



The W.A.S.P.



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The Warren Astronomical Society Publication



Image: Doug Bock

The WASP

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



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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. E, Room 208
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.

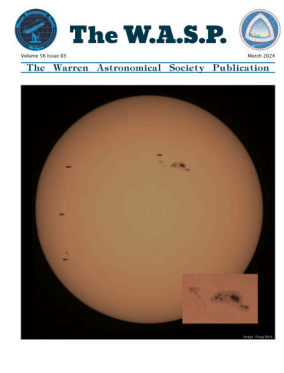
Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted in person, via US Mail, or by email (publications@warrenastro.org)

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.

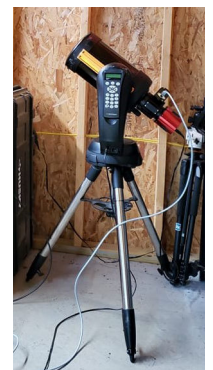
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About the Cover

February 25, 2024 image taken of a massive sunspot (inset) by Doug Bock using his 6" f/10 SCT and the ZWO asi071mc pro camera (right.) He used ASICAP to capture the data.





Field of View

The U.S. lands on the Moon again... finally!



Intuitive Machines, a private U.S. company has landed a spacecraft on the Moon's south pole on Feb. 22 - carrying with it a diverse payload including a piece of artwork, and a NASA LIDAR system. Good thing too because the on-board LIDAR system failed; mission engineers patched-in (hacked) the NASA system and were able to use that for the landing sequence. From what I read this only took them 2 hours to do, which is amazing!

However, the landing was not without drama. Communications with the spacecraft were not as expected; engineers were getting a signal that the lander was alive, but comms were not optimal. Most alarming was that engineers reported a yaw upon landing - indicating that the lander had likely tipped-over.

Scott Manley created a video describing what happened to the lander - including an animation from Kerbal Space Program where he simulates the landing, and the spacecraft tipping-over. He mentions that KSP players have "all been there," and BOY have I ever!

When I showed a model of the Odysseus lander to my wife, her first comment was "Isn't that going to be top-heavy?" and I laughed out loud because that was my first thought. When I design landers in KSP, I've learned to make sure the center-of-gravity of the vessel is as low as possible, and to come STRAIGHT down when landing - no sideways velocity.

That being said, it was technically a successful landing: the spacecraft didn't break apart, and they do have communications. So that makes this the first U.S. spacecraft to suc-

cessfully soft-land on the Moon since Apollo 17 in 1972. Intuitive Machines stock rose after the landing. Congratulations are in order.

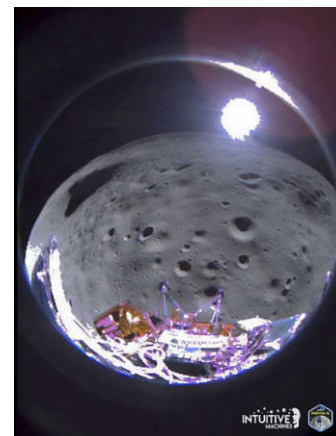
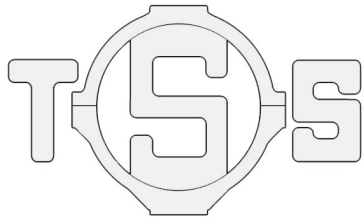


Image: Taken 35 seconds after pitching-over.
Credit: Intuitive Machines via AP

The spacecraft was not designed to survive the 2 week-long lunar night... but I'm pretty sure engineers will try to find a signal from it again in mid-March.

**Bob Trembley,
President**



Telescope Support Systems



FAAC Astronomy Conference & Swap Meet

Saturday, March 23, 2024 9:00 am - 3:00 pm

General Astronomy

- 9:30 am: **Eclipse Photography** – Tim Campbell
- 10:45 am: **Rehabbing Old Equipment** – Gary Gibson
- 12 N **Starship/Starbase** – John McGill
- 1:30 pm: **Smart Telescopes** – Paul Goelz

Technical Talks

- 9:30 am: **Photometry & Spectroscopy** - Jeff Thrush
- 10:45 am: **Star Exterminator Suite** – Gordon Hansen
- 12 N: **Observatory Automation** - Sean Pickard
- 1:30 pm: **James Webb Telescope** – Tim Campbell

Planetarium Shows

10:00am, 11:30am & 2:00pm FAAC Members

Swap Meet

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

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

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

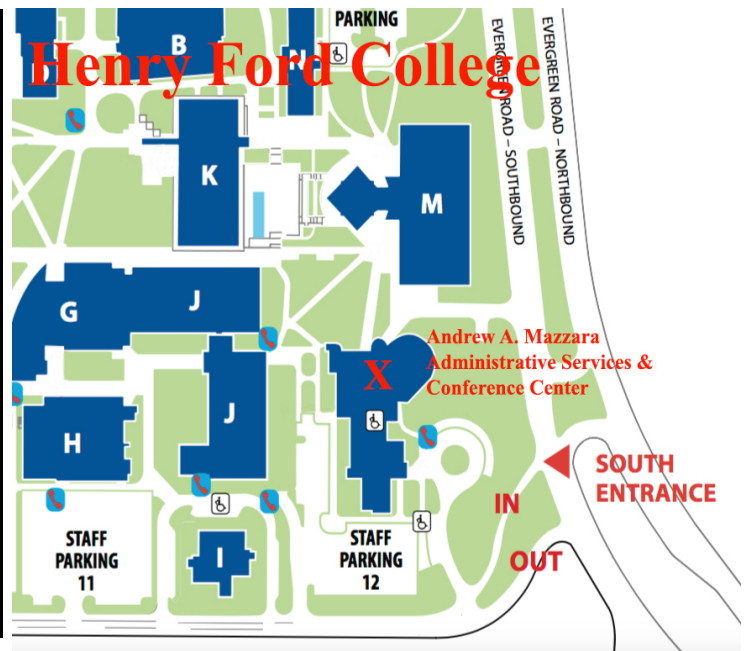
Advanced Table Registration ends Mar 1, 2024

Doors Open: 8:00am for setup.

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

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

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



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



Clearance Table



WAS Stargate Observatory Macomb County, MI T-shirts -

- Adult sizes - Medium (8) & Large (5)
- Youth sizes - 10-12 (17) & 14-16 (14)

Original price was \$8 each - reduced to \$4 each

WAS collared Polo Shirts w/ WAS embroidered patch on right sleeve -

- Total of nine (9) - Adult LARGE Original price was \$12 - reduced to \$8

WAS Windbreaker Nylon Jackets w/4" logo in front and 10" logo on back - button snap front -

- Adult Medium - total of two (2)
- Adult Large - total of two (2)



See Mark Kedzior at the meetings or email:

merch@warrenastro.org

All offers considered.

WAS Apparel Price List

T-SHIRTS

Black - Navy - Gray (Pink or Yellow if desired) - one imprint

Small - XL	\$15.00
2XL	\$18.00
3XL	\$19.00

LONG SLEEVE T-SHIRTS

Black - Navy - Gray - one imprint

Small - XL	\$19.00
2XL	\$21.00
3XL	\$22.00

CREW NECK SWEATSHIRT

Black - Navy - Gray - one imprint

Small - XL	\$22.00
2XL	\$24.00
3XL	\$25.00

LOGO COLOR SCHEMES:

Black background with gold/yellow artwork and lettering

Black background with blue lettering and gold/yellow artwork

Choose when placing order

ZIPPER HOODIE W/Pockets

Black Only (at this time) - one imprint

Small - XL	\$27.00
2XL	\$33.00
3XL	\$34.00

HATS

Black - Blue 2 ½" logo

\$15.00

IMPRINT LOCATIONS:

Front left chest (3 ¼" logo)

Front or back (9" or 10" logo)

Back (12" logo for jackets or sweater)

Combination front left chest (3 ¼" logo) and back (9", 10" or 12" logo) - add \$7.00

Choose when placing order

IMPRINT ON YOUR CLOTHING ITEM: Logo + Imprint Charge

3 ¼" Logo - \$8.00

9" - 10" Logo - \$12.00

12" Logo - \$15.00

HOW TO ORDER:

Place order at the Cranbrook meeting on the first Monday of month -

Select garment type - color of garment - logo imprint and color scheme -

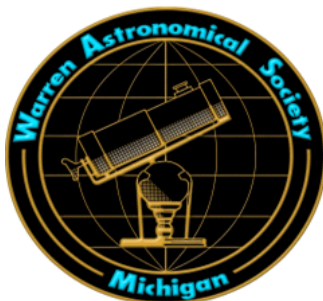
Pay in full for order to be placed -

Your order will be ready for pickup at next Cranbrook meeting -

(Your order may possibly be ready for the Macomb meeting following the Cranbrook meeting of that month - you will be notified if that is the case)

Contact Mark Kedzior @ bazonga952@hotmail.com with any questions

LOGO COLOR CHOICES



Gold/Blue



Gold-3D



WAS Astrophotos

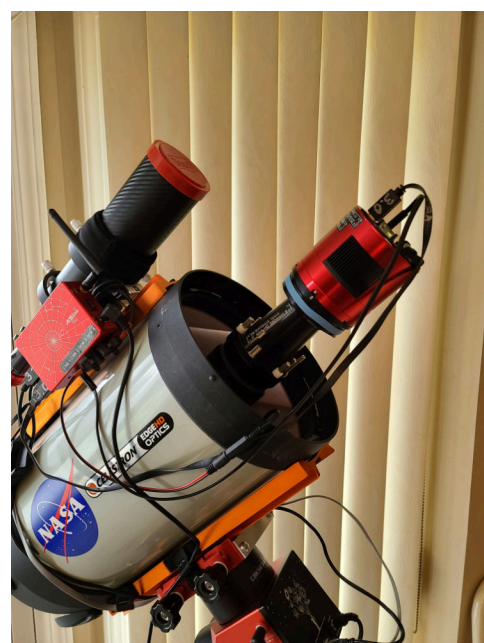


Image: Bob Berta

IC-1805 (Heart Nebula)

Above is the photo Bob Berta took 2/4/2024 of the Heart Nebula IC-1805 in Cassiopeia. It was with the Hyperstar on his 8" SCT (right.) The Hyperstar replaces the normal secondary mirror on the scope with an optical assembly and the camera mounts to that device.

Bob says, "The main advantage of the Hyperstar is that it makes the scope into an f 1.9 scope instead of the stock f 10 scope but also widens the FOV. This means you can take the same image in far less time....25 times faster than at f10 and 10 times faster than at f7. I also used my narrow band filter matched to the Hyperstar which though very dense still lets me shoot an image in 3 minutes. I stacked a bunch of three minute exposures that I collected over 2 hours total. This is on my ZWO AM 5 mount which also gave extremely good guiding.... .3 - .4 arc seconds best I have gotten to date with it. It was about 25 degrees out so was nice to run everything from inside my warm house kitchen table. The camera is a one shot color camera. The filter captures Ha and OIII so avoids lot of light pollution. I have about a Bortle 6 sky, similar to Stargate on best nights. I previously took the same photo with my 80mm APO refractor last year and while it was good.... this one has a lot more detail in it... hard to beat bigger aperture. Image capture and stacking along with plate solving was all done with the ASI AIR Plus which is that little red box next to the guide scope. Finally, I used Photo Shop for tweaking of the image."



More WAS Astrophotos

“Quick Moonshot”

Adrian Bradley write, “Back on 2/19, I was coming out of a bowling alley. The name of my bowling ball is the *Astro Physix*... Ironically enough, I've had some good league series with this ball lately.

The picture below isn't a picture of my bowling ball. It's a picture of the moon that I took after coming out of a bowling alley. Yes I admit I was showing off a little to a couple other bowlers, showing what a good camera and 600mm could do for moon photos.

What I did not know was that I'd captured a moment where the terminator was situated perfectly around the Jura Mountains, where the mountain peaks were bathed in rising sunlight while the rest of the region was still plunged in darkness. When this happens, those mountain peaks are known as the 'Golden Handle'. The Jura Mountains sit above the Bay of Rainbows, which is a smaller part of the Sea of Rains.



Image: Adrian Bradley

Toss this one in along with Lunar X and Lunar V as a favorite target of moon imagers. Shot at ISO 200, 1/800", f/6.3, 600mm (Sony A7R4, Sigma 150-600mm contemporary lens), handheld pointing right at the zenith where the moon was at the time.”

And From the Bright Side of the Sky...

(Left) This is an image Bob Berta took September 1, 2023 in Ha (Hydrogen Alpha filter.) Be sure to join us at Macomb Community College for the [March 21st meeting](#) when Bob will teach us solar imaging techniques.

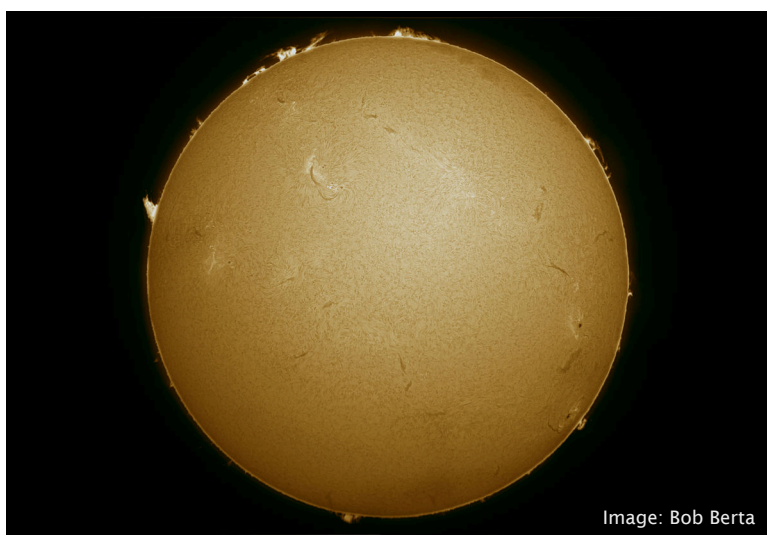


Image: Bob Berta

Letter

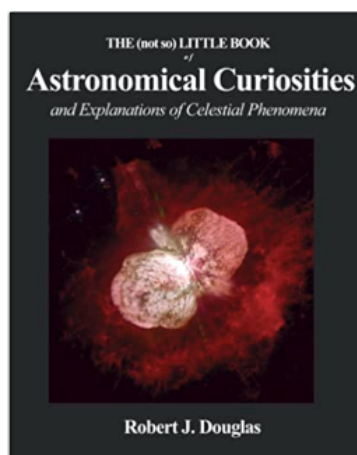
Great book that a friend of mine wrote.

This is a link to a web site that describes the book my friend wrote. It is a fabulous book and I thought club members might be interested. The author is a retired college professor and a very dedicated visual astronomer back in California. There are links here to see samples and the subject of the book.

<https://douglas.asimha.net/>

Available from [Amazon](#).

Bob Berta



The View From C.W. Sirius Observatory

SH2-273 - The Fox Fur Nebula

At the beginning of February, I was lucky enough to have 3 clear nights in a row up at the observatory. Having never imaged in the winter time for about 8 years, due to terrible weather conditions, I decided to image the Fox Fur nebula which is Sharpless2-273. The Fox Fur is located 2700 light-years away in the constellation Monoceros, which is very close to the arm of Orion. My image is a close-up of a small section of a much larger complex, generally known as the Christmas Tree cluster. The Cone Nebula is also a part of this same cloud. The Fox Fur Nebula contains enormous quantities of interstellar dust and gas, which are illuminated by the massive young stars that are being formed within the nebula's thick clouds. The red regions of this nebula are caused by hydrogen gas that has been stimulated to emit its own light by the large amount of ultraviolet radiation coming from the hot, blue stars of the cluster. The blue areas shine by a different process: they are mainly dust clouds that reflect the bluish light of the same stars. The Fox Fur gets its name because the nebula looks like the head of a stole made from the fur of a red fox. The very bright star in the image is S Monocerotis which helps to light up the Fox.

This is a very tough imaging target due to its faintness. I took this image using the 11" SCT f/7, a ZWO 2600 one shot color camera, and no filters. It consists of 5 ½ hours of



Image: Bill Beers

total integration time, which is done with 22 x 15 minute exposures. I put thin wires in front of the telescope to add the star diffraction spikes. To visually see this object through a telescope would require using a large scope in very dark skies. I would recommend a 20" or larger scope in a dark Michigan area. If you do get a chance to see it visually, please let me know because the entire Fox Fur region is a very pretty area.



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 Bill's 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: BEEZOL-L@AOL.COM



From the Desk of the Northern Cross Observatory



M 81 - Bode's Galaxy

On February 4/5, 2024 it was clear the entire night, so I scheduled up a run at Messier 81 with the 10" f/8 RC telescope and the ZWO asi2600mc pro camera on the Losmandy G11 mount.

From Wikipedia:

Messier 81 (also known as NGC 3031 or Bode's Galaxy) is a grand design spiral galaxy about 12 million light-years away in the constellation Ursa Major. It has a D25 isophotal

diameter of 29.44 kiloparsecs (96,000 light-years). Because of its relative proximity to the Milky Way galaxy, large size, and active galactic nucleus (which harbors a 70 million M_{\odot} supermassive black hole), Messier 81 has been studied extensively by professional astronomers. The galaxy's large size and relatively high brightness also makes it a popular target for amateur astronomers. In late February 2022, astronomers reported that M81 may be the source of FRB 20200120E, a repeating fast radio burst.



Data collection: 111 X 300 second light frames (9 hours, 15 minutes). 24 dark frames. 50 flat frames. Stacked in Deep Sky Stacker and processed in PixInsight.

-Doug Bock

Presentations

Cranbrook

7:00 pm, March 4, 2024

Main Talk

Open Skies Project: Calumet Air Force Station

By Zachary Garner and Kyle Kary

Explore the beginning transformation of the Calumet Air Force Station, a once iconic Cold War Air Force installation, from an abandoned, blighted site to a preserved historic site for modern purposes. This presentation outlines the history of the facility paired with the greater history of the cold war and the journey Open Skies Project has taken to save that history and tell its often unheard story.

Learn about our vision for the Calumet Air Force Station as a future destination for various recreation opportunities. With its remote location and minimal light pollution, the site offers unparalleled opportunities for observing the night sky. Join us as we discuss the exciting possibilities for collaboration and engagement.



About the Presenters

Zachary Garner
President, Open Skies LLC
Secretary & Researcher, Calumet Air Force Station Heritage Museum

Kyle Kary
Vice-President, Open Skies LLC
President & Researcher, Calumet Air Force Station Heritage Museum



Short Talk

Asteroid Occultations

By Bob Trembley

An occultation of a star by an asteroid is fairly high on the list of "amazing sights" that the amateur astronomer can witness. Occultations are similar to eclipses as they involve the passage of one celestial object in front of another. The process gives observers an opportunity to study the nature of one or both objects, and teams of observers witnessing an occultation can gather valuable data for researchers. Observation of asteroid occultations can be done by amateur astronomers (like us) with just a few pieces of equipment... and a car.

About the Speaker

Bob is the president of the Warren Astronomical Society, a volunteer NASA/JPL Solar System Ambassador, a podcast host and factotum for Vatican Observatory Foundation, and he's on the board of the Great Lakes Association of Astronomy Clubs which just hosted the amazing successful Astronomy at the Beach.



Macomb

7:00 pm, March 21, 2024

Feature

Solar Imaging

By Bob Berta

Bob is going to discuss what it takes to get into solar astrophotography and how to image our nearest star. He notes that there are more clear days than nights in Michigan and you don't have to travel any farther than your house to get fantastic photos. The equipment is generally a lot less expensive than deep sky gear, light pollution is not an issue, and the best part... no mosquitoes! The sun is moving into in the Solar Max part of its 11 year cycle which means a lot of dramatic activity and potentially GREAT photos.

About the Speaker

Bob retired to Michigan in 2004 from California where he was born and worked 36 years in the power industry in Northern California. He has 5 children, two by his late wife and three by his current wife and is celebrating their 31st anniversary this year. He is looking forward to being a great grandfather for the first time around September.



He was very active in the San Francisco Amateur Astronomy Club and still is a member. He is a member of WAS as well as the Oakland Astronomy Club and the 7 Ponds Astronomy club. He has been in several board positions in WAS including Secretary, Observatory chair, Outreach and two terms as club president. He also was VP of the Oakland club for a few years.

Bob is a Solar System Ambassador for JPL/NASA and also a 35 year Michigan representative for the Astronomical Society of the Pacific/Night Sky Network in California. His two favorite astronomy interests are Outreach and Astrophotography. He is also a gigging musician on electric and pipe organ, accordions and synthesizers. He belongs to a few musical organizations.

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



David H. Levy

Mystical Thoughts about the Night Sky

In the autumn of 1976, my first, “practice wife” and I visited Safed in northern Israel. In addition to being shown a 400-year-old Torah, we were introduced to the idea that Jewish mysticism, known as “Kabbalah”, got its start and flourished there. A lot of that mysticism had to do with connecting Jewish (and later Christian) ideologies with the night sky.

Kabbalah comes from a Hebrew root word, which means to receive; the ideas were originally passed on from parent to child, from master to disciple. In this article I explain what Kabbalah means to me. Several writers have attempted, with varying degrees of success, to compare Kabbalah with the origins of modern cosmology and with the formation of the universe. I agree that there may be a valid argument here, but for me, Kabbalah has taken on a deeply personal connotation.

I am not a scientist. At McGill University in Montreal, I flunked twice in two successive years in my attempts to master physics. During a third try at Acadia University in

maritime Canada, I very nearly failed again, this time in Geology. It wasn't until I transferred out of science altogether into the world of English literature that I finally started to do well. I still have never taken a course in astronomy. Everything I know about the Cosmos, about planetary science, about double stars, and about clusters of galaxies comes from my own reading, and my own observations of the night sky. I am in it because my heart and soul are forever linked to the magic and wonders of the night sky. I am much more at home with Kabbalah than I am with any scientific thoughts about the cosmos. I believe that the heart and soul of Kabbalah derives from personal experience, failure, and a sense of wonder.

In Psalm 36.10, We are told “By your light will I be enlightened.” As each of us tries, in her or his own way, to comprehend our world and the universe in which our world resides, we are struck by how complex, yet how simple, it can be. Einstein himself said that “The most incomprehensible thing about the world is that it is at all comprehensible.” It can work. We can understand. All it takes is a little patience, some intelligence, and the passion involved in looking up at a darkening sky.



Above, David's family of telescopes, looking up at a darkening sky. At right, one of David's scopes, Miranda, residing at the Donner Telescope museum of the Royal Astronomical Society of Canada.



Winter's Back Breaks

By Brad Young, Astronomy Club of Tulsa

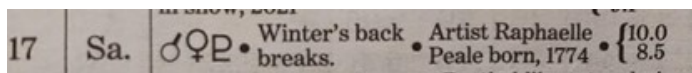
Each year when I get the new Farmer's Almanac, I turn to the February page to find this listing for the upcoming year. Of course, since the almanac comes out the first Tuesday of September, it seems a bit strange to be looking up this date regarding the winter that's still a ways off. But this is a date I look forward to every year, because by then I'm sick of winter and ready for its back to break. Unfortunately, a wild animal with a broken back will still thrash its tail and spasmodically swipe its claws at everyone around it. Although we have light winters here in Oklahoma, many of our worst winter storms have occurred in March. But normally, the middle of February does represent a good point to talk about the end of a season and whether that end should be celebrated or perhaps is worth just a tinge of regret. Besides, a fresh look may be in order, as the mere thought of breaking winter's back *may be cruelty*.

and the sun goes down, the temperature drops quickly in the dry air, and you're left shivering.

However, there are several advantages to the season. You won't have to worry about bug spray. As mentioned, the skies are often clearest of the year. Since we are on standard time and the sun sets early, you can get a whole observing session in and be ready for bed by midnight. And since it's cold there's not much else to do outside that's fun. Perhaps winter isn't such a monster after all, which is why I said that it's passing might be just a little sad.

SPRING REFLECTED IN THE SKY

You can see a metaphor for the seasonal changes played out in the constellations as we look up during [Late Winter](#), [Early Spring \(when everybody goes to Mexico\)](#). We all know the adage that March comes in like a lamb and goes out like a lion, based on Leo rising in the east after Twilight and Aries setting soon after the Sun. This is mimicked by the often-gusty winds of early March and then a more peaceful end to the month as spring starts to show everywhere with daffodils and buds on the tree limbs.



2024 date was Feb. 17

Winter certainly represents a low point for most outdoor astronomy. Although some of the clearest, driest nights happen in winter, they're usually also unsteady due to atmospheric turbulence, and of course much colder than I want to be. Nice sunny days in winter may tempt you to go outside that night. But you'll find once the oven door is shut



3 Leaps of the Gazelle

Other sky sites that tell us winter is ending is watching the bear Ursa Major rising in the east sort of like a bear de-camping from its winter cave and staggering out into the world still half asleep. Caught between this yawning bear and the rising lion Leo a gazelle bounds away, leaving "The Three Leaps of the Gazelle" in the sky (see picture). Leo the Lion is presenting her new spring cub, Leo Minor, just to her north. Ursa Minor, the little bear, also begins to come around behind its mom, I guess a little sleeper than her.

Orion is at his best now right after sunset, and he and his faithful hunting dogs will spend the first half of the night finishing up their winter hunting trip. But if you stay up late, especially in the few days before daylight saving time, you'll notice that Orion, Aldebaran, and the other southern winter constellations are starting to set before midnight now, foreshadowing the upcoming run to the Sun that they will do over the next two months. In March, the big winter "G" [consisting of those stars plus the wide pairs of Castor and Pollux, Menkalinan, and Capella] is already starting to tip over in the early evening. By May, it will be hard to see the western side. In another article I described how [quickly things change in the evening sky in springtime](#). It's almost as if the sky wants to sweep the winter constellations away much as we'd like to put it behind us down on Earth.

PLANET DEARTH

This year there are hardly any planets to be seen until very late. Jupiter and Uranus are still visible low in the evening sky but setting earlier every night as it they appear in the area between Cetus and Aries and will be lost in the glare of the Sun mid spring. Mercury will be the only other planet to see for a short evening elongation, as Saturn and all the rest have moved to the morning sky.

CHANGES IN LATITUDE, CHANGES IN ATTITUDE

Each year we spend a lot of time wanting and hoping winter to end instead of enjoying the last taste of the bright winter sky that holds so many good deep sky objects and bright stars. This year, instead of dreaming of spring warmth and hours you season, try enjoying the last few weeks of winter and remember that a couple of months from now you'll be complaining bitterly about how hot it is outside and having to wait until 10:30 for it to get dark.

If you don't think that will work, go someplace crazy south like [Coonabarabran, Australia](#). Its just like western Oklahoma, but has sheep instead of beef. Or go to South Texas or somewhere else warmer and observe there. But if you don't or can't, remember each season has its ups and downs, and maybe its best to just enjoy them for what they offer.

ADDENDUM

This month's article was supposed to be on a different subject, but events have conspired to keep me too busy to give it the research it needs; maybe next Messier Marathon season I'll get to it. Also, a few bits and pieces here from the February General Meeting:

The Astronomical League has added several new observing programs with a nod to southern hemisphere targets:

- HERSCHEL SOUTHERN 400
- 250 FROM ORIGINAL LISTS (e.g. if you have done any of the other Herschel programs, or have 250 finished)

- Add 150 SOUTHERN OBJECTS to achieve another level and receive a certificate.
- BENNETT – 107 (SILVER) certificate or all 152 (GOLD) for a pin. This is a corollary of the Messier list.
- BAMBO'S LIST (600 OBJECTS) includes all the southern objects of note, including double stars, variables, and deep sky. I'll see John Bambury here in 2 weeks and hope to interview him and some others at the Ozsky Star Party. <https://ozsky.org/BAM600/>



John Bambury

SOURCES:

<https://www.constellation-guide.com/three-leaps-of-the-gazelle/>

<https://ozsky.org/>

<https://www.almanac.com/>

Join the Astronomical League



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

Also:

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

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

alcor@warrenastro.org



Over the Moon



With Rik Hill

Lacus Mortis and Burg

The region of Lacus Mortis (left of center) is the hexagonal plain with the nearly central crater Burg (41km dia.) that has a valley dividing its central peak in two, surrounded by nice hummocky terrain for another 40km or so. There are some interesting rimae (what we used to call "rilles") around the Lacus starting at the 8 O'clock position from Burg where there is a shear fault that points to the north from the rim of the Lacus. Moving up from there is a graben that extends out to the north of Burg. Then above Burg is a short rima only about 25-30km long, that appears to be a catena formed from impact debris, probably from the Burg impact since it is the youngest in the area, being of Copernican age (1.1 billion years ago to present).

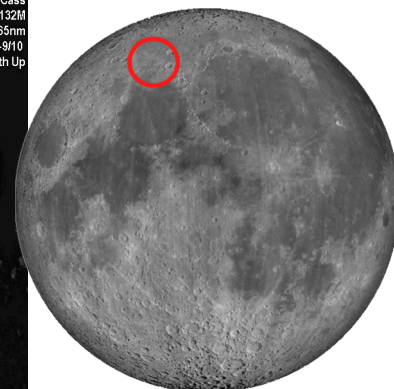
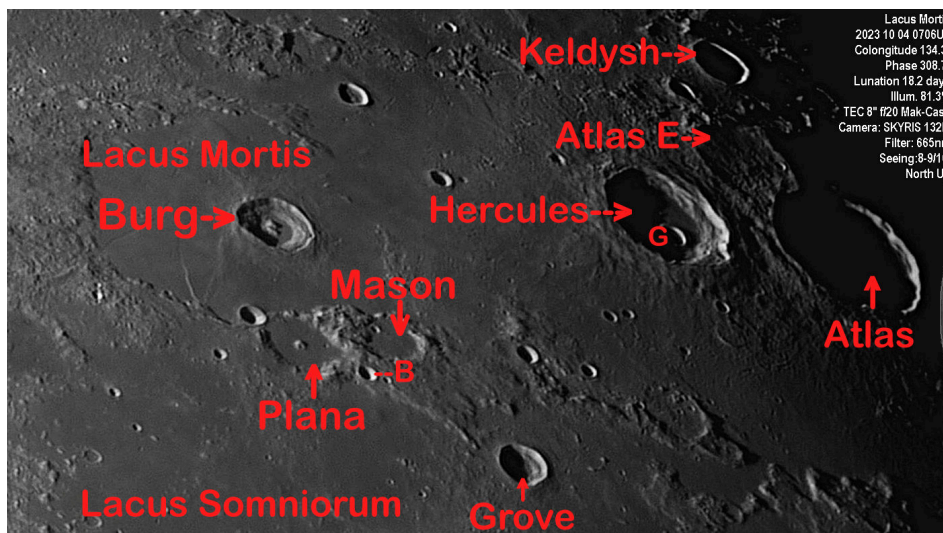


Below Burg are a pair of craters, the flat floored or flooded crater Plana (42km) and to the right of it is a smaller flat floored crater Mason. Between them and below (south) is the crater Mason B, a very fresh crater as is the small unnamed 3km crater below and to the right of it. About 20-25km below Mason B on the plain of Lacus Somniorum, is a low isolated dome. Moving further south you come to the crater Grove (29km) at the bottom of this image. Due east of Burg (right) are the two large craters. The nearest being Hercules (68km) with the large Hercules G (13km) crater on its floor. Then deep in evening shadow further east is Atlas. These two craters are more familiar to the amateur ob-

server as two of the more identifiable features in the waxing crescent moon.

Notice above Atlas there is the hint of a crater outline. This is Atlas E (59km), very ancient possibly pre-Imbrian, and deeply overlain by ejecta from both Atlas and Hercules. Further north you can just make out Keldysh (33km) almost completely in the night's shadow.

This image was made from portions of two 1800 frame AVIs stacked with AVIStack2 and knitted together with MS ICE. Final processing was done with GIMP and IrfanView.



Location Maps by Ralph DeCew

History S.I.G.



March 1994

This issue leads off with computer chatter by Larry Kalinowski. Next up is Journal Roundup by Scott Jorgensen reviewing recent journal articles on various astronomical topics, such as neutrino telescopes, Hubble space telescope, cosmic rays, and black holes. Of note in the minutes: I found a proposal for a club event built around the impending collision of Comet Shoemaker-Levy. This issue also includes a word find puzzle comprising of constellation names.

March 2004

By this decade computer chatter by Larry Kalinowski has changed to Astro chatter we are also getting minutes of meetings on a more regular basis. In this issue we find Larry has the "Swap Shop" going, then, an article, "If the Milky Way Galaxy was a Dot" by Dave Workun where he works out the mind-boggling sizes/distances involved in measuring the universe. Finally there is the NASA space place article making an early appearance.

Dale Thieme,
Chief Scanner

Paul Strong Scholarship

Lauren Mount

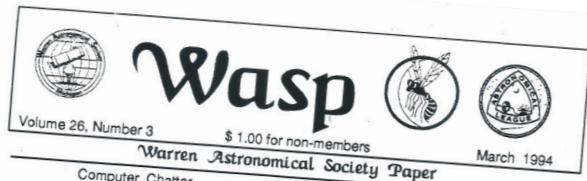
This year, the \$500 Paul Strong Scholarship, funded by WAS, is awarded to Lauren Mount. Congratulations!

A graduate of Chippewa Valley High School, Lauren is currently taking classes at Macomb Community College full time which she can transfer to Oakland University in Winter/Spring 2025 to graduate with a B.S. in Environmental Science with a minor in finance or business. She would like to use this to have a career in consulting businesses for environmental related projects.



WAS Name Tags

Name tags are back. If you wish to have one and are a dues paying member, contact publications@warrenastro.org and we'll get one printed up for you.



Computer Chatter
by Larry F. Kalinowski

Jeff Bondano, our new president, made a computer splash at the Macomb business meeting last month. He demonstrated his latest version of Our Cosmohood, a graphic, 3-D astronomy program that displays the positions of the nearest 2500 galaxies, out to a distance of forty megaparsecs. Jeff led a demonstration which gave members the chance to try his program on five of the labs IBM computers. The program automatically graphs the galaxy's positions and rotates to give you better views of the filamentary structure of the universe. The user can choose to look at any portion of the user requires. Utilizing color coding, the program familiarizes the user with the numerous galactic structures and associations that make up our known portion of the universe.

COMPUTER TIP OF THE MONTH. The second best way to buy a computer is to have one assembled by a local, independent dealer in your neighborhood. Why? Because you can specify a generic design, one that is easily repaired and upgraded by yourself, one whenever it's required. Independents are now offering adding something special in all price ranges with the option of computers have become increasingly designed, making range from expensive to mail order levels. The prices can be around. The best way? Assemble it yourself! All it takes is a case with a power supply built in, a keyboard, a monitor with interface card, a hard drive with interface card, a three inch floppy drive, a five inch floppy drive and a motherboard (386, 486 or S85) of your choice. Memory chips are usually extra but the dealer will include them in the price of the motherboard if you ask. You now have everything you need to be productive except a printer.

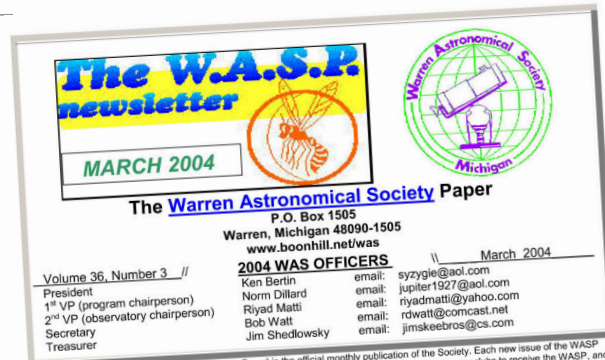
The CD-ROM drive is making a big splash in the computer world. Many of the computers being sold today have them included as a third type of drive (hard, floppy and CD). By the end of this year the CD-ROM drive could be standard equipment on all computers. That's how popular they've become. If your proposed computer is going to have one, be sure it's the double-spin type for faster data transfer. Triple-spin CD drives are now available on dealer shelves but are still a little pricey for most users (about \$500). NEC, the developer of the triple-spin drive has also developed a quadruple-spin model. It's now available through mail order purchase (\$1200).

The libraries in your county have probably gone on line recently. I know Macomb has. I've called the Roseville library's bulletin board and had access to all the information regarding which books are checked in or out, who has the ones that are out and when they're due to be returned for each library in Macomb county. You can search the library's files by title, author name or subject matter. If you're doing research, it saves a lot of running around.

The May 10th annular eclipse could provide a lot of publicity for the WAS. It has all the requirements that can be taken advantage of by an astronomical organization... a mid-day event, easily observable with modest equipment, long lasting and probably a lot of media coverage. The only disadvantage is, it occurs on a week day, Tuesday. As with all solar viewing, care must be taken to prevent the possibility of eye damage. Toledo, Ohio is the closest metropolitan city near the umbra's centerline, however, the eclipse will still be seen as an annular event, even from Detroit.

If you plan to acquire high density filters for the event, I suggest that you order or buy the filters now, before the rush starts. You'll need Neutral Density #5 filters for visual observing and ND #4 for photography. Neutral density filters are available at most good photography stores. Any vendors supply store will stock filters strong enough for visual work, however they aren't neutral density. If you don't mind a green or brown Sun, they'll do fine. The visual filter should reduce incoming radiation (light, heat, ultraviolet, etc.) by 100,000 times (10 to the fifth power) or to put it another way, transmit only .001% of incoming radiation. Welding shops don't grade their filters the same way photographers do. You'll have to get a number 12 or 13 grade welding filter to approach a neutral density #5 filter.

The clock speed of the human brain is only 17 hertz. How does it accomplish so much? Parallel processing. The brain acts like billions of processors, all working at the same time. The result is a chemical super computer.



The Warren Astronomical Society Paper
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Warren, Michigan 48090-1505
www.boonhill.net/was

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2004 WAS OFFICERS

President	Ken Bertin	email: szyzyg@aol.com
1 st VP (program chairperson)	Norm Dillard	email: jupiter1927@aol.com
2 nd VP (observatory chairperson)	Riyad Matti	email: riyadmatti@yahoo.com
Secretary	Bob Watt	email: rdwatt@comcast.net
Treasurer	Jim Sheddowsky	email: jimskeebros@cs.com

The WASP (Warren Astronomical Society Paper) is the official monthly publication of the Society. Each new issue of the WASP is mailed to each member and/or available online www.boonhill.net/was. Requests by other Astronomy clubs to receive the WASP, or all other correspondence should be addressed to the editor, Cliff Jones, email: clifford@ameritech.net.

Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the first of each month. Any format of submission is accepted, however the easiest forms for this editor to use are plain text files. Most popular graphics formats are acceptable. Materials can be submitted either in printed form in person or via US Mail, or preferably, electronically via direct modern connection or email to the editor.

Disclaimer: The articles presented herein represent the opinions of the authors and are not necessarily the opinions of the WAS or the editor. The WASP reserves the right to deny publication of any submission.

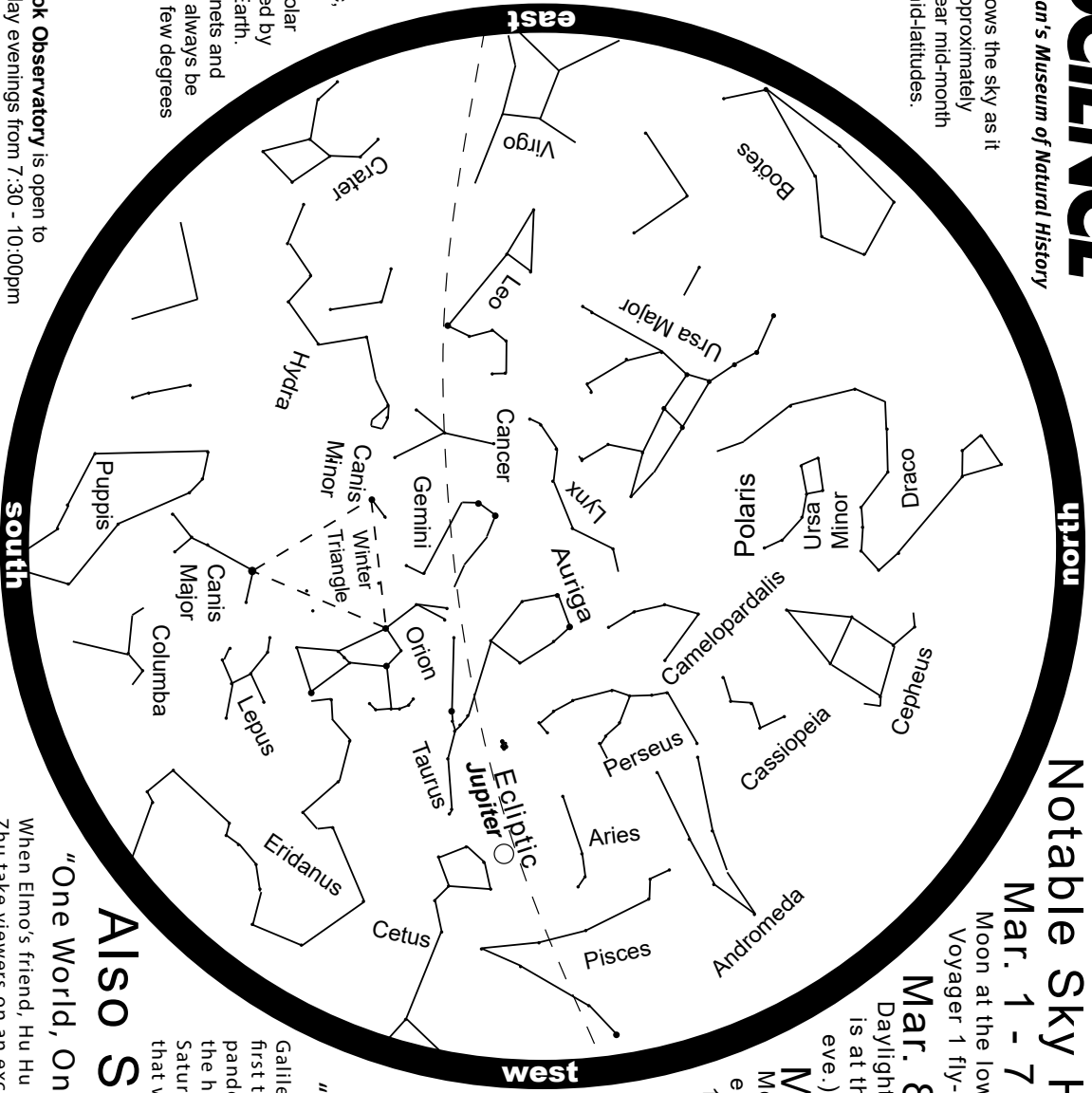
Astro Chatter
by Larry Kalinowski

The comets are coming! As mentioned earlier, in this newsletter, Comets LINEAR C/2002 T7 and Neat C/2001 Q4 are going to make an interesting sight this spring. Unfortunately, T7 will best be viewed in the morning around 5:00am, so they both won't be visible in the same part of the sky, during their brightest displays. Both will be visible in the north-west sky during the end of May, though not at their brightest. T7 is observable right now in the western, evening, sky as a sixth magnitude object, in Pegasus, near the star Algenib. Q4 won't become observable until early May but will become a spectacular sight, high in the western, evening, sky for at least a month, maybe more. Both comets are behaving as expected and following their predicted brightness. They're both expected to become as bright as first magnitude or even brighter. I'll talk about the best time to view these comets in future issues of the WASP. So keep reading this newsletter. This could be the best comet viewing since Hale-Bopp and Hyakutake.

COMET LINEAR C/2002 T7 - PHOTO BY DENNIS PERSYK JAN. 13, 2004

A new state of matter? Something besides gases, solids, liquids, plasmas and a Bose-Einstein condensate? Don't look now but it's another step further into the super conducting world of electricity. Deborah Jin, a recent recipient of the MacArthur Foundation's "Genius grant" was expanding on the work of Eric Cornell and Carl Wieman, winners of

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



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

The Cranbrook Observatory is open to the public Friday evenings from 7:30 - 10:00pm EST, and the first Sunday of the month from 1:00 - 4:00pm for solar viewing.
For observatory information visit <http://science.cranbrook.edu/explore/observatory>

MARCH 2024

Notable Sky Happenings

Mar. 1 - 7

Moon at the lower left of Antares on the 3rd (S predawn). Voyager 1 fly-by of Jupiter 45 years ago on the 5th.

Mar. 8 - 14

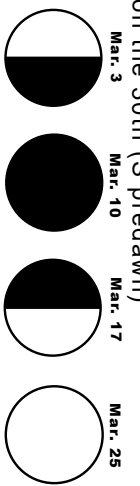
Daylight time begins at 2:00am on the 10th. Moon is at the upper right of Jupiter on the 13th (W eve.) 14th: Happy 145th birthday, Einstein!

Mar. 15 - 21

Moon is below Pollux on the 18th (WSW evening). March (Spring) Equinox is at 11:06pm EDT on the 19th. Moon is above Regulus on the 21st (SE evening).

Mar. 22 - 31

Moon is below Spica on the 26th (ESE evening). 29: Mariner 10 at Mercury 50 years ago. Moon is to the right of Antares on the 30th (S predawn)



Now Showing

"Two Small Pieces of Glass"

Galileo did not invent the telescope, but he was the first to use it to examine the sky. Telescopes have expanded our knowledge of the cosmos. We'll learn about the history of telescopes, explore the Galilean Moons, Saturn's rings, the structure of galaxies and view images that were made through our observatory telescope.

Also Showing

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

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

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





Moon Over the Dock - Adrian Bradley

March 2024


Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3 LAST QUARTER MOON	4 Cranbrook	5	6	7	8 Maha Shivaratri	9
10 Daylight Saving Begins NEW MOON	11 First Day of Ramadan	12	13	14	15	16 FIRST QUARTER MOON
17 St. Patrick's Day	18	19 Vernal Equinox	20	21 Macomb	22	23 Moon at Apogee: 406292 km Stargate
24	25 Holi FULL MOON	26	27	28	29 Good Friday	30
31 Easter						

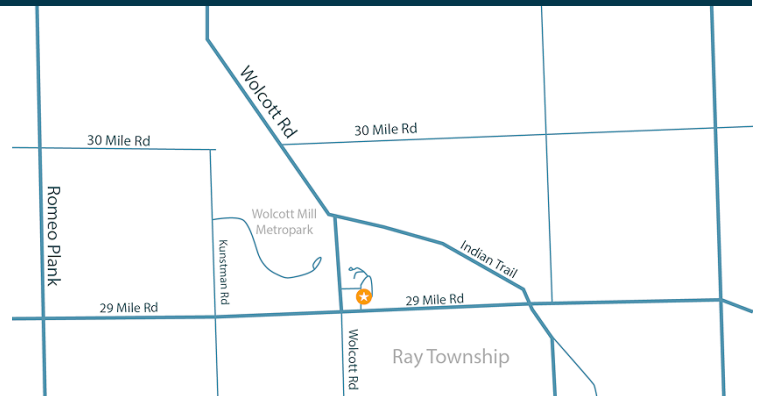


Stargate Observatory

Monthly Free Astronomy Open House and Star Party 6:30 PM, 4th Saturday of the Month Wolcott Mill Park - Camp Rotary Entrance

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

- Sky tours.
- See different telescope types in operation.
- Get help with your telescope.
- We can schedule special presentations and outings for scouts, student or community groups.
- Contact: outreach@warrenastro.org
- Find us on Meetup.com 



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

Observatory Rules:

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

Stargate Report

February Open House

The observatory opened at 6:17 pm. The sky was clear with a slight haze. Roughly 60 people came to the open house including club members, a group of scouts, and new visitors. We used the 8-inch refractor to observe several objects including Jupiter, Deep Sky Objects, Double Stars, and the Moon. There were 4 telescopes set up outside the observatory used for observing and astrophotography. The observatory was closed after all visitors left just after 9 pm when clouds moved in.

Thanks to all the members who helped with observing and answering questions. We had a very good observing session.

March Open House

The next open house is scheduled for Saturday, March 23

Riyad I. Matti
2024 2nd VP,
Observatory Chairperson

Treasury Report

For February 29, 2024

Over 30+ members renewed their accounts last month.

BOA account:

Balance:..... \$25,880.01
Received:..... 839.50
Expense 0.00

PayPal Account:

Balance:..... \$947.96
Received:..... 167.11
Paid 17.99

(Website domain fee)

Membership

Total Paid Memberships 79

We welcome new members Bob & Mihaela Charlier and Richard Willemsen.

Notes from the Treasury:

Is it time to renew your membership? Every New Year, many memberships expire. Please let me know via email at treasurer@warrenastro.org to verify your membership status. When you receive your membership flyer in the mail, fill it out and send it to: Warren Astronomical Society, P.O. Box 1505, Warren, Michigan 48090-1505. We strongly recommend using PayPal for faster service, but we also accept checks and cash at the meetings."

Astronomical Events For March 2024		
Add one hour for Daylight Saving Time		
Source: http://astropixels.com/almanac/almanac21/almanac2024est.html		
Date	Time (h:m)	Event
3	3:16	Antares 0.4°S of Moon
3	10:24	LAST QUARTER MOON
7	23:59	Mars 3.5°N of Moon
8	12:01	Venus 3.3°N of Moon
10	2:06	Moon at Perigee: 356895 km
10	4:00	NEW MOON
11	20:18	Moon at Ascending Node
13	20:02	Jupiter 3.6°S of Moon
14	21:54	Pleiades 0.4°N of Moon
16	23:11	FIRST QUARTER MOON
17	6:00	Neptune in Conjunction with Sun
17	12:00	Mercury at Perihelion
19	1:44	Pollux 1.5°N of Moon
19	12:00	Venus at Aphelion
19	22:07	Vernal Equinox
21	17:00	Venus 0.3°N of Saturn
21	23:46	Regulus 3.6°S of Moon
23	10:44	Moon at Apogee: 406292 km
24	17:00	Mercury at Greatest Elong: 18.7°E
25	2:00	FULL MOON
25	2:13	Pen. Lunar Eclipse; mag=0.956
25	23:07	Moon at Descending Node
26	14:40	Spica 1.4°S of Moon
30	9:24	Antares 0.3°S of Moon

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

Dave Baranski,
Treasurer

Outreach Report

I have been reaching out to as many libraries and institutions ahead of the April eclipse, most seem to have something worked out. I have gotten the Stargate Observatory listed on the Pure Michigan website <https://www.michigan.org/property/stargate-observatory>. Hopefully more people will find us.

February:

Connie Trembley spoke at the Planet Characterization Workshop via Zoom on February 21st. Her talk was titled: "The impact of taxonomy on public perception of science and the universe in which we live."

Upcoming:

- One of the places I contacted was the Discovery Learning Center in Mt Clemens. They host Steam Saturdays,

and the fourth Saturday of every month is Space. They would love to have someone for presentations for younger children. Next one is March 23rd (1-4pm)

- Wright-Patterson Air Force Base National Museum of the US Air Force (OHIO). They want presenters not only for April 8th, but every Wednesday in March plus April 5th to build interest in the eclipse.
- State Wide Astronomy Night - April 12 Belle Isle Nature Center 7-10pm. This is a partnership between the Nature Center and Wayne State University. They are always looking for more scopes.

**Jeff MacLeod,
Outreach**

Meeting Minutes

Board Meeting

January 29, 2024

Zoom Meeting called to order around 7:03pm

Attendance: President Bob Trembley, First VP Dale Partin, 2nd VP Riyadh Matti, Treasurer Dave Baranski, Secretary Charles Strackbein had technical / internet connectivity troubles and missed most of the meeting some notes were taken by Publications Vatsalya Dandibhotla and Editor Dale Thieme.

Officers Reports:

President Bob Trembley spoke about his trip to Tucson, Arizona and Meetings with Brother Guy.

Treasurer Dave Baranski spoke about Bank of America update and the need for a letter that enables him to do banking on our behalf on our letterhead.

Secretary Charles Strackbein had technical/internet connectivity troubles and missed most of the meeting some notes were taken by Dale T.

The need to renew memberships and availability of lanyard-ready WAS badge was discussed.

Cranbrook Meeting

February 5, 2024

The meeting started and went live shortly after 7pm

Present: 30 at Cranbrook, 16 on Zoom, and 5 on YouTube.

Announcements were made about Brother Guy being at Cranbrook March 17th, a few WAS calendars may be available for \$15 and WAS wearables can be purchased from Mark Kedzior and swag is still left to be announced. Get going on plans for the total solar eclipse on April 8th if you haven't already, we need ideas for the message board at the observatory,

Officer reports

Riyad noted our first open house will be January 27th and we need volunteers for spring clean up April 27th at the open house. We can look forward to the Perseids meteor shower on August 10 at the open house and the picnic and open house is planned for Saturday August 24th.

Observing Reports

The blueness of Uranus and Neptune was discussed, David Levy presented solar news about the SDO images and Riyadh Matti spoke of a double star and the Perseids at as viewed at the open house at Stargate Observatory.

Short talk

The famous, highly intelligent and always entertaining Gary Ross spoke of his "The Problem of TZ Arietis" noting how the experts were misled by "optics" and had it all wrong.

Snacks were brought by Mike O'Dowd and Laura Wade.

Main Talk

A very fascinating feature talk was made by Diane Hall thor-

oughly calling attention to some of her favorite Deep Impacts on Earth. The meeting ended around 9:15pm.

Respectfully submitted by:

C. Strackbein
WAS Secretary

Macomb Meeting

February 15, 2024

Present: 13 at Macomb, 13 on Zoom and 5 on YouTube

Board Members: Onsite- Dale Partin; Remote- President Bob Trembley, Secretary Charles Strackbein, Outreach Board member Jeff Macleod and Publications board member Vatshalya Dandibhotla were unable to attend the meeting in person.

Meeting was called to order about 7:03pm by President Bob Trembley (Remote)

President's introduction

Bob spoke about renewing memberships, we had suggestions for Banquet, reception and raffle ticket committee (not Dale T.) Having the Banquet at the Ukrainian Cultural center again was suggested and briefly discussed, Lanyards, Brother Guy at Cranbrook on March 17th, Calendar Availability and WAS Merch and Swag were announced. The urgency of making solar eclipse plans was noted. The immediate need and an appeal for WAS volunteers for Cranbrook to help people see the partial eclipse in Michigan. Discussion pertaining the need for ideas for the Stargate Message board. Officers Reports were made by President Trembley, who

noted his new podcast for the Vatican Observatory was released. The Podcast featured Brother Bob Macke who has Brother Guys old position. Bob noted Brother Guys current activity.

Officer reports

First VP Dale Partin noted the upcoming short talks and long presentations and made an appeal for short talks and even bigger need for long presentations. 2nd VP Riyadh Matti spoke of double stars, Treasurer David Baranski updated us on the status of the Bank of America Account and the progress made for him to perform banking on WAS behalf. The secretary was participating remotely and was taking notes. Dale Thieme stated that the WAS February 2024 News Letter was out.

Astronomy in the news was discussed, David Levy updated Solar news, Riyadh spoke of Double Stars at the observatory, and President Bob Trembley asked for other special interest groups recommending SIG: Radio, Computers and Technology, Education, Light Pollution and Podcasting.

Mike O'Dowd and Laura Wade brought the snacks and after snack time First VP Dale Partin introduced the nights speaker.

Main Presentation

"Astronomy 101" by Ronald Kyle. A beginner's introduction to the myriad facets of what makes up astronomy.

The meeting ended shortly after 9pm

Respectfully submitted by:

WAS Secretary
C. Strackbein

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.

The Warren Astronomical Society is a proud member of the

Great Lakes Association of Astronomy Clubs

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.

Club Name and 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
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

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
University Lowbrow Astronomers:	http://www.umich.edu/~lowbrows/reflections/

WAS Member Websites

Steven Aggas: <http://apache-sitgreaves.org/>

Jon Blum: [Astronomy at JonRosie](#)

Doug Bock:

Facebook: Northern Cross Observatory: <https://www.facebook.com/NorthernCrossObservatory>

Boon Hill and NCO Discussion <https://www.facebook.com/groups/369811479741758>

Flickr (astrophotography album): <https://www.flickr.com/photos/141833769@N05/>

YouTube channel: <https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w>

Bob Trembley:

<https://www.vaticanobservatory.org/profile/rtrembley>

[Vatican Observatory Foundation Blog](#)

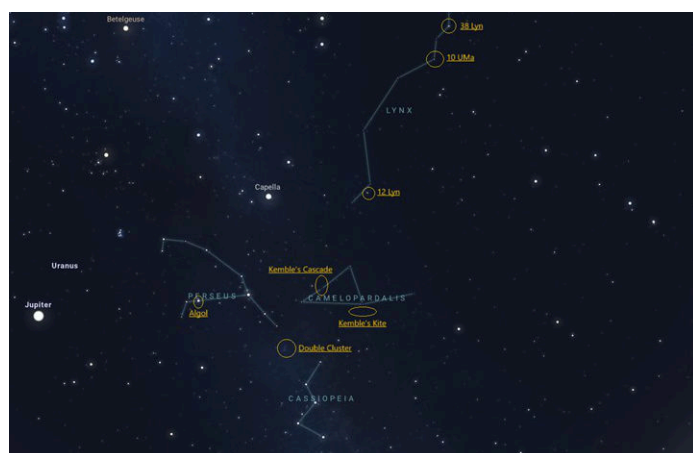


This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Constant Companions: Circumpolar Constellations, Part II

By Kat Troche

As the seasons shift from Winter to Spring, heralding in the promise of warmer weather here in the northern hemisphere, our circumpolar constellations remain the same. Depending on your latitude, you will be able to see up to nine circumpolar constellations. This month, we'll focus on: Lynx, Camelopardalis, and Perseus. The objects within these constellations can all be spotted with a pair of binoculars or a small to medium-sized telescope, depending on your [Bortle scale](#) – the darkness of your night skies.

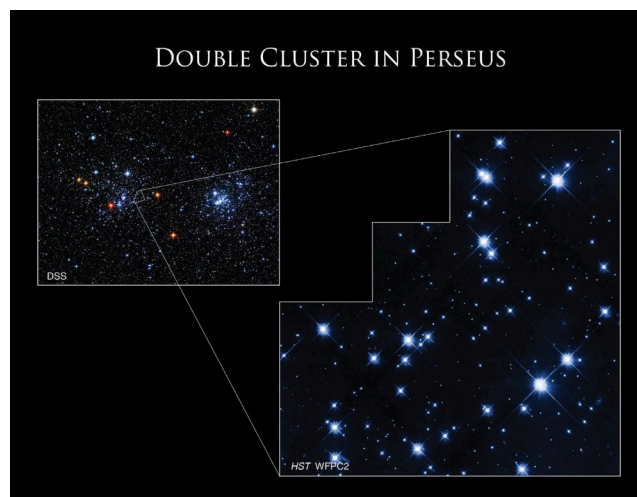


In the appearance of left to right: constellations Perseus, Camelopardalis, and Lynx in the night sky. Also featured: Cassiopeia as a guide constellation, and various guide stars.

Credit: [Stellarium Web](#)

- **Double Stars:** The area that comprises the constellation Lynx is famous for its multiple star systems, all of which can be separated with a telescope under dark skies. Some of the notable stars in Lynx are the following:
 - **12 Lyncis** – a triple star that can be resolved with a medium-sized telescope.
 - **10 Ursae Majoris** – a double star that was once a part of Ursa Major.
 - **38 Lyncis** – a double star that is described as blue-white and lilac.
- **Kemble's Cascade:** This [asterism](#) located in Camelopardalis, has over 20 stars, ranging in visible magnitude (brightness) and temperature. The stars give the appearance of flowing in a straight line leading to the Jolly Roger Cluster (NGC 1502). On the opposite side of this constellation, you find the asterism **Kemble's Kite**. All three objects can be spotted with a pair of binoculars or a telescope and require moderate dark skies.

- **Double Cluster:** The constellation Perseus contains the beautiful Double Cluster, two open star clusters (NGC 869 and 884) approximately 7,500 light-years from Earth. This object can be spotted with a small telescope or binoculars and is photographed by amateur and professional photographers alike. It can even be seen with the naked eye in very dark skies. Also in Perseus lies Algol, the Demon Star. Algol is a triple-star system that contains an eclipsing binary, meaning two of its three stars constantly orbit each other. Because of this orbit, you can watch the brightness dim every two days, 20 hours, 49 minutes – for 10-hour periods at a time. For a visual representation of this, revisit [NASA's What's Up: November 2019](#).



A ground-based image from the Digitized Sky Survey (DSS) in the upper left shows Caldwell 14, the Double Cluster in Perseus, with an outline of the region imaged by Hubble's Wide Field and Planetary Camera 2 (WFPC2).

Ground-based image: Digitized Sky Survey (DSS); Hubble image: NASA, ESA, and S. Casertano (Space Telescope Science Institute); Processing: Gladys Kober (NASA/Catholic University of America)

From constellations you can see all year to a once in a lifetime event! Up next, find out how you can partner with NASA volunteers for the April 8, 2024, total solar eclipse with our upcoming mid-month article on the [Night Sky Network](#) page through NASA's website!

ADDITIONAL LINKS:

<https://science.nasa.gov/solar-system/skywatching/how-to-find-good-places-to-stargaze/>

<https://science.nasa.gov/solar-system/skywatching/what-are-asterisms/>

<https://www.youtube.com/watch?feature=shared&t=94&v=4mSETiiOpeg>