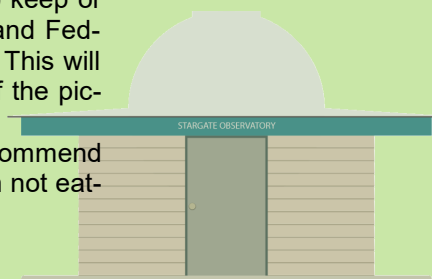
August 28, 2021



Tentatively scheduled, the board may elect to keep or cancel the event based on COVID-19 State and Federal health mandates and recommendations. This will be determined as we get closer to the date of the picnic.

Even though the event is outdoors, we still recommend social distancing, wearing of face masks when not eating, and not sharing eyepieces for safety.

This is a members and immediate family only event. No pets, please.



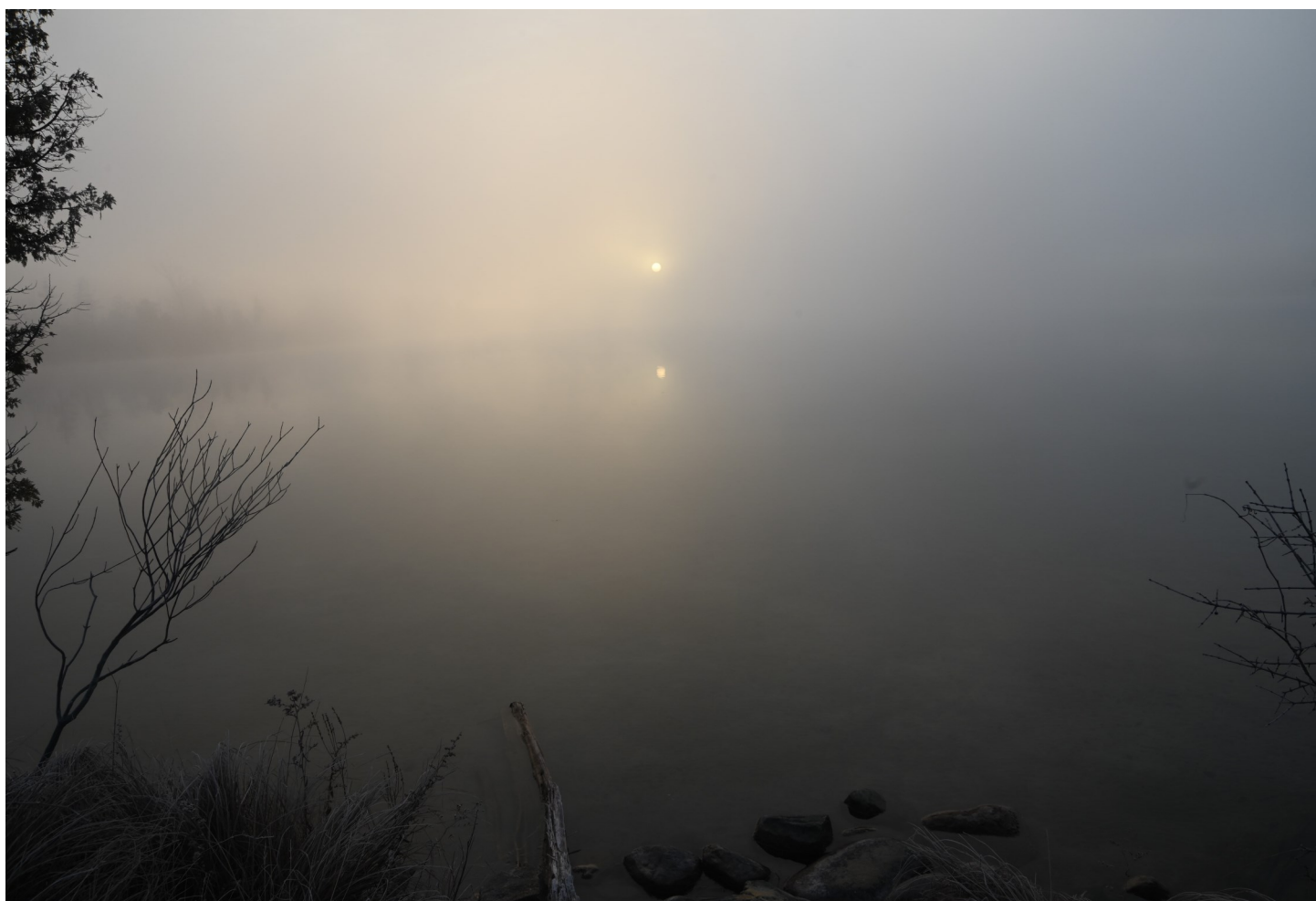


Letters

Letter of Thanks and another photo submission

I certainly wish to thank Adrian and Dale for their time, effort, and willingness to share their wide experience and knowledge so freely in responding to my question in the April edition, and to G. M. Ross' observations and offer of assistance in the May edition. As a token of thanks to them, and the entire Warren Astronomical Society, I humbly submit another reflection shot (taken December 10, 2020) which I have dubbed "My Magically Mysterious Mystical Misty Morning" (AKA "My Two Suns").

-Ray Bosshard



*-My Magically Mysterious Mystical Misty Morning-
Ray Bosshard*

Urban Dictionary for Astronomers

Brad Young, of the Astronomy Club of Tulsa, takes another tongue-in-cheek look at our hobby

Astronomy is a wonderful hobby that attracts a variety of people and they bring or develop slang to describe activities to their “crowd”. You may hear some of these buzzwords at a star party or convention, but not understand quite what they mean. So, I present below a guide, in a format I learned in 5th grade. Slang words are bold and italicized for reference.

WHO

Amateur astronomy endured a schism long ago into the Orthodoxy of **visual astronomers** and the Heresy of **imagers**.

Visual astronomers use their senses in real time actually looking at something. They are known as **The Greatest Generation** and **OGs** (Original Grinders) if they ground their own mirrors. They are rare and should be cherished. Unfortunately, some **imagers** refer to them as **John Henry**, **The Poor**, or **Super Boomers**.

Imagers (shortened to imagers by some) use black magic and devilry to coax fake apparitions transmitted by Moloch. They are also called **Frame Junkies**, **Organ Sellers**, and **John Denver** (“early to rise, early in the sack”).

Of course, these two main groups (**The Living** and the **Undead**) share many archetypes.

Couch surfers - believe the night sky is best enjoyed by watching that YouTube video again with Neil deGrasse Tyson responding to Katy Perry’s question “Is math is related to science?”

Clubbies - make every club meeting... unbearable.

Amazons - to each according to his wishes, from each... nothing. Related to common aperture fever, except they just order more stuff, and never use any of it.

Gearheads - have the cleanest, best aligned, most collimated scope to ever sit in a garage.

Librarians - Have a collection of observing guides that fill a room, but they never go outside and look at the sky at night. Often **couch surfers** and/or **amazons**.



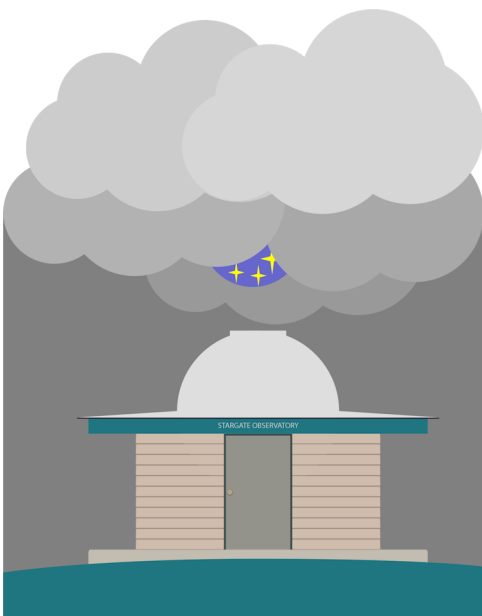
Roid Ragers - Often drive 8 hours to see an asteroid occultation but had the wrong star / time / night etc. Also known as **stoners**.

Itty Bitty Crescent Committee - folks who look for incredibly old or new moons. Often for religious purposes; more often just to brag.

Cloud Chaser - folks who succumb to the treachery of sucker holes, sky monitors, and weather forecasting.

Averted Imagination - visual doppelganger of the imager who believes you process the image until it looks right.

Remote Hogs - usurpers who use someone else's equipment somewhere else to image something. The fact that preparation, processing, cost, skill, and experience required is comparable to other observing methods does not reduce the villainy of these barbarians.



(Continued on page 6)

(Continued from page 5)

WHEN

Astronomers must follow the motion of the sky over the course of the night to observe, and accomplish this using several methods:

Hopheads - insist that Herschel was impure because he made his sister Caroline do all the work and star hop to each target. Also called **Dark Burners** for wasted time hopping.

Pushers - use push-to; also, they push the buttons of both other types as **hopheads** think they still don't learn the sky and **cheaters** think they are stuck in the 20th century.

Cheaters - use DSCs (Digital Sky Cheats) and go-to drives to take the fun out of an 8-hour star hop to Messier 42.

Scope Surfers - walk around until they hear "Oh thank God! After 3 hours of patient star hopping, I have it in my scope!" whereupon they say "Are you sure? Better let ME confirm!"

WHAT

Natural Astronomy is a main **Kingdom of Amateur Astronomy** that includes everything in the universe that is not pollution like all the stuff Elon Musk and his cohorts put up.

Followers of this sect are **HOEs** - Human Object Exclusionary. They consider satellite observers to be **ASSes** - Artificial Satellite Sighters. This phrase is often preceded with the adjective stupid.

Satellite observers themselves are not immune to bias. Those who only track classified birds are **UnCLEs** - Unclassified Exclusionary. The people who categorize them as such are **SJWs** - Satellite Justice Warriors.

And there are:

LEO Losers = ones who only track (i.e., lose) low earth objects

Stoners = only want to get high (objects); although this is more commonly used as a pejorative term for asteroid hunters (see above).

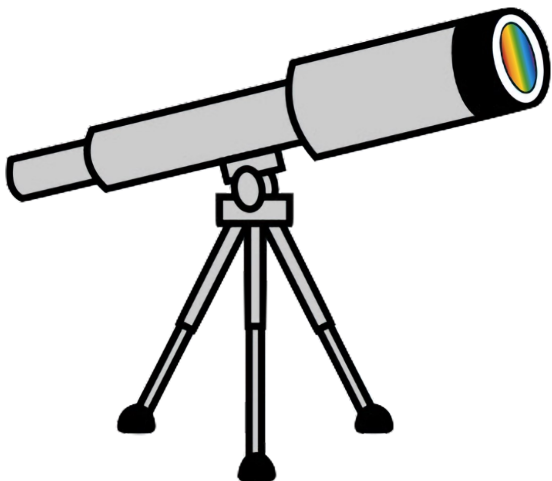
HOW (and HOW \$MUCH???)

OTA - Optical Tube Assembly

A kaleidoscope without the colored chips. There are two (2) kinds:

Reflector - uses a mirror

Refractor - uses a lens



That's it! All of them use one or other! If it has a dish or antenna, it's not optical. If it sounds funny like **Mazda Shootoff** or **Richey - Crikey!** or **Schmidt Casserole**, you can't afford it.

Reflectors are best suited to scaring the crap out of yourself by looking at the mirror in daylight. The refractor's strength lies in making every object look like a pretty little rainbow.

Eyepieces

This is what the public smears and you drop.

Erkles - use at public star parties since you will hear "Did I do that?" all night.

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Holy Hand Grenade - ultra wide 5+ element EPs with 5+ numbers in US\$ price.

Disposable - 0.965" diameter EPs typically made of plastic. Usually found at Walmart and as a replacement for a Holy Hand Grenade in your EP case after a star party.

Pathos - the feeling you get if you ever drop an Ethos EP or must confess to your spouse how much it cost.

Imaging Equipment

Gimcrack and boondoggle used to make us think the imaginers are doing something.

CCD - Cold Cheating Device = main photon capture technology used today by imaginers.

Fudgesicle - the little \$100 guide telescope used to get your \$12,000 mount to track right.

Filters

If you don't have a wheelful you're not a real astronomer. They are found in three main types:

Wideband means it includes so much of the spectrum that the object is lost to light pollution or other interference. You will need to open your wallet wide to afford these.

Narrowband means the pass frequencies are so constricted that you spent \$600 to get a great filter for making imaging flats. Your retirement options will narrow after purchasing these.

Polarizing - used to reduce the glare of the moon while observing it. Or just wear your sunglasses at night... then you won't see everyone laughing at you.

Within the imagining community are specific bands, based on the frequency bands they use:

LGBR Community - Among imagers (already famously open minded), only luminance, green, blue, and red filters are allowed in this inclusive group. But beware! Red can mean Wratten #23A or #25 red, or Cousins, or Johnson, or Eggen. Sometimes it even just means "red". And if you have to ask...

O₃ - used by both visual observers and imagers. Not the OIII (doubly ionized oxygen) filter famous for teasing out detail in planetary nebula, but actual ozone, used as another excuse by the **couch surfers** for why they can't go outside and observe in the foul air.

Hubcaps (portmanteau of *Hubble Captures*) - refers to the palette of wavelengths used for the stunning pictures produced by the Hubble spacecraft. Loved by imagers - when they screw up, they can download free legacy Hubble frames and pass it off as theirs.

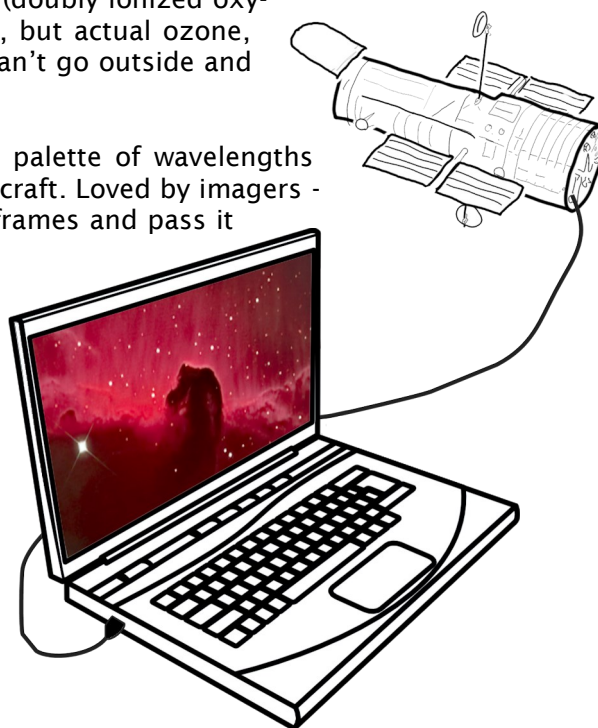
VidKids - Take 10,000 video frames of planets and use artificial intelligence to stack the best 3 for that "just walked up to the eyepiece" look.

Mounts

All equipment needs a mount, even your eyes. And boy, some cost like eyes. The OTA and everything else sit on it. You should not.

Pierce - metal or Sonotube monstrosities that will pierce your bank account.

Try Pod - Ever wondered why mammals and sturdy chairs have FOUR limbs?



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GEMs = German Equatorial Mount and not diamond or emerald jewelry as price would appear to indicate.

Dob Sons - invented by a genius to be a simple, lightweight, cheap and manual mount. So, fools have been adding clock drives, computers, power, stalks and carburetors to it ever since.

WHERE

Some people, like dogs, must let everybody know where they have been.

T-shirt King (or Queen) - wears all kinds of T-shirts from dubious sources like “Tycho Brahe Telescope Party - 1588” and “Baptist Big Bang Believers Club”.

WWW (World Wide Wanker) - has been everywhere, and will tell you all about every minute of it while you try to observe. Usually a **Shadow Junkie** (see below) or just a jerk.

WHY? I MEAN REALLY, WHY??!!

Some say objects need to be observed or imaged for scientific purposes. Or because the kid has a recital tonight or there’s nothing on Netflix.

Comet Chasers - These fine folks are called **Hair Brains**, **Fuzz Ballers**, and **Cat Lovers**.

Comets once struck mortal fear in English kings and the guy who found he had a pre-discovery image he missed. But recently, only Pan Starrs, I. Son, and some chick named Catalina ever discovers them. The only fear nowadays is that this is yet another one that makes the cover of Astronomy and Sky and Telescope and then smacks the sun.

Eclipse chasers - self-explanatory. Called **Shadow Junkies**, **Slim Shady**, and **Johnny Cash** (Ring of Fire). Formerly “known” for liking a Mexican beer, but this is now unseemly.



Dead Heads - live in their RVs and go to every star party from Key West to the Yukon. Often sell trinkets or guide-books to buy gas and Spam.

I hope this helps you understand the slang you hear, hopefully not in reference to you. Or, it may provide ammunition to respond. For further reference, check out “Where Are You on the Amateur Astronomer Spectrum?” in the [February 2020 WASP](#), and other articles at my website: <https://hafsnt.com/index.php/parks-and-barks/>.

-Brad Young

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.

WE WANT YOU

to join the

Astronomical League!



Our [Astronomical League](#) membership list is due at the end of June. [Please let us know immediately](#) if you'd like to join the Astronomical League or renew your membership.

A membership for the whole year (through next June) costs only \$7.50. Membership nets you their quarterly magazine, [The Reflector](#), and participation in their [observing clubs](#) - a great way to encourage yourself to observe. (They even have online leaderboards!)

Beyond these fun programs, you also get the right to attend their [annual convention](#) for a reasonable fee, not to mention full voting rights at the convention.

If you would like to join or renew, and your W.A.S. dues are paid up for 2020, please:

immediately let me know at alcor@warrenastro.org

OR

send a check for \$7.50 to:
Warren Astronomical Society
22712 Nona St.
Dearborn, MI 48124

OR

send \$7.50 via PayPal to treasurer@warrenastro.org with a note that it's for the AL membership.

Thanks!

Jonathan Kade
Astronomical League Coordinator
Warren Astronomical Society

Sample award pins





Observing Reports

7 - 8 May

LESATH -- Could not see optical /"line of sight" companion as delineated on Sinnott POCKET SKY ATLAS. Very low in predawn. 6th mag. star to N.W. in same field invis. (a/k/a Upsilon Sco.)

KAUS BOREALIS -- Same result for "companion" to E. of star, same atlas.

Target of opportunity in early twilight. (a.k.a Lambda Sgr).

Transparency excellent. 7 X 35 binoculars.

COMMENTARY: Even the improved S. horizon @ Veen Obs. insufficient for "deep southern" sky. Most programmed objects not with in reach.

G. M. Ross

9-10 May

UPSILON - 1,2 Scorpii

One of several bright "double" stars in Sco, another "cat's eyes" but requiring magnification. (Very acute observers with naked eye?) A side-by-side when approaching culmination. Westerly component, Upsilon-1 estimated to be a full mag. brighter than 2, and distinctly redder, estim. as "G" or even "K".

Transparency fair. Zeta Sco due S. barely vis.

7 X 35 binoculars.

COMMENTARY: Subsequent investig. = estimates difficult in heavy extinction.

1 and 2 are same spectral class, "B". More over ~ equal mag. 3.1 to 3.6 per ATLAS CATALOGUE by A. Becvar. OBS. HANDBOOK (2018): Upsilon - 1 is ecl. variable 2.9-3.2, period 1.4 d.

G. M. Ross

10 - 11 May

UPSILON 1, 2 Sco -- (reprise) Colour discrepancy prev. reported gone, but the listed diff. in magnitudes again seems not to conform to visual impression. Since both components very close, not from atmospheric extinction.

ZETA 1, 2 Sco -- Another Scorpius "cat's eyes". Both components easily vis. 4.9 and 3.8 respectively. (ATLAS CAT., Becvar 1964) Not vis is 3rd component of Zeta complex per Sinnott POCKET ATLAS. Between A and B is ~ 5th mag. "field" object. Zeta-2 seems reddish, in keeping w/ K5 classification. Probably atmos. effect from approx. -42 deg. Dec.

N.G.C. 6231 Sco -- Immed. N. of Zeta. Not vis.

Cr 316 Sco -- Easy in averted vision and large as depicted on Sinnott.

Ragged, with "sides" and shoots. Only one star clearly visible @ "four-of-the-clock", not likely a

cluster member @ 5th mag. Complex of Colinder, N.G.C. and above asterism prob. stunning from better longitude.

SARGAS -- 1.9 @ -43 Dec. (2018) Very dim with none of 3 "companion" stars to E. visible, brightest ~ mag. 5. Theta Sco ruddy, not in keeping with F1 spectral classif.

IOTA -2,1 Sco -- Brightest component 3.0, both easily visible, but neither of the two 6th mag. stars on either side of Iota-1. Another "cat's eyes" pair.

KAPPA Sco -- 2.4 mag. @ -39 Dec. None of the 2-3 "companions" around star vis.

LESATH -- (reprise) The "B" star to S.W., 6th mag. easy /no challenge given previous obs'n.

KAUS BOREALIS Sgr -- (reprise) Two stars making asterism, 6th & 7th mag. easily vis. Obliterated in previous obs'n by early twilight. No real test: far north in constellation.

M 69 Sgr -- Not visible. Mag. 7.6, size 7.1 arc-min. "small, poor globular cluster". (Dyer, OBS. HAND.)

M 70 Sgr -- Ditto. mag 8.0 "small globular" (supra).

Transparency excellent, vastly improved from prev. by N.W. flow.

7 X 35 Binoculars. Not multi-coated. Not gyro stabilised. No "auto" focus. No (useless) "red dot" finder nor laser pointer.

G. M. Ross

11 - 12 May S.E. Kent County

Zeta -1,2 Scorpii (reprise) -- Fine triple unobservable in binoculars @ 43 N. lat. Very symmetrical with 3rd member in between pointing S.

N.G.C. 6231 Scorpii (reprise) -- Open cl. Not vis. even with telescope. From inspection of field edition of ATLAS OF THE HEAVENS, contains modestly bright stars, 6 - 7 mag., a mystery.

Cr 316/ a.k.a. H 12 -- Open cluster depicted differently between ATLAS, supra, and Sinnott's POCKET ATLAS. Newer data likely. Large ragged spray of stars with hint of a undifferentiated stellar cloud. 6231 immediately below 316. Misidentification possible but unlikely.

N.G.C. 1622 Scorpii -- Small open cluster not visible just E. of Eta.

Theta Sco (reprise) -- All four "companions" visible to east, if three very faintly, approx. 7-7.5 mag.

Iota-1 Sco (reprise) -- Two faint "companions" making a "triple" (or quad.) of the Iotas.

Kappa Sco (reprise) -- Very faint Galaxy line-of-sight "companions" making triple or quadruple aster-

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ism.

Delta Lupi -- Attractive "double" with bright companion ~ Position Angle ~180 deg. + very close var.

star GG Lupi, appears slightly ruddy. Not depicted var. on ATLAS of HEAV. ~2 mag. range?

Gamma Lupi -- Well past upper culmination. Dull appearing. Double but not seen. Both components 3.5, "similar spectra" 1.0" apart (OBS. HAND, 2018)

Transparency good (Zenith star)

5 - cm. refractor @ 22X / 45X

G. M. Ross

12 - 13 May

Gamma Lupi (reprise) -- Three close, scattered "companions" now vis. Attempt to split bona fide double system failed. See prior entry.

Beta Lupi/ Kappa Cen -- Stunning sight @ low power, "up and down" asterism.

6th mag. "companion" ~ 90 degree Position Angle to Beta Lup easy.

Kaus Australis Sagittarii -- Mag 1.8. Could not split. Depicted double by Sinnott but no reference thereto, 2018 OBS. HANDBOOK. (comment: "[shell?]" }. Not shown double on ATLAS OF HEAV. but plots ~ 7th magnitude star superimposed on Epsilon. Confusing: not recall any bright star next to Kaus/ Epsilon. 10 degrees from Galactic centre.

N.G.C. 6723 Sgr -- Globular cl. Very faint, req. averted vision and sustained sweeping. Small.

Gamma Coronae Australis -- Could not split. ATLAS CATALOGUE (1964): 2.1 arc-sec. separation of 5th mags. "A" - "B". Telescope insufficient.

Transparency good

5 - cm refractor, 22X & 45X

G. M. Ross

13 -14 May

Mercury -- Alerted prev. evening from observation by "Handsome Joe" McBride:

Mercury as bright as Vega. (0.0 mag.) Related the planet was incredibly bright in dusk, along with very close passage of ~ 30-31 hr. crescent Moon.

As 4th Greatest Astrophotographer in Michigan, McB. made picture thereof.

2nd evening confirmed he was correct re brilliant. Have NEVER seen Mercury that bright! Consider intrinsic dark albedo only 0.11, like the Moon. 0 magnitude seemed under-estimate. Blazing silver. Easier to find in binoculars than crescent Moon.

GG Lupi -- Var. star immediately S.W. of Delta Lupi. On ATLAS OF THE HEAVENS not depicted as variable, but correct on POCKET ATLAS (2015). Obs'd

CORRECTION, issued 16 May

Previous report in serious error! Seen in evening twilight: VENUS, not Mercury, hence impression the planet was too bright, well above 0.0.

"Handsome Joe" McBride admitted mistake, not checked for accuracy by this Observer.

likely near bottom of amplitude ~ mag. 7 (?) As before, GG appears "dull" or dusky.

No attempt to estim. brightness, an over-sight.

Psi Centauri -- Easy to locate E. of Menkent, mag. 2.1 Initially recorded in field as double star in-correctly plotted as single. This first impression was ERROR.

k and Delta Lupi -- impressions of both stars double. Confusion! ERROR.

N.G.C. 6231 Scorpii (reprise) -- Prior observation in ERROR.

Misidentification. 6231 is much easier to see immed. N. of Zeta-1, 2.

Collinder 316 (a.k.a. H 12) is the true challenge: large faint open cluster to north marked by bright incidental field stars incl.V861 Scorpii. Star plotted as constant on ATLAS, supra. By contrast small & bright 6231 resembles Trapezium in the M 42 /43 complex, a quadrangle of close stars surrounded by (apparent) nebula.

N.G.C. 6242 Sco -- Open cl. due north of Cr 316. Not visible.

Gamma Coronae Australis (reprise) -- At first blush this closely matched double of 5th mag. was cleanly divided. Per ATLAS CATALOGUE: 2.7 arc-sec (1943). This impression was ERROR. Attempt to split @ higher power, unsuccessful.

Transparency good. Seeing good.

8 X 30 binoculars & 5-cm. f /11 refractor @ 22X

COMMENTARY: Confusing, wrong observations due to the eye-piece. Defective 24.5 mm Kellner.

COMMENTARY In re Gamma Coronae Australis:

The separation of this double was old datum when ATLAS CATALOGUE (Becvar) was published in 1964. Triangulation information is valuable: See much more recent CAMBRIDGE atlas (Tirion). Mags. the same at 5th, but the sep. is 1.3 arc-sec. Probably a challenge with 10.2 cm. refractor @ Veen Obs. Gamma has 120 year mutual revolution.

G. M. Ross

25 - 26 May

Lunar eclipse. Totally cloudy out here as observed during early morning business on front lawn. Rain later.

(Continued on page 12)

(Continued from page 11)

From Martin Mill, San Diego: mostly cloudy, and even during 14 min. totality the N. limb of Moon remained bright in binoculars.

G. M. Ross

29-30 May

Venus/ Mercury conjunction

Attempted low magnification of very close approach -- ~ 20 arc-min -- taking place @ 06 hr. U.T. on 29th, so not visible from eastern N. America. Obs'n began after sunset, 29th, from site w/o "sea" horizon, estimated tree line 2 deg. above. Venus easily acquired, high in W.N.W. -3.9 magnitude. Mercury = +2.3 "fully 6 mag. fainter than Venus". (OBS. HAND. 2021, p. 106). As +sky darkened Mercury did not appear until -- very close to tree line, a faint "star", under scrutiny for less than three minutes. Observer deemed effort a success w/ serious odds. Obs'n ceased before nautical twilight.

Eventual doubts: Why was the "winged" planet so far BELOW Venus less than 24 h. of a close conjunction? Sighting could not be a planet. Next day ATLAS ECLIPTICALIS (1972) was examined. Hypothesis: Al-Debaran, mag. 1.5, only "bright" star in said direction. Consulted with "Handsome Joe" McBride who informed Alpha Tau was below the Sun! -- not vis. in dusk. Nath, at tip of the Bull's horn, far too faint for twilight. He suggested Betelgeuse @ +/-0.45 magnitude (vis.), but

Alpha Ori would be very far to left, not directly under Venus -- and below horizon. McB. repaired to planetarium program to find Mercury between and "down" from horns of the Bull. Conclusion: very slow moving aeroplane observed at extremely low angle of sight.

Transparency excellent.

1960's - '70's 7 X 35 mm. binoculars on surveyor's tripod, not gyro-stabilised. Not multi-coated nor auto-focus.

G. M. Ross

30 - 31 May

Mercury-Venus post-conjunction

Determined meeting at boundary of Lowell/ Cascade Townships, Kent County.

This Observer + "Little Dave" DeRemeau and "Handsome Joe" McBride. Attempt to salvage from unfavourable weather and previous attempts. But alto-cumulus gradually approaching from W. after Sun's set. Acquired Venus w/o trouble, but the twilight still too bright for Mercury now below 2.0 approaching infer. conj. McB opined another 20 min. might have been sufficient.

Transparency fair.

7 X 50 binoculars, 5-cm. f/ 11 refractor.

G. M. Ross



Moonrise, Waxing Gibbous.

Photo by Adrian Bradley

Focus on Macomb Community College

Astrophotography in the City

By Nicholas Bradley

Nick is a student who enjoys astrophotography. His telescope and examples of photographs he has taken are shown below.

Nick is currently a student at Macomb Community College. Beginning in the Winter 2021 semester he plans to study cybersecu-



rity. Below you will see a couple of images that Nick took from his driveway of the Rosette and Heart Nebulas using the telescope pictured left. He's been a lover of astronomy ever since he was a kid and has since acquired a deep sky astronomy set up that he uses whenever he can. See more of his work on Instagram @highonspcx. His equipment includes a Meade 70mm F/5 Quadruplet Astrograph on a Orion Sirius goto equatorial mount and a Zwo Asi 533Mc-Pro cooled OSC camera.

Nick says, "I want to keep astronomy as a hobby since I don't want to look up at the stars and be reminded of work."

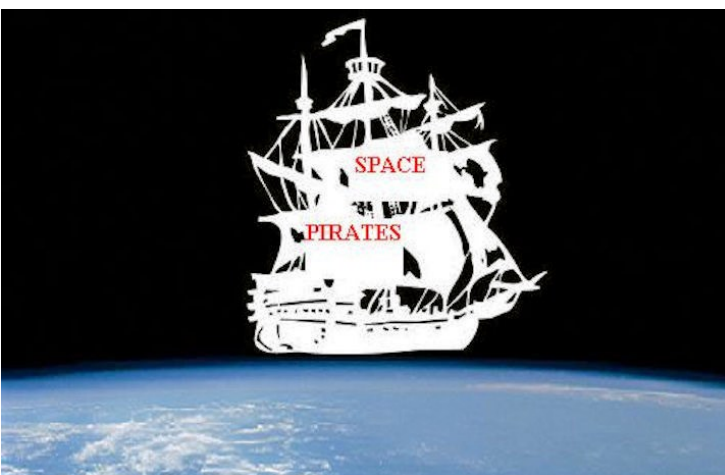
Originally published as: Bradley, N. (2021, February 13). Student Highlights. *Helium Flash a Macomb Community College Astronomy Newsletter*, Issue 2, 6.



Rosette Nebula. Six hours of narrowband data on 11/23/2020
Processed with Pixinsight and Photoshop



Heart Nebula, similar conditions.



Space Pirate Radio

Tune in to Captains Marty Kunz and Diane Hall for live radio
Wednesday nights at 9:00 pm ET on
Astronomy.fm



**PlaneWave Instruments, in partnership with the Institute for Student
Astronomical Research, is excited to offer an opportunity for area
students and instructors to do real scientific double-star research**

Course starts on June 22nd

8 weeks of classes and team meetings

Produce a scientific paper and get it published

Amazing addition to resumes and college/job applications

No experience required

Course cost: \$350.00

Scholarships available through the Lenawee County Education Foundation!

Contact <https://www.in4star.org/doublestar> for details or to sign-up!



M51 - Whirlpool Galaxy



Image by Dale Hollenbaugh

Technical:

Imaging telescope: Stellarvue SVX080T-3SV

Imaging camera: ZWO ASI2600MC Pro

Mount: Celestron CGX-L

Guiding telescope: ZWO Off Axis Guider

Guiding camera: ZWO ASI174MM Mini

Focal reducer: Stellarvue SFFX-1 Field Flatteners

Software: Topaz Labs DeNoise AI · Aries Productions Astro Pixel Processor (APP) · Adobe Photoshop CC 2020 · PixInsight

Filters: Optolong Clear Focusing 2"

Accessory: ZWO EAF Electronic Auto Focuser ·

ASlair Pro · ZWO M42 Filter Drawer

Date: May 14, 2021

Frames: Optolong Clear Focusing 2": 30x600" (5h)
(gain: 100.00) -20C bin 1x1

Integration: 5h

Bortle Dark-Sky Scale: 5.00

RA center: 13h 29' 50"

DEC center: +47° 11' 55"

Pixel scale: 1.547 arcsec/pixel

Orientation: -75.790 degrees

Field radius: 1.209 degrees

Data source: Backyard

M106



Image by Dale Hollenbaugh

Technical

Imaging telescope: Stellarvue SVX080T-3SV

Imaging cameras: ZWO ASI2600MC Pro

Mounts: Celestron CGX-L

Guiding telescopes or lenses: ZWO Off Axis Guider

Guiding cameras: ZWO ASI174MM Mini

Focal reducers: Stellarvue SFFX-1 Field Flatteners

Software: Topaz Labs DeNoise AI · Aries Productions Astro Pixel Processor (APP) · Adobe Photoshop CC 2020 · PixInsight

Filters: Optolong Clear Focusing 2"

Accessory: ZWO EAF Electronic Auto Focuser ·

ASlair Pro · ZWO M42 Filter Drawer

Dates: May 12, 2021

Frames: Optolong Clear Focusing 2": 30x600" (5h)
(gain: 100.00) -20C bin 1x1
Integration: 5h

Bortle Dark-Sky Scale: 5.00

RA center: 12h 18' 50"

DEC center: +47° 17' 58"

Pixel scale: 1.547 arcsec/pixel

Orientation: 103.992 degrees

Field radius: 1.016 degrees

Nightscapes

Right and below: The same beach scene showing just what kind of color palette you can get with a night sky image using the light of the full moon.

For the moon itself, you can tell it is truly a waning Gibbous because of the detail in the upper right limb, which has begun falling into shadow.



Images by Adrian Bradley

And, for those who want to see what that bright shiny thing was in the above images, here it is, taken on the full moon night.



The View From C.W. Sirius Observatory

Omega Centauri

Back in May, I had the pleasure of once again attending the Texas Star Party (this year's event was officially called the WesTex Star Party due to covid). I took along all of my imaging equipment so I could experience all of the southern beauties that we can't see from Michigan. One of the main attractions being at this southern location, 30 degrees latitude, is the giant globular cluster Omega Centauri. This cluster, located in the constellation Centaurus, is 17,000 light-years away from earth. It is said to contain 10 million stars, and is thought to actually be the central core remnant of a disrupted dwarf galaxy. Also known as NGC 5139, Omega Centauri is 150 light-years in diameter making it the largest globular cluster in the Milky Way. Edmund Halley was the first to discover Omega in 1677 listing it as a non-stellar object. The center of

Omega is so crowded that the stars are estimated to be only .1 light-years away from each other. Can you imagine flying your space craft through Omega Centauri!

A 2008 study presented evidence for an intermediate-mass black hole at the center of Omega Centauri, based on observations made by the Hubble Space Telescope and Gemini Observatory on Cerro Pachon in Chile, adding to the speculation of Omega Centauri once being a dwarf galaxy.

Up here from our northern latitudes, our favorite globular is Messier 13. I always wanted to see how much bigger Omega was than M13. So I imaged M13 from Texas also using the same telescope and image scale. I then pasted M13 alongside of the Omega image. You can see from the photo the huge size difference.



Omega Centauri

(Continued on page 19)

(Continued from page 18)

If you ever get a chance to visit some southern locations, the Winter Star Party in Florida or the Texas star party for example, be sure to find a telescope, any size, and take a view of this beauty. A larger

scope 10" or bigger, will simply amaze you. Oh, I also recommend every astronomer attend the Texas Star Party once in their life for an incredibly dark sky experience.



M13 and Omega Centauri comparison



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: BEZOLL@AOL.COM





On May 22, 2021 we had a virtual open house using the Northern Cross Observatory.

At one point we had a dozen people online, however, people did come and go over the 4 hours we were up and running, so I don't have an exact count of how many attended. Lots of dialog about various subjects. The images gathered were of the Moon, M 3 – a globular cluster in Canes Venatici, M 51 – the Whirlpool galaxy in Canes Venatici, M 97 – the Owl Nebula in Ursa Major and comet C/2020 T2 (Palomar)



In addition, over the past month I've been testing out a Canon 300mm f/4 lens that Adrian Bradley has let me borrow for a bit. This image is the setup I was using when I took the image of the North American Nebula. The lens is connected to my Canon T3i.

The advantage of putting this on top of the 10" is I can guide with the 10" and take images with the 10" at the same time. In this configuration I'm using two optical systems, and 3 cameras in an automated way to collect data. This wider field of view would be better for comet hunting and larger deep sky objects than the 10" would provide.

This coming season I hope to attach my ZWO cooled camera to this lens and give it a try on some of these large Nebula regions.



(Continued on page 21)

(Continued from page 20)



NGC 7000, Canon T3i w/300mm lens f/4 at ISO 1600, 2 hours 24 minutes of integration

Presentations

Monday, June 7, 2021 Virtual Presentations

Main Talk:



By Doug Bock

In 1979 a group from the Warren Astronomical Society went to Canada, chasing a total solar eclipse. They were joined by a Canadian film crew to document the event. Doug Bock will give a little bit of history behind it as well as pointing out members who were the movers and shakers of the club back then, and may not be with us anymore.

Film length ~28 minutes

About the speaker

Doug Bock

Past President, VP and Editor for the Warren Astronomical Society

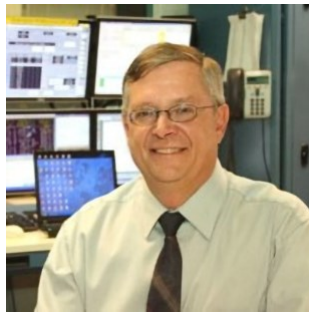
Member since the Spring of 1973

Member of ½ dozen other clubs over the years.

Chairman and Vice-Chairman of the Great Lakes Region of the Astronomical league in the early '80's.

Retired from Ford Motor Company at the end of 2018

Owner and operator of the Northern Cross Observatory.



(Continued on page 23)

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

Thursday, June 17, 2021 Virtual Presentation



By Stephen Uitti

Death From the Skies is based on Phil Plait's 2008 book by the same name. And, it's a discussion of some of the main ways that the Universe wants to kill you. Main topics include Asteroid and Comet Impacts, The Life of the Sun, Supernovae, Gamma-Ray Bursts, Black Holes, Alien Attack, The Death of the Sun, Galaxies, and The End of Everything, as time permits. Astronomical news is published daily. It seems that 2008 was a long time ago, so minor updates and snarky commentary may be included.

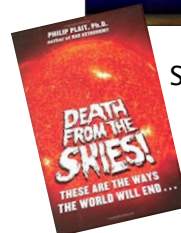
About the Speaker

Stephen ("Steve") Uitti ("Witty") is a software engineer and holds a bachelor of science in Mechanical Engineering. He writes software for a living (go figure). He has been a WAS member for a couple decades, has given multiple talks, contributes to the WAS Astronomy In The News Facebook page, and has served in various WAS officer positions. He's also a member of the Ford club where he is part of a group that produces the monthly half hour video program called "Astronomy For Everyone". Since 2009, it has been shown on YouTube and the public access on cable TV for many South East Michigan towns. Over 140 episodes to binge watch.



Source for *Death From the Skies*

<https://www.amazon.com/Death-Skies-Science-Behind-World/dp/0143116045>



(Continued from page 22)

Short Talk:

Thomas Kuhn, The Paradigm Shift and The Copernican Revolution



By Kevin McLaughlin

Thomas Kuhn coined the term “paradigm shift” to illustrate how the same data can be viewed through different models. The new model requires a shift in thinking. Both our mind and the world we live in must adapt to the change. The history of astronomy provides a great example of how paradigms evolve and shift.

This talk will substantially use the material in Kuhn’s book “The Copernican Revolution” to illustrate how a scientific crisis, often caused by measured data, drives the development of new paradigms. The history of astronomy, as presented by Kuhn, starting with Plato and Aristotle and ending with Newton’s developments, will be used to illustrate man’s changing model of both the universe and man’s place in the universe. Kuhn’s ideas are especially valid today as the world tries to adapt to new scientific data and models that may only be adopted when a substantial crisis occurs.

About the Speaker:

Kevin McLaughlin worked in dynamics and controls for more than 30 years. He graduated from Wayne State in 1983 with a Bachelor’s in mechanical engineering and received his Master’s in mechanical engineering from Purdue in 1985. He joined TRW Aerospace in Redondo Beach, California after Purdue, and relocated to Maryland in 1989 to work on the Compton Gamma Ray Observatory.



After a year of on-orbit operations with GRO he joined TRW Automotive in 1992 and was involved in all aspects of TRW’s electric steering program. His experience includes Director of Engineering at both TRW and Hyundai-Mobis.

Kevin retired from Hyundai-Mobis in 2016 and took physics classes at Wayne State. He worked at Blue Origin in 2019-2021 on an engine that will land payloads on the moon.

About the Cover

This month we celebrate the life of Robert Burnham and his *Burnham’s Celestial Handbook: An Observer’s Guide to the Universe Beyond the Solar System*.

A life triumphant and tragic, this quote from a biographical article by Tony Ortega says it best:

He led an extraordinary, but ultimately tragic, life. He also was a bundle of contradictions.

Burnham was a recluse, and yet he craved public recognition. He devoted years of labor to extraordinary, disciplined work, and yet he was incapable of staving off poverty. He was a brilliant writer who had an uncommon memory, yet words failed him in social situations. He knew the night sky like few other people have, but was oblivious to earthly concerns. He felt betrayed by his publisher and others who had benefited from his years of remarkable work, and he sank into depression and bitterness at the same time his reputation soared. His books are revered by tens of thousands, yet he died alone and unnoticed.

And that’s apparently just what he wanted.

The full article is preserved on Tony’s website:
<https://tonyortega.org/sky-writer-the-cosmic-life-of-celestial-handbook-author-robert-burnham-jr/>

Cosmic Coffee (video discussion of Burnham)
<https://www.youtube.com/watch?v=UKVwlmUnAkk>

National Astronomy Day & International Observe the Moon Night (includes interview with Robert’s Niece and Tony Ortega.)
<https://www.youtube.com/watch?v=Lows6sLswtU>

On a personal note:

I found out about Robert Burnham, Jr from the article by Tony Ortega. Why I looking for Robert is now buried in the deep recesses of my memory, but having learned about him, I had to get my own copies of his book.

-the Armchair Astronomer



Faint fuzzies.

The night before last, a comet named Palomar (actually known as C (for comet)/ 2020 T2 Palomar) was gliding near one of the most beautiful clusters of stars in the entire sky. It was parading about at about magnitude 11, which means that for my oldish eyes, it would be too faint to see. In fact, just a few weeks ago I spotted a second comet, named ATLAS. That comet, at ninth magnitude, was so diffuse that I barely spotted it. So, I was not going to try for this other comet.

With the onset of darkness that Friday evening, I set up my telescope in my backyard observatory and pointed it toward Messier 3. The exquisite star cluster made its appearance. Then I nudged the telescope just a little bit to a nearby field of stars. Sud-

denly I spotted a faint fuzzy spot precisely where Comet Palomar was supposed to be. As I looked around, a meteor scratched the sky to the north. It was a bright and unusual member of the May Ophiuchid meteor shower, a bonus on this unforgettable night.

Comet Palomar is the 219th comet I have seen during my lifetime. Most of these comets have also been faint, barely visible spots of haze. But some have been wondrous. My first comet, Ikeya-Seki, was the great comet of 1965. Whether a comet is a faint fuzzy of a magnificent comet with a long tail, they are always welcome visitors to the Earth's region of the solar system, each one signing, as comet finder Leslie Peltier loved to write, "its sweeping flourish in the guest book of the Sun."

This is the dome for the 18-inch telescope, which Gene and Carolyn Shoemaker and I used to discover tall of the Shoemaker-Levy comets, including the one that collided with Jupiter in 1994.

Photograph by David H. Levy.

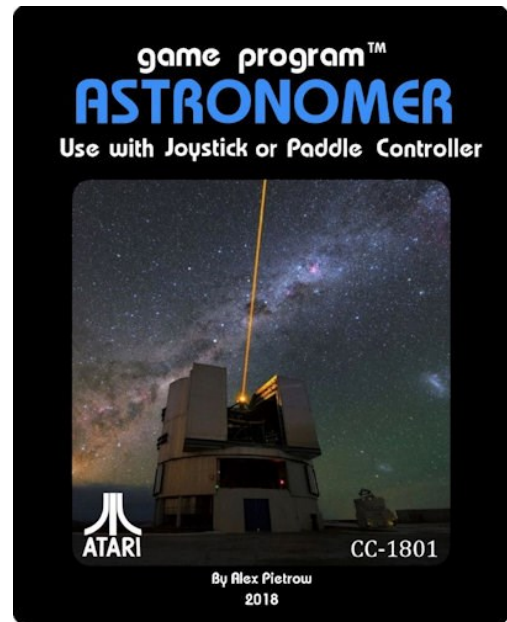




“Astronomer”

As some WAS members may know, retro video gaming is another hobby of mine. When I found out that a new game called “Astronomer” had been released for the venerable Atari 2600 Video Computer System, I knew I had to check it out. I didn’t know what to expect - was it a gritty, realistic astronomy simulator, another silly sci-fi shooter, or something else? I could have played the game online or downloaded it from the author’s website (<http://pietrow.net/atari/astronomer/>), but I wanted to have the real cathode ray tube experience, so I bought a cartridge and manual from Packrat Video Games for just \$18. (<https://packratvg.com/astronomer.html>) This spring I got my copy and over the last couple months in spare moments up north I dug into it. So, what is this strange astronomical endeavor?

It is, in no uncertain terms, an honest to goodness astronomy simulator. You might think that the humble 8-bit granddaddy of video game consoles might not be well suited to simulate the complex



practice of astronomy, but somehow it works. As the soul of wit is brevity, so is the soul of a successful retro game simplicity, and “Astronomer” boils down the whole thing into a two-dimensional projection that just plain works.

The goal of the game is simple: you, a professional astronomer, have time on a very large telescope. You have to observe as many objects as you can for your research project in the time you have been allotted on the scope. Successful observations win you a few more seconds on the telescope, but if you take too many frames of the object with clouds in them, you may have to throw away all of your frames and start over!

Your scope has pretty low horizons, but it can’t go all the way to the horizon. The horizons are the top of the screen, while the zenith of the sky is at the bottom of the screen. Objects transit the sky at different right ascensions, and you have to track them as they go. Clouds in different arrangements cross the sky, and if they get close to your object you just have to wait until they move on, or risk taking frames between the clouds and put the whole observation in jeopardy.

As in real astronomy, a big part of success in this effort is luck. Sometimes stars line up with slow moving clouds and you just have to watch your precious allotted seconds tick away. Sometimes you try to get a frame in between clouds and wreck the whole thing. Sometimes you get a series of stars near the zenith and don’t have to worry about clouds at all. While it feels unfair at times, life as an

(Continued on page 26)



(Continued from page 25)

astronomer is anything but fair, as Michigan astronomers smarting from a clouded out partial lunar eclipse can attest.

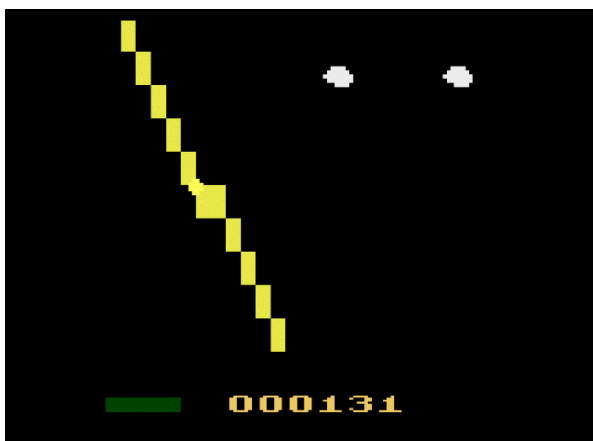
The randomness and the simplicity make for an addictive and compelling experience. The graphics aren't much to look at, but they're effective. The sound is heavy on the slewing and not exactly the music of the spheres - it's the title's weak link, but it's not unusual for 2600 games.

Successful astronomers can earn a free "Stargazer" embroidered patch by making 20 successful observations in one session. I've earned mine - can you earn yours?

Here's some background: "Astronomer" was written in 2018 by Stockholm University PhD student in astronomy Alex Pietrow. Playing the game, you will immediately understand that the person who wrote it understands deeply the often painful and capricious nature of observational astronomy. Developing new software for ancient computer hardware is never easy but doing it while working on your PhD program is a really impressive achievement indeed!

I'm not sure whether non-astronomers will fully appreciate this game but given the awards this title has won it seems like people enjoy it just for the

gameplay. Hopefully, it also helps them feel our pain as astronomers at least a little bit. On the B. Diane Hall scale of astronomical entertainment quality, I give this inventive and addictive game four moons out of five.





Another Trio

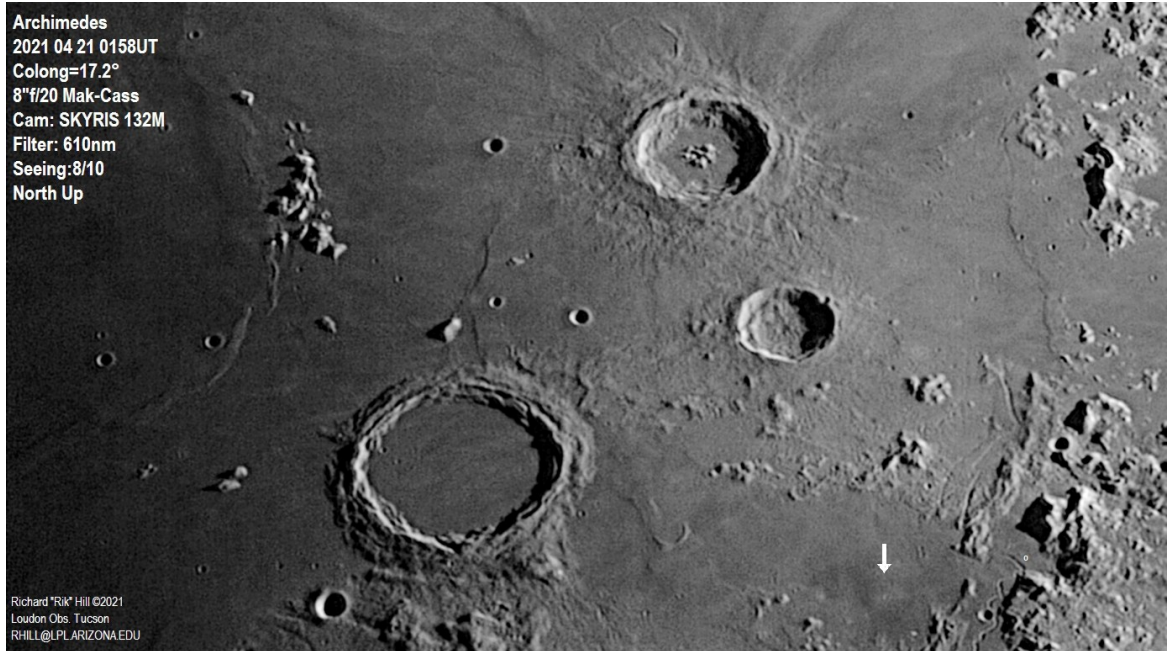
I enjoy triplets of craters like Ptolemaeus, Alphonsus, Arzachel and here the grouping is Archimedes (85km dia.), Aristillus (56km) to the upper right with the nice radial ejecta splash pattern and then below it the smallest member of the trio, Autolycus (41km). The Soviet Luna 2 spacecraft impacted the moon about 1/3 of the way from Autolycus to Archimedes releasing two sphere shaped markers just before impact.

Archimedes was once a crater similar to Copernicus with central peak(s) and all, until the Imbrium impact event when the crater was flooded from Imbrium lavas oozing up through cracks in the crater floor. This all happened from 3.2-3.8 billion years ago (b.y.a.) called the Upper Imbrium period. The other two craters were formed much more recently in the Copernican period in the last billion years, as their fresh look might indicate (and the preservation of the ejecta around Aristillus). The little sea to the right of Archimedes is Palus Putredinis that con-



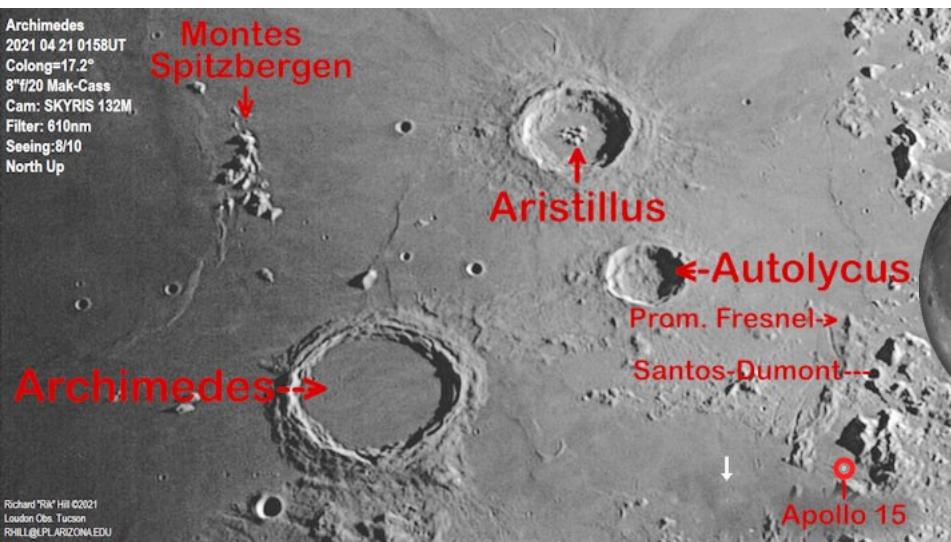
tains a nice dome pointed out by the arrow. A little further to the right you'll see a little "o" that marks the Apollo 15 base at "Hadley Rille" now known as Rima Hadley.

The mountains above Archimedes are the Montes

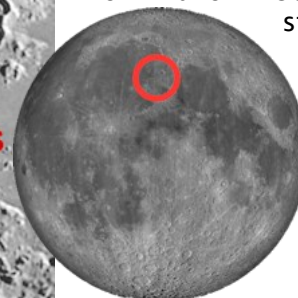


Spitzbergen and they just sparkle in the early lunar morning light. In the upper right corner of the image can be seen some of the Montes Caucasus and in the lower right are the northern peaks of the Montes Apenninus. The northern most point is Promontorium Fresnel with the Rimae Fresnel to the left of that.

Below P. Fresnel is the small crater Santos-Dumont (9km) and the large mountain below that is Mons Hadley rising to 4.8km above the Apollo 15 site.



This montage has been made from two 1800 frame AVIs stacked with AVIS-tack2 (IDL) and assembled with Microsoft ICE software. Finish processing was done with GIMP and IrfanView.



Location maps by Ralph DeCew

History S.I.G.

June 1988

This issue does include an “about the cover”: “The Editor wishes to thank Eric Hallman and his wife for the drawing on the cover. The equation on the blackboard is one of the equations in the Lorenz Transformation, first derived by the Dutch physicist H. A. Lorenz...” Also of note, the cover displays an interesting version of the WASP logo: the mascot wasp replacing the Newtonian telescope and the word “Paper” added to “Warren Astronomical Society” in the ring surround.



Following the Observatory Report by Clyde Burdette, Observatory Chairman, we have the “Survey Results” concerning cosmology by Michael O’Dowd, prefaced by some interesting remarks from the editor. Interesting remarks seems to be a hallmark of Ken Kelly- case in point: In the May 1988 issue, he ran a book review which prompted a “Letter to the Editor- Ken Kelly, Editor, The Wasp” from Michael Cyrek (author of said book.) and, of course, “The Editor Responds” by Ken Kelly, Editor (who seemed to get the last word in as no further exchanges appear in subsequent WASPs. In a less controversial vein, Ken calculates the ephemeris of:

Minor Planets for May - June

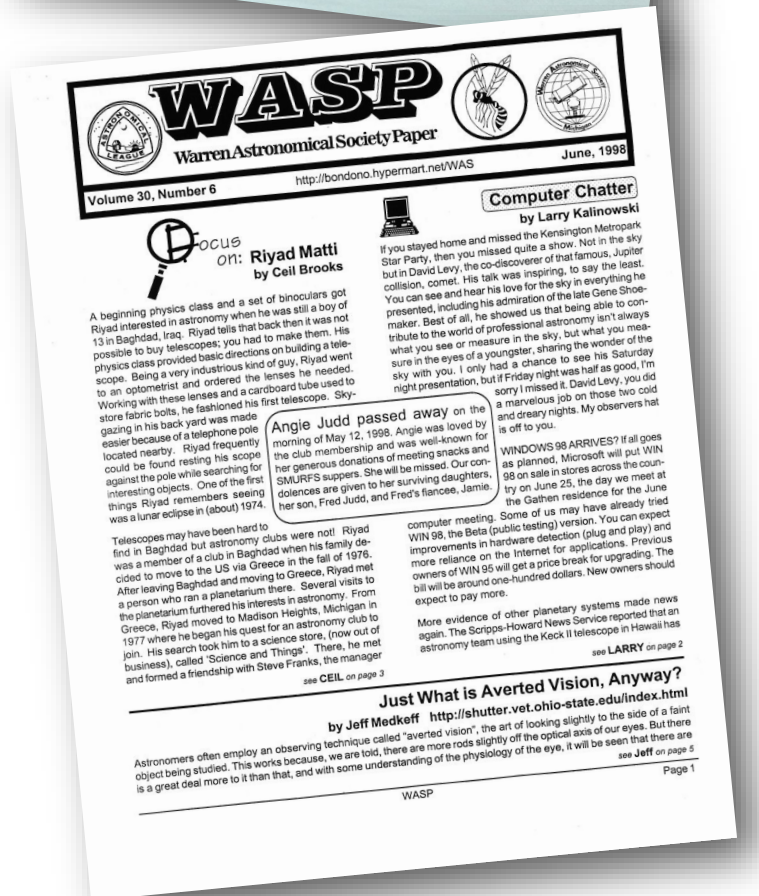
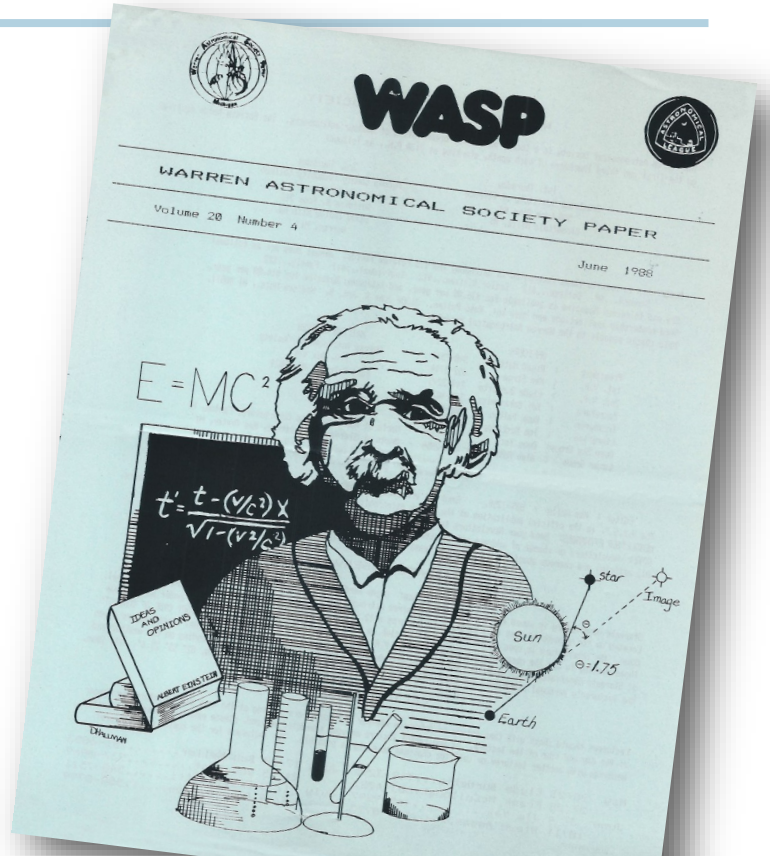
- Ephemeris for (15) Eunomia
- Ephemeris for (43) Ariadne
- Ephemeris for (21) Lutetia
- Ephemeris for (2) Pallas

June 1998

The front cover banner includes the WASP logo in a format we (well, at least this editor) are more familiar with. This also an example of the printed version tending to have more content than the online version.

Ceil Brooks starts a series of interviews with WAS members, starting with: “Focus on Riyad Matti.” In “Computer Chatter” by Larry Kalinowski, we find increasing doses of astronomical news. Notice of Angie Judd’s (Fred Judd’s Mother) passing in this issue. Finally, we get “Just What is Averted Vision, Anyway?” by Jeff Medkeff and a blank page (sometimes it’s just impossible to get member articles.)

Dale Thieme,
Chief scanner





Looking Back

From the Dave Harrington collection

Southfield Public Schools

19100 Filmore
Southfield, Michigan 48075
Phone 353-8300, Ext. 215

Mr. & Mrs. Irvin C. Vollbrecht Planetarium

SOUTHFIELD AMATEUR ASTRONOMICAL SOCIETY

Minutes of October 11, 1973

Led by Dr. Dave Harrington, several members of the Astrophotography Division of the Warren Astronomical Society provided the SAAS with a slide presentation of deep sky objects, planets, and rich star fields which they have photographed over the past several years. The slides and technical discussions which followed were a welcome addition to our efforts in sky observation. We greatly appreciate the contributions which our guests made to the program last month. Thank you for taking the time to share your work with us.

Next Meeting: Thursday-November 8, 1973. 7:30-9:30 P.M. at the Vollbrecht Planetarium.

Agenda: To be announced at the meeting. May include a planetarium program on Comet Kohoutek or Mars.

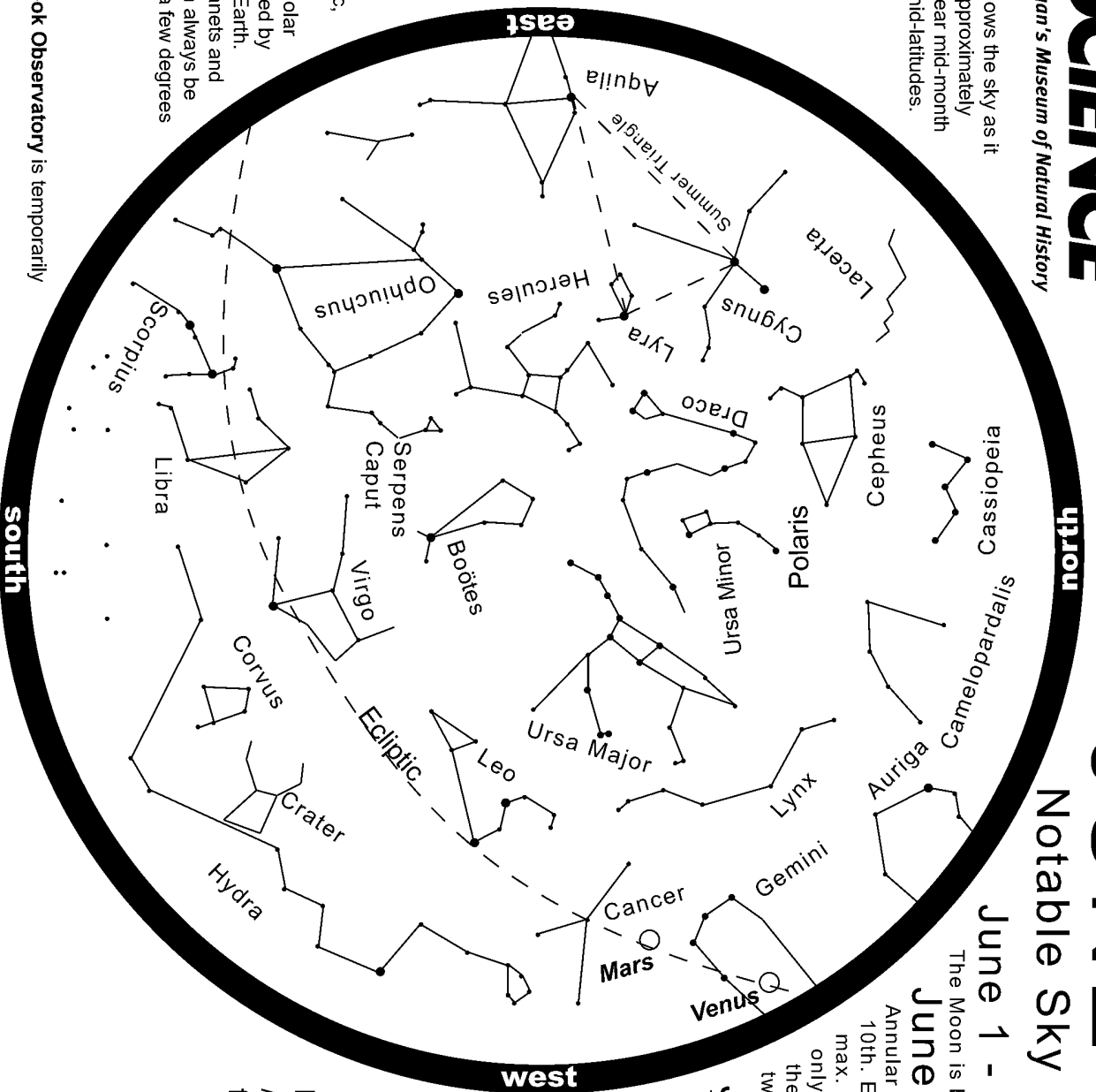
UP-Coming Sky Events to Watch:

- November 10 (Saturday) - Transit of Mercury in progress at sunrise ending at 8:18 am EST. Are you all familiar with safe methods of solar observation? If not be certain to ask about this at the November 8th meeting.
- Comet Kohoutek - Early morning sky through December 28th (date of perihelion passage). Additional printed information will be available at the Nov. 8th meeting.
- November 17 (Saturday) - Leonid Meteors. Best after midnight reaching a poor rate of 15/hr. As these travel rapidly (72 km/sec) they are interesting to watch.

MANY THANKS AGAIN TO THE ASTROPHOTOGRAPHY DIVISION OF THE WARREN ASTRONOMICAL SOCIETY FOR THEIR PARTICIPATION IN OUR PROGRAM. WE HOPE WE WILL SEE YOU MANY MORE TIMES DURING THE COMING YEAR.

G. Robert Thomson
November 6, 1973

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 temporarily closed.

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

JUNE 2021

Notable Sky Happenings

June 1 - 7

The Moon is below Jupiter on the 1st (SE predawn).

June 8 - 14

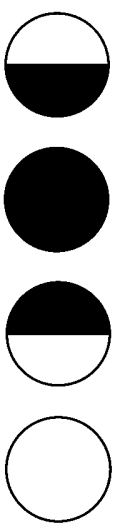
Annular solar eclipse is barely visible from Detroit on the 10th. Eclipse is in progress as the Sun rises (5:55am), max. eclipse is 5:58, eclipse ends at 6:37 with the Sun only 6 degrees above the horizon. The Moon is at the lower right of Venus on the 11th (WNW evening twilight) and above Mars on the 13th (WNW eve.).

June 15 - 21

The June solstice is at 11:32pm on the 20th. Summer begins in the N. Hemisphere and winter begins in the S. Hemisphere.

June 22 - 30

The Moon is below Saturn on the 27th, at the lower right of Jupiter on the 28th and Jupiter's lower left on the 29th (all in the S predawn).



Now Showing

Please visit science.cranbrook.edu/explore/acheson-planetarium for program updates.



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



Ed Stuckey - Messier 45 Pleiades Star Cluster (aka: Seven Sisters)

June 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7 Cranbrook Virtual Meeting	8	9	10 Annular Eclipse New Moon	11	12
13	14	15	16	17 Macomb Virtual Meeting	18	19
20 Father's Day Summer Solstice	21	22	23 Moon at Perigee: 359960km	24 Full Moon	25	26 Virtual Stargate
27	28	29	30			



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

June 2021

Stargate observatory and the Dob shed along with all equipment are in good condition as of May 27, 2021.

There will be no open house in June since the observatory will remain closed until further notice due to the COVID-19 pandemic.

Virtual observing or discussion may be possible from Northern Cross Observatory (NCO) depending on weather and if Doug Bock is available to host it. Use the same WebEx link from last meeting and join online starting at 8 pm on June 26, 2021.

Riyad I. Matti
2021 WAS 2nd VP, Observatory Chairperson

Treasurer's Report

As of May 31, 2021, we have:

175 Paid Memberships

\$22,732.43 in the main account

\$3,279.84 in the GLAAC account

\$1,246.05 in the W.A.S. PayPal account

GLAAC may purchase a conference program for its online component of AATB other than Zoom. HOPIN was one such possibility, and it looks pretty good. The IAU used it for its CAP (Communicating Astronomy to the Public) conference.

Adrian Bradley,
Treasurer



Astronomical Events for June 2021		
Add one hour for Daylight Savings Time		
Source: http://astropixels.com/almanac/almanac21/almanac2021est.html		
Day	EST (h:m)	Event
01	03:57	Jupiter 4.6°N of Moon
02	02:24	LAST QUARTER MOON
07	21:27	Moon at Apogee: 406230 km
09	11:42	Moon at Ascending Node
10	05:42	Annular Solar Eclipse; mag=0.943
10	05:53	NEW MOON
10	20:00	Mercury at Inferior Conjunction
12	01:44	Venus 1.5°S of Moon
12	08:00	Venus at Perihelion
13	01:19	Pollux 3.1°N of Moon
13	14:52	Mars 2.8°S of Moon
17	22:54	FIRST QUARTER MOON
20	22:32	Summer Solstice
22	22:26	Antares 4.8°S of Moon
23	01:07	Moon at Descending Node
23	04:58	Moon at Perigee: 359960 km
24	13:40	FULL MOON
27	04:30	Saturn 4.0°N of Moon
28	13:38	Jupiter 4.5°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

Gary Ross held a public night at the Veen Observatory, he reports: Sky fairly good. Most time spent with a couple whose husband is "under Scorpius", but even if the constellation was not up yet, I duly made a big deal about it. Told them to come back in June.

Six-in. Newtonian on wooden tripod and pipe mount. Press fit spider. No electronics. People just push or pull it. Duly deployed by Obs'y front door where visitors are "wowed" by the instrument and tales of the Heroic Era.

Ken Bertin continues his weekly "Report on Objects in Space" via Facebook each Wednesday. Ken says he's getting positive feedback on each of them.

Bob Trembley: I presented a "Tour of the Milky Way Galaxy" using SpaceEngine, and my presentation about the Sun to Connie's astronomy class via Zoom. I visited a boatload of places during the Milky Way tour; first was the red dwarf Proxima Centauri and its two exoplanets - I discussed exoplanets and how in 2019, Proxima Centauri increased in brightness 14,000 times in UV for 7 minutes! Yikes!

I then went to Alpha Centauri and showed that it was a double star; I time-accelerated and showed the two stars orbiting their barycenter - shown with and without orbit lines. I went to Mizar and showed how it was a quadruple star system.

I went to several planetary nebula and star-birth regions, globular clusters, a supernova remnant, and 2 black holes: Cygnus X-1 and Sgr A*. I flew the students through the disk of the galaxy, and rose far above the galaxy to look down upon it, and then rotated around and showed them a side-view of the galaxy. I think this may be something I try to present frequently!

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

Great Lakes Association of Astronomy Clubs Board Meeting

May 13, 2021 - ONLINE, 7pm

<https://umich.zoom.us/j/584733345>

AATB 2021: September 24/25, 2021

Call to order: 7:06 pm

Online:

- Adrian Bradley - GLAAC President, Lowbrows
- John Wallbank - GLAAC Vice President, Lowbrows
- Jeff Kopmanis - GLAAC Secretary, Lowbrows
- Tim Campbell - Ford
- Bridget Harwood - MI-DNR

Discussion:

Treasury Report

~\$3200 in GLAAC

Re-imburements are now easy, since AB is WAS treasurer

We now have a federal tax ID number (not an EIN)

(Continued on page 35)

(Continued from page 34)

IRS 990EZ will be getting done this weekend
GLAAC is not a membership organization
Once 990 is submitted, then bank accounts can be created (Comerica)

Bridgette @ MI-DNR

No immediate changes
Groups 100 or less, no masking; 300 max
90-day outlook (June 24 is 90 days from AATB)
Hybrid might be possible, but with limited registrations;
DNR has a registration system that we could use
Mobile-Cause

Projection over in-person viewing

Non-AATB events (virtual)

Shannon: Request from Farmington elementary home-schooled kids (JW will follow up)

AATB 2021 - Sept 24/25 - **25th Year!!**

Virtual Event with possible, limited In-Person component

Virtual Speaker Events

David Levy
Adrian's connections (Explore Scientific Star Party)
Michigan Science Center
Diane Hall: Binoculars
Adrian ESSP Presentations

Virtual Viewing Events

Ford
Lowbrows
Awni: Solar H-alpha
Brian Ottum: Remote Obs
Doug Bock: Remote Obs
JK: Orange Can

WAS

Hybrid Concerns

If things are OK in September, we simply announce to the member clubs to "bring your scopes". BIG "IF".

Decisions will probably have to be made last-minute in early September, regarding possible September outbreak

TC: Concerned that it could bring thousands of cooped-up public attendees

No big tents in 2021

AB/TC: Big wave in September due to vaccines wearing off

Bandwidth at Island Park

Day/Time slots

Enforcement issues

Wristband, hang-tag, fluorescent?

Recommended Safe Viewing sites?

Difficult, due to permits from various parks and locations

Adjourn:

Motion to adjourn by **AB**, seconded by **JK**. Approved by unanimous vote.

Meeting Adjourned at 8:06 pm

TODO:

Speakers for AATB

BT: Ask to start trolling for speakers

JK: Hot Spots from ATT/Verizon/Comcast

JK: check out **Mobile-Cause**

JK: Have Bob create an outreach/contact page that we can refer people to

Next GLAAC Meeting: June 10 7:00 PM

<https://umich.zoom.us/j/584733345>

Save the Date!

AATB 2021: September 24/25, 2021

-Bob Trembley
(Continued on page 36)

(Continued from page 35)

Michigan Dark Sky Update

(From emails from Sally Oey)

- **Chelsea:** Chelsea Dark Skies has its first victories! The Planning Commission voted on April 20 to approve the revised Zoning Ordinance, including a 0.1 foot-candle limit to light trespass onto residential properties, and stronger language on shielding. There are still items that need to be addressed, but considering the last-minute nature of the group's requests in the ZO revision process, this is a great accomplishment. Moreover, they've been informed that the new Heritage Pointe subdivision will have shielded lights. Congratulations to Kathie Gourlay & Co.! The group is continuing their pamphleting campaign in the downtown district, and working to engage DDA. For info: ChelseaDarkSkies@gmail.com

- **Detroit,** Belle Isle Urban Night Sky Place initiative: Jerry Hasspacher's group has been frustrated by the glacial pace of engagement by MI DNR, which administers the park. The group has decided to initiate dark sky programming on the island, which will be necessary for approval by the International Dark-Sky Association (IDA). Rochelle Breitenbach (MI Audubon) will reach out to the BI Nature Center in hopes that they'll be willing to host. Ed Cackett and Megan McCullen (Wayne State) will be instrumental in developing content. For a nice overview on the IDA Dark-Sky Places program, please see this new article in Popular Science sent by Kathie G.

- **Scio Twp:** Still waiting for Supervisor Will Hathaway to organize a meeting on the Miller / Wagner roundabout with the Washtenaw County Road Commission. New roundabouts in Scio will be constructed this summer. Would anyone be willing to contact people who will be affected at Zeeb and Liberty? Please help us get in touch to warn them.

- **Upper Peninsula:** Keweenaw Mountain Lodge on Lake Superior has initiated plans to apply for IDA Dark-Sky Park status! According to MLive, they hope to be approved as early as this summer. This would be the 3rd IDA Dark-Sky Park in Michigan.

I've been to this lodge - it's *BEAUTIFUL!* It would be a fantastic place to host a star party, and I happen to know a LOT of people up there! -*Bob T.*

- **Adrian Bradley** shares the photos [below] of the Milky Way, illustrating light-polluted skies from Leslie Nature Center, Ann Arbor (Bortle 7); versus Highway 123 near Paradise, MI (Bortle 2). The Bortle scale is a measure of dark sky quality, explained [HERE](#). These photos could be useful in presentations, lectures, or outreach materials. Adrian is available to take other sky quality shots for anyone needing them. Thanks, Adrian!



- **Joel Bregman** shares that the FCC has approved a request from SpaceX to revise their satellite constellation orbits to lower altitude. This was advocated by the American Astronomical society, and is excellent news for astronomy, since the swarm won't be as visible, being less illuminated by the sun. However, other constellations are planned by other companies. Reported by CNBC.

- **Kathie Gourlay** notes that IDA has updated their general guidance into a Resolution for Values-Centered Outdoor Lighting.

- **Mary Adams** and her sister have written an illustrated children's book, *The Star Tales of Mother Goose*, reviewed on MLive. Get it here: www.starlore.co

Meeting Minutes

MINUTES OF (VIRTUAL) BOARD MEETING

MAY 3, 2021

Meeting was called to order at 6:30 PM by President Diane Hall. Board Officers in attendance: Dale Partin, Riyad Matti, Mark Kedzior, Adrian Bradley, Bob Trembley & Dale Thieme (quorum present).

OFFICER REPORTS

Diane gave kudos to our Publications Chair Dale Thieme on an outstanding May issue of the WASP. Diane led discussion on our virtual meetings and how we can get more people involved in discussions – possible chat rooms with specific topics for people to join during break between presentations.

1st VP Dale Partin stated need for speakers for the month of July.

2nd VP Riyad Matti reported on the Stargate Observatory – did some general cleaning along with regular inspection of our facilities.

Secretary Mark Kedzior reported the April meeting minutes were in the May issue of the WASP. He also reported on the Library Telescope Program at Grosse Pointe Woods – did inspection, maintenance and repair (if needed) on all seven telescopes in their collection. The program has been going on there for six years since its launch on June 26, 2015. Monthly programs will resume shortly after discussion with Pat McClary, Branch Manager at GPW Library.

Treasurer Adrian Bradley reported on the amounts in the WAS, GLAAC and PayPal accounts, and he is now able to make deposits via a mobile app. Outreach Chai

Bob Trembley reported on a Yuri's Night presentation on April 12th.

Publications Chair Dale Thieme reported on the article contributed to the WASP from Dr. Christopher Zin from Macomb College. Dale Partin reported that a bi-monthly astronomy magazine will be published by Macomb College. Discussion on the "P" in the WASP – Paper or Publication (or PDF)????

OLD BUSINESS

Discussion on WebEx hosting. Outreach request from Northville Library Youth Program – discussion on in-person at this event but will remain virtual online only until state guidelines permit in person gatherings. Discussion on WAS Picnic

August 28th with discussion on social distancing at this event.

NEW BUSINESS

None

Motion to adjourn by Dale Partin – supported by Bob Trembley – motion passed unanimously.

Meeting adjourned at 7:10 PM.

Respectfully submitted,
Mark Kedzior
Secretary

CRANBROOK (VIRTUAL) MEETING

MAY 3, 2021

The meeting was called to order at 7:30PM and a welcome to all by President Diane Hall. She then reviewed the ground rules, meeting format and etiquette of this virtual meeting and presentation so as to be enjoyed by all in attendance.

(Attendance on WebEx was 29 at 8:30PM).

Diane commented on the WAS Picnic August 28th and whether it would be in person, but that would be determined on state COVID guidelines as the time nears, as with our December Banquet. She also commented on the May edition of the WASP and the outstanding contributions to it.

OFFICER REPORTS

1st VP Dale Partin reported on the upcoming presentations: At the Macomb May 20th meeting, Gillen Brown will be presenting "The Origin of the Elements". At the June 7th Cranbrook meeting, lifetime member Doug Bock will be presenting and narrating a video of the 1979 Total Eclipse of the Sun from Western Canada, "Chasing the Eclipse", with a short presentation by Kevin McLaughlin at the same meeting. He also mentioned the need for presenters for future WAS meetings.

2nd VP Riyad Matti reported that the Stargate Observatory and Dob Shed were in good condition upon his regular inspection and stated that the observatory will remain closed until state pandemic guidelines dictate ease on restrictions.

Secretary Mark Kedzior reported that the April meeting minutes were in the May Issue of the WASP, and briefly reported on the Library Telescope Program beginning its sixth year of providing telescopes to Grosse Pointe Library

(Continued on page 38)

(Continued from page 37)

patrons, in partnership with the WAS. Treasurer Adrian Bradley reported that his report is in the WASP and we now have 174 members – he also will report new members who have signed up in future editions of the WASP. Outreach Chair Bob Trembley reported on presenting the “Kerbal Space Program” on Yuri’s Night April 12th, and to email him with Outreach requests and reports. Publications Chair Dale Thieme reported on the May issue of the WASP and the article by Dr. Christopher Zin of Macomb College.

SPECIAL INTEREST GROUPS

Solar – no report.

Double Star Group – no report.

Astrophotography – Adrian Bradley said in his recent imaging attempts that he is still capturing zodiacal light. Doug Bock reports he will be doing a live broadcast when clear from the Northern Cross Observatory.

History – Dale Thieme reports he received early issues of the WASP from former WAS President Dave Herrington, including a couple of issues he did not have, which will be scanned accordingly and be made available in our WASP archives.

Astronomical League – members wishing to join or renew their membership in June should send check or payment via PayPal to WAS Treasurer Adrian Bradley (\$7.50).

OBSERVING REPORTS

Doug Bock shared 30 second video of 11th magnitude Comet 2020 R4 Atlas – a total of 656 frames @ 15 seconds each – also shared image of M63 - David Levy reports he will be heading to observe at local dark sky site in his locale – Adrian Bradley shared zodiacal light captured in one of his images.

IN THE NEWS

Presented by Bob Trembley: Passing of Apollo 11 astronaut Michael Collins 1930-2021 – Crew of Space X Dragon returns from ISS after 168 days – Perseverance Rover MOXIE module extracting oxygen from CO₂ – Mars Ingenuity helicopter 4th flight brief then a successful 117 second flight for a distance of 16 feet – next steps to coordinate rovers and aerial explorers – current space program inspiring kids as did the Apollo program – IAA Planetary Conference April 26-30 discussing potential hazardous asteroid impact scenarios – scientists watching gas giant grow right in front of their eyes with Hubble Space Telescope (PDS 70b).

IN THE SKY

Jupiter and Saturn in pre-dawn sky – 4383 exoplanets confirmed.

SHORT PRESENTATION

Dale Partin introduced Jenny Calahan, 3rd year graduate student in Astronomy/Physics at the University of Michigan, with her presentation on “Temperature Profile of a Protoplanetary Disk”. Using radio telescope data, she described the process by which we can learn about planetary formation: focusing on clumps of gas in protoplanetary disks, mass and temperature of the disk, low mass=cold disk & high mass=hot disk, bisection of a protoplanetary disk describing the dusty midplane and flared gas atmosphere – carbon dioxide is a common molecule found in protoplanetary disks.

Following her presentation, she answered questions pertaining to the software used for her research – the closest protoplanetary disk to us is about 120 light years away – the James Webb Space Telescope will help in the infrared study of disks – she has applied for time on the JWST on the first round but was denied but will apply again, explaining that time on the JWST highly competitive.

To see Ms. Calahan’s presentation in its entirety, go to: <https://www.youtube.com/warrenastro>

Ken Bertin shared his recollections of Michael Collins.

Breakout into mini discussion groups during break.

MAIN PRESENTATION

Dale Partin introduced WAS member Dale Hollenbaugh, doing his first presentation to the WAS, with “From Beginner to Journeyman: My Journey in Astrophotography”. Dale told the story of how he took his interest in astronomy and combined it with his passion for photography to take on the challenge of astrophotography. He described his early introduction into astronomy, years of photography background with numerous cameras and lenses, then sharing his early images in astrophotography of the Milky Way, aurorae, Moon, eclipse, etc. – then progressing into planetary astrophotography, then finally imaging deep sky objects with his astrophotography equipment and setup.

Questions and discussion followed. Regrettably, due to technical issues, the presentation did not make it to YouTube.

Meeting ended at 10:05 PM.

Respectfully submitted,
Mark Kedzior, Secretary

(Continued on page 39)

MACOMB (VIRTUAL) MEETING

MAY 20, 2021

Meeting was called to order at 7:30 PM and a welcome to all by President Diane Hall. WAS Board members in attendance: 1st VP Dale Partin, 2nd VP Riyad Matti, Secretary Mark Kedzior, Treasurer Adrian Bradley, Outreach Chair Bob Trembley & Publications Chair Dale Thieme (WebEx attendance at 8PM - 28).

IN THE NEWS:

- 1) One more Mars rover from China - "Zhurong" - landed in Utopia Planitia in northern hemisphere
- 2) Tardigrades - simulations of Earth and Mars ejecta reaching its moons
- 3) Space Tourism - 4 passengers in July 2021
- 4) Exoplanet Gliese 468B in Constellation Virgo
- 5) Osiris-Rex returns after five years with samples.

IN THE SKY

Lunar Eclipse alert on May 26th - totality lasting 4.5 minutes - totality not visible here but partial eclipse - Nova in Cassiopeia near Caph - brightening from 9th magnitude to 5th magnitude - Shadow transit of Jupiter's moons Ganymede & Io on May 23rd - not visible in our locale - Mercury and Venus 25 arcminutes apart in evening sky.

OFFICER REPORTS:

President Diane Hall commented on the WAS Picnic in August, and COVID restrictions for in person meetings based on host guidelines.

1st VP Dale Partin with the upcoming WAS meetings presentations: June 7th - Lifetime WAS Member Doug Bock narrates 1979 film "Chasing the Eclipse" in western Canada, with short talk by Kevin McLaughlin on "Thomas Kuhn: The Paradigm Shift and the Copernican Revolution" - June 17th - Steven Uitti with "Death from the Skies" - also reiterated need for presenters in upcoming meetings.

2nd VP Riyad Matti reports that everything was in order at Stargate Observatory and did a general cleanup - observatory is still closed due to state pandemic guidelines - virtual observing with Doug Bock is still on docket.

Secretary Mark Kedzior had nothing to report. Treasurer Adrian Bradley reported balances in the WAS, GLAAC and PayPal accounts, with 177 paid memberships to date.

Outreach Chair Bob Trembley gave "Tour of Milky Way" presentation to Connie Trembley's science class in New Haven Schools - discussed Citizen Scientist program, SciStarter and NASA Osiris-Rex programs - Adrian Bradley and David Levy will be part of the "Global Star Party" hosted by Explore Scientific.

Publications Chair Dale Thieme reports getting ready to assemble the June WASP -

SPECIAL INTEREST GROUPS

Solar - One sunspot observed - Double Star Group - No report (not active as of this time) - History - Scanning issues of the Detroit Astronomical Society for the WAS archives - Astronomical League dues are \$7.50 and due in June - Jim Shedlowsky gave report on the McMath-Hulbert Observatory

OBSERVING REPORTS

David Levy reports observing faint comet Palomar close to Messier 3 and read a quotation from Gerard Manley Hopkins - Bill Beers attended Texas Star Party with Joe Van Pucker - reports having five clear nights out of eight - situated at 30 degrees latitude at 6,000 feet altitude - 60 persons in attendance instead of 600 as in past - Zodiacal light prominent - image of Omega Centauri and comparison of M13 and Omega Centauri - also image of Omega A and Messier 7 in Scorpius, the lowest Messier object in latitude - Doug Bock shared images of three sunspots taken on May 12 - Comet Atlas R4 on May 13 - Messier 108 in Ursa Major - North American Nebula - NGC 4565.

MAIN PRESENTATION

Dale Partin introduced Gillen Brown, PhD student studying Astronomy at the University of Michigan, with his presentation "The Origin of the Elements". Starting with the creation of hydrogen and helium in the Big Bang, he described the processes and lifecycles of stars which created the different elements - cosmic ray spallation - low mass stars - exploding massive stars - exploding white dwarfs -merging neutron stars - our sun is made up of 70% hydrogen, 28% helium, and 2% of everything else - in explaining the makeup of atoms, the number of protons determine the element.

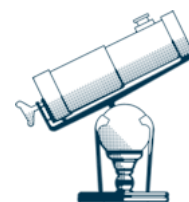
Questions and discussion followed his excellent presentation - (President Diane Hall summed up his presentation, stating it "demystified the Periodic Table").

To see his presentation in its entirety, go to:

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

Meeting ended at 9:37 PM

Respectfully submitted,
Mark Kedzior
Secretary



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

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

GLAAC Club and Society Meeting Times

Club Name & Website	City	Meeting Times
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
McMath-Hulbert Astronomy Society	Lake Angelus	Board and paid members-First Sunday of the month Public open house—first Saturday at 11 am
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/
McMath-Hulbert Astronomy Club	http://www.mcmathhulbert.org/solar/newsletter/
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>



This article is distributed by NASA Night Sky Network

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

Astrophotography With Your Smartphone

David Prosper

Have you ever wanted to take night time photos like you've seen online, with the Milky Way stretched across the sky, a blood-red Moon during a total eclipse, or a colorful nebula? Many astrophotos take hours of time, expensive equipment, and travel, which can intimidate beginners to astrophotography. However, anyone with a camera can take astrophotos; even if you have a just smartphone, you can do astrophotography. Seriously!

Don't expect Hubble-level images starting out! However, you can take surprisingly impressive shots by practicing several basic techniques: steadiness, locked focus, long exposure, and processing. First, steady your smartphone to keep your subjects sharp. This is especially important in low light conditions. A small tripod is ideal, but an improvised stand, like a rock or block of wood, works in a pinch. Most camera apps offer timer options to delay taking a photo by a few seconds, which reduces the vibration of your fingers when taking a shot. Next, lock your focus. Smartphones use autofocus, which is not ideal for low-light photos, especially if the camera readjusts focus mid-session. Tap the phone's screen to focus on a distant bright star or streetlight, then check for options to fine-tune and lock it. Adjusting your camera's exposure time is also essential. The longer your camera is open, the more light it gathers - essential for low-light astrophotography. Start by setting your exposure time to a few seconds. With those options set, take a test photo of your target! If your phone's camera app doesn't offer these options, you can download apps that do. While some phones offer an "astrophotography" setting, this is still rare as of 2021. Finally, process your photos using an app on

your phone or computer to bring out additional detail! Post-processing is the secret of all astrophotography.

You now have your own first astrophotos! Wondering what you can do next? Practice: take lots of photos using different settings, especially before deciding on any equipment upgrades. Luckily, there are many amazing resources for budding astrophotographers. NASA has a free eBook with extensive tips for smartphone astrophotography at bit.ly/smartastrophoto, and you can also join the Smartphone Astrophotography project at bit.ly/smartphoneastroproject. Members of astronomy clubs often offer tips or even lessons on astrophotography; you can find a club near you by searching the "Clubs and Events" map on the Night Sky Network's website at nightsky.jpl.nasa.gov. May you have clear skies!

(Photo 1: Photo of a smartphone held up in a horizontal orientation on top of a small plastic tripod, propped on top of some bricks in a grassy yard.)

A small tripod for a smartphone. They are relatively inexpensive - the author found this at a local dollar store!

(Photo 2: Photo of a crescent Moon hanging over the silhouette of a rooftop at sunset.)

(Photo 3: Photo of many rough craters on the Moon.)

The Moon is large and bright, making it a great target for beginners. The author took both of these photos using an iPhone 6s. The crescent moon at sunset (left) was taken with a phone propped on the roof rack of a car; the closeup shot of lunar craters (right) was taken through the eyepiece of a friend's Celestron C8 telescope.



Photo: 1

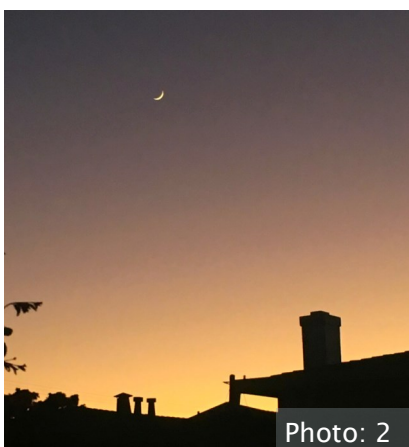


Photo: 2

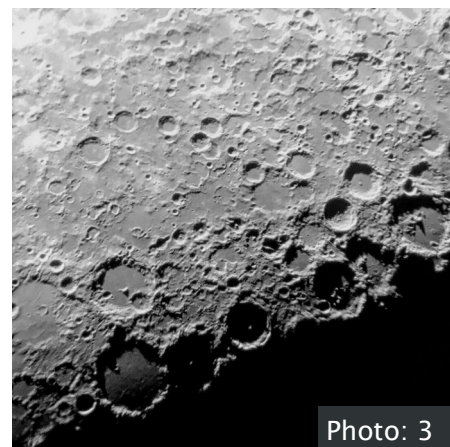


Photo: 3