Happy Holidays

from the W.A.S.P.

About the cover: page 5
The Warren Astronomical Society Paper (WASP) is the official monthly publication of the Society. Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted in person, via US Mail, or by email (publications@warrenastro.org).

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

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

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

First Monday meeting:
Cranbrook: Institute of Science
1221 North Woodward Ave
1122 Bloomfield Hills, Michigan

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

Membership and Annual Dues
Student: $17.00; Individual: $30.00; Senior Citizen: $22.00; for families: 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
Loanser telescopes (with deposit). See 2nd VP.
Free copy of each WASP newsletter.
Free use of Stargate Observatory.
Special interest subgroups. See chairpersons.
Free use of W.A.S. library. See librarian.

The 2019 Officers:
President: Jeff MacLeod (president@warrenastro.org)
1st VP: Jonathan Kade (firstvp@warrenastro.org)
2nd VP: David Baranski (secondvp@warrenastro.org)
Secretary: Jerry Voorheis (secretary@warrenastro.org)
Treasurer: Mark Jakubisin (treasurer@warrenastro.org)
Outreach: Bob Trembley (outreach@warrenastro.org)
Publications: Dale Partin (publications@warrenastro.org)
Entire Board (board@warrenastro.org)

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).

Discussion Group Meeting
Come on over, and talk astronomy, space news, and whatnot!

The Discussion Group for December will be on Thursday, Dec 19th at 7 pm, hosted by Anita Malys: 6935 Inkster Rd, Bloomfield Hills 48301.

Anita will provide pizza and drinks.

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Snack Volunteer Schedule
Dec 2 Cranbrook Dale Partin
Dec 5 Awards Banquet
Jan 6 Marty Kunz
Jan 16 Bob Berta

If you are unable to bring the snacks on your scheduled day, or if you need to reschedule, please email the board at board@warrenastro.org as soon as you are able so that other arrangements can be made.
Annual Awards Banquet
Thursday, December 5th, 2019
Price $30 per person, $35 at the door

Don’t forget, every dinner purchased ($30 per person, $35 at the door) comes with one opportunity for the door prizes. More door prize tickets can be purchased at $1.00 a piece or 6 for $5.00. Limit $20.00.

Program
6:00 pm
Cash Bar

7 pm
Dinner

8:30 pm
Presentation
Skylore & Mythology
From Around the World

9:30 pm
Awards and door prizes

Ukrainian Cultural Center
26601 Ryan Road
Warren, MI 48091

Menu

Entrée:
Beef Sirloin Tips in Mushroom and Wine Sauce
Roasted Chicken with Choice of Sauces
Broiled Cod with Corn Relish, Lemons and Tartar Sauces

Side Dishes:
Potato and cheese Varenky (pierogi)
Green Beans Ukrainian Style
Seasoned Whipped Potatoes with Garlic and Butter
Romaine Lettuce Garden Salad with House Dressing
Fresh Rolls and Butter

Dessert
Cherries Jubilee

Soft Drinks
Wine and Beer Included
You can buy calendars for $15 each at the next few meetings. You can also order them online. (But you still have to pick them up in person or find a kind fellow member to mail it to you.)

Buy Yours Today

Want to keep track of W.A.S. meetings and exciting astronomical events next year?

Order your 2020 Warren Astronomical Society calendar now!

These beautiful calendars feature W.A.S. member astrophotography and historical photos, including:

- Cara Reneski - Moon Craters
- Zsolt Nagy - Almost a Quarter Moon
- Bill Beers - Messier 82 Galaxy
- Doug Bock - Messier 51
- Doug Bock - M13
- Astronomy Outreach with Ken Heilig, Amanda Mullins, and Gary Ross
- Bob Berta - Sh 2-54 and M16
- Cheryl Kaplan - Milky Way over Longs Peak
- Joe Tocco - Stargate
- Doug Bock - M 33 Triangulum Galaxy
- Bill Beers - Helix Nebula NGC7293 (aka. The Eye of God)
- Yusef Hakki - Plane in front of moon
- Dale Hollenbaugh - Watching and Imaging the Solar Eclipse
About the Cover

December 1970, the WASP completed its first full year of publication. On the cover, we have a cheery Yuletide scene with a picture of Stargate hanging over the fireplace, complete with the moon and the infamous light post.

Of course, the ditto process leaves much to be desired in portraying artwork and I’m sure this did not do justice to the original drawing. In keeping with the spirit of that long ago issue and finishing out our celebration of fifty years of publication, this editor chose to produce a “modern” version with computer aided design.

President’s Field of View

Well, November is over and that means we had elections! We were able to fill every position with no need for a call to the audience for a treasurer like we did last year. Our nominating committee headed by Jon Blum wanted to get more first-time board members, but they did manage to get some new members for non-board position, a great first step for future board members. The results of the election are as follows:

President: Diane Hall
1st VP: Dale Partin
2nd VP: Riyad Matti
Secretary: Glenn Wilkins
Treasurer: Mark Jakubisin
Outreach: Bob Trembley
Publications: Jonathan Kade

I would like to congratulate everyone who ran for a position for next year. They are the ones that will make this next year of club activities possible. I am really excited by some of the names returning to the board and have no doubt that I will be leaving the club in the best of hands. I am looking forward to working with the new board as a general member again. I plan on doing more presentations in 2020 as well as more outreach!

In upcoming club news, we have the banquet coming up soon! By the time you might be reading this it could be right around the corner. If you have not read my previous field of view, or if you have not seen or heard elsewhere in the WASP and at meetings, here are the details for the banquet. It will be held on December 5th, with the bar opening at 6:00pm at the Ukrainian Cultural Center, located at 26601 Ryan Rd, Warren MI. This is not far from our old venue. Your last chance to buy tickets in advance for $30 is at the Cranbrook meeting on December 2nd, they will be $35 the night of the banquet at the door. The banquet is going to be a blast so make sure you are there; door prizes have already started to arrive. There will be social hour, a fancy dinner, a lecture by our very own Cranbrook liaison Don Klaser entitled “Stories in the Sky”, and of course, prizes! So be there or --.

The Calendars have been ordered and we should have them for the Cranbrook meeting and the Banquet so get your 2020 WAS calendar before they are gone!

Jeff MacLeod,
President
When it comes to telescopes everyone has their own opinion and each telescope has its features and capabilities that make it excel at one thing or another. In my opinion there are three different types of telescopes to consider if you’re a beginner, but before buying any single telescope I’d suggest that you look through as many telescopes as possible and talk with their owners to see what they like/don’t like about their telescopes. Ask them what they’d do different if they could purchase their first scope all over again.

Let’s cover a few basics:

Aperture - the width (diameter) of the telescope opening affects its ability to gather light over the human eye. The larger the aperture the fainter the object that you can see and the brighter most objects will look when viewed. All other factors being equal, aperture rules! Light gathering capabilities go up as the square of the diameter since it’s the surface area of the lens that gathers light. For example, a telescope with twice the aperture gathers four times as much light. One with three times the aperture gathers nine times as much light.

Focal length - The length of the optical path. The longer the focal length, the more magnification that you can get from your telescope (the bigger images will look.) The shorter the focal length, the wider your field of view will be which lets you view more area of the sky. Many objects in the sky are larger than you might realize and often you’re avoiding high power (magnification) because your field of view goes becomes smaller with higher magnification. When viewing beautiful open star clusters, a low power, wide field of view will show the entire object with some dark sky area around it that frames the object nicely. The desirable razor-sharp images tend to become soft with poor contrast as you push the magnification on the telescope beyond its design and more often beyond the limitations of our atmosphere.

Magnification - the optical systems ability to enlarge the object that you view. A rule of thumb is not to exceed 75x power per inch of aperture. So, a four-inch telescope would be limited at 300x under ideal conditions. It’s safe to say that 35x to 50x is more realistic under Michigan skies (your skies may vary.) There are rare nights (very rare) that you could push 100x per inch or more if the optics are very good. The department store telescopes that tout 545x from a 60mm (2.4”) refractor are so far beyond realistic that the advertising should be criminal; or at least laughable.

Focal ratio - this is the ratio of aperture to focal length. An 8” aperture telescope that has an 80” focal length would be an f/10 (focal length/aperture.) A 16” telescope may only have a 72” focal length; hence its focal ratio is 4.5. It’s only important in gauging how a particular telescope would perform. Achromatic reflectors below f/10 suffer from achronatic aberration (color distortion) … reflectors below f/5 suffer from coma (another type of distortion.) Longer focal lengths are better if you can deal with long, gangly telescope tubes that require heavy massive mounts to hold the tubes steady or if you don’t mind climbing a ladder to look through the eyepiece of a reflector telescope.

Refractors - these are the classic design and the one telescope that everyone thinks of first. A large glass lens at the skyward end of the tube and a small eyepiece at the tail-end of the tube where you place your eye to view. These telescopes arguably offer the highest contrast and sharpest images of all the designs. Inexpensive refractors are called Achromats and have two glass elements in the main objective lens. They are typically very long for the width (aperture) and require a tall tripod or pier to keep the eyepiece at a comfortable height from the ground. The images in them are dim compared to other (wider aperture) telescope designs but the images are usually razor sharp. They can be made with shorter focal lengths but suffer from chromatic aberration with bright objects suffering from purple or violet fringing or green or red fringing on the moon and bright planets. Also, bright stars will look soft and bloated with purple halos around them. If the moon, planets, individual stars, and double stars are most interesting to you then this would likely be a great choice, but you’ll want the focal ratio to be at least f/10, better to have f/12 to f/15. Secondly, if you live in light-polluted skies like most of Metro-Detroit then the moon, planets and stars are what you’d view most often anyway. There is a variation on the achromat that is made with exotic glass that is nearly free

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of color. They are higher priced, and the views are quite stunning. I’m thinking of an Orion EON as an example. The most desirable refractor is an Apochromat. This is a refractor made with exotic glass and has at least three elements in the main objective lens. The apochromat is free of any color aberrations. The telescope at Stargate is a simple 8” f/12 achromat refractor and shows very little color due to its longer focal length, even on the brightest objects. The views are really incredible. The small telescope mounted piggy-back on it is an apochromat that we used for wide-field viewing, as a guide/finderscope and for wide-field astrophotography. Refractors are usually the most expensive per inch of aperture of most common telescopes and require heavy, sturdy mounts for 6” telescopes and larger. Achromats are reasonably priced at $400.00 to $1,000.00 for a 4” to 6” telescope of moderate quality with higher quality achromats costing $1,200.00 to $2,500.00. If money is no object then a 6” to 8” Apochromat is the scope to buy… Start your budget at $10,000.00.

Reflectors - this is probably the most common telescope among amateur astronomers, also called a Newtonian (named after its inventor, Sir Isaac Newton.) A reflector has a large concave mirror (called a Primary or Objective) at the bottom end of the tube, a smaller flat mirror (called a Secondary) tilted at a 45 degree angle at the top of the tube with an eyepiece sticking out of the side of the tube near the top of the telescope. Ideally the primary mirror is not quite concave but rather parabolic which is ideal for the best image quality. Some inexpensive primary mirrors are simply a concave or spherical mirror and they will never offer pleasing views. The reflector offers wider apertures at low costs over any other telescope optical design. The main drawback to Newtonian telescopes is that they require more attention and tweaking to keep the optical path “aligned” so that they produce the best possible image. The process is referred to as “collimation” and requires adjustment on the primary mirror cell at the bottom of the telescope and at the secondary mirror that redirects the light sideways through the side of the telescope. There are tools to make collimation easier (such as laser collimators that pin-point light on the mirrors to help you adjust them accurately and easily.) Reflector telescopes show dim or faint images better than nearly any other telescope since they can gather the most light but they can gather much of the man-made light that causes light pollution too. If most of your viewing is under city skies than a large aperture reflector may not be ideal. The reflector telescope offers the best bang for the buck…$200.00 to $300.00 will buy you a very nice and very capable 6” to 8” reflector on a basic alt/azimuth mount (also called a Dobsonian mount.)

Catadioptric (Compound) - these vary in designs but by definition they incorporate both lenses and mirrors. The most common is the SCT (Schmidt-Cassegrain Telescope) which has a lens (corrector plate) at the front of the tube and two mirrors inside the tube that fold the optical path back on itself to make a very compact telescope. SCTs (and Catadioptrics in general) are extremely portable. An 8” aperture SCT that has a 2000mm (nearly six feet long) focal length (f/10) but it is in a tube that is only about 20” long. It can sit in a car seat next to you and is light enough to easily set up by one person. The scopes hold collimation extremely well but may require collimation at some point. Some people never have to collimate an SCT. One of the nicest views I ever experienced was through a Russian-made Maksutov-Newtonian, which is another type of Catadioptric. These telescopes are highly susceptible to dew on cool Michigan evenings and require dew-heaters and dew-shields to keep them operational through the evening. It’s not uncommon to hear an electric blow-dryer whirring out on the observing field (if you’re fortunate enough to have electric power available.)

Because Michigan is a relatively humid state all telescopes are susceptible to dew to some extent. Even in the winter moisture will condense on lenses in the form of frost. Breath from your mouth or nostrils will likely form frost on the glass of an eyepiece and require some heat to remove it. Optics also need to be as close to the ambient air temperature as reasonably possible to perform to the best of their ability. Air temperatures drop at sunset and thick pieces of glass will require some time to release the heat they are holding. Until they do an image can be soft and with poor detail. Telescope designs that are enclosed like the SCT and Maksutov have longer cool down times, the Maksutov having the longest due to its very thick front lens. Large aperture Maksutov telescopes may never reach equilibrium and would likely be “chasing” temperature changes in the evening air all night long. This is one reason that few manufacturers offer the Maksutov in apertures larger than 7”.

The other thing you need to consider is what kind of mount that you would like to have.

Alt/Azimuth - This mount is the most basic in design and allows you to tip the telescope up and down and left and right in order to position it on an object. This is the least expensive to build and also the most intuitive to use. It makes sweeping the sky as you look through the eyepiece very easy. It is often light weight and the easiest to set up.

German Equatorial - mounts are complex, heavy and a must-have for astrophotographers. It allows the telescope to track an object with precision as the earth rotates and

(Continued on page 8)
easily incorporates advanced GOTO capabilities that will point the telescope at thousands of objects that are stored in a database built into a small hand-controller. They require an alignment procedures to be accurate and as I mentioned, they are typically very heavy.

**Fork Mounts** - have become popular as a standard mount for Catadioptric telescopes and can be used as Alt/Azimuth mounts or as Equatorial mounts by tilting them on a wedge. They are more portable than German Equatorial mounts but not as accurate and not as easy to balance well (which can make them a little cumbersome to use manually.)

**GOTO Mounts** - Computerized “Go To” capabilities can be adapted or installed on any type of mount. They automate the movement of the telescope and let the user simply punch in the object to be viewed and then will slew the telescope to the object and continue to track it as the earth rotates. They are very accurate once they are aligned and can allow you to see hundreds of objects in a single night. Many astronomers feel they are a crutch that keep an observer from learning the night sky but I can tell you that my GOTO telescope “taught” me more about the night sky than it has ever hindered my learning. I have also done “tours of the night sky” which is a feature on my GOTO telescope mount and looked at beautiful objects that I’d never have thought to point the telescope toward otherwise.

**PUSH-TO Mounts** - are an inexpensive variation on the Go To. They have digital encoders and a computer hand-controller that directs the user where to manually point the telescope to find an object. They lack the expense of electric servos that move the telescope and they WILL NOT automatically track the object once it is centered. You’ll have to “nudge” the telescope along by hand to keep the object centered in the field of view. This becomes a little taxing at public events or if you are letting friends and family look through your telescope since you have to step into the line of people to reposition it every 30 seconds or so. If you are by yourself then it’s not an issue to give it a little nudge as you are observing.

This is just a cursory overview to give you some ideas to think about as you research what scope might be best for you. If you’re like me, you’ll end up with several and each will be near and dear to your heart for one reason or another.

If I was going to do it all over again, I’d start with a basic but high-quality 8” f/6 Newtonian on a dobsonian mount and then back that up at some point with a 4” (or larger) refractor. But that’s just me.

There are many excellent telescope manufacturers and you’ll get guidance from resellers like Agena Astro and Astronomics who are resellers with outstanding price and support. I purchase from them without question. For warranty and factory service/support you cannot beat Explore Scientific. Their products are excellent, prices are very reasonable, and the customer service is legendary.

It’s best to ask me (or any enthusiast) about a specific model from any mass-produced telescope manufacturer because they all seem to make a little junk too. And remember what I said at the beginning of this story. It’s best to try out some of the basic types and sizes of telescopes before you buy one. Our Stargate open houses are an excellent place to do this!

These are my opinions. Other’s may vary.

Have fun and good luck. Feel free to contact me with any questions that come up.

Joe Tocco
joetocco0921@gmail.com

**Sources for Telescopes & Accessories**

- **Agena Astro** [https://agenaastro.com](https://agenaastro.com)
- **Astronomics** [https://www.astronomics.com](https://www.astronomics.com)
- **Celestron** [https://www.celestron.com](https://www.celestron.com)
- **Orion** [https://www.telescope.com](https://www.telescope.com)
- **Meade** [https://www.meade.com](https://www.meade.com)
- **Explore Scientific** [https://explorescientificusa.com](https://explorescientificusa.com)

**Letters**

**Current WASP** (November 2019)

Really impressive!

-- Hakki’s Moon-aeroplane picture illustrates how “fortune favours the prepared mind” but only a real dead-eye can capture such an event on a half-degree diameter object.

-- Hill’s reference to the Dome Kies Pi in the un-annotated photograph actually threw me until looking at the picture with red delineations. The dome is really shallow and the crater pit tiny. As usual, “easy once you know how”. (Every once in a while, I come up with a pretty good idea—many thanks to Ralph DeCew for putting his A.L. Lunar award to good use and doing the annotations of the image—Ed.)

-- Dezelah wrote of “Magellanic spirals”, of which I never heard. Learnt the Cloud as an Irregular galaxy, so has the classification changed? Perhaps a spiral galaxy which substantially lost its arms upon capture by the Via Lactea?

G. M. Ross
Nearly forty of Brian Klaus’s family, friends, and fellow W.A.S. members gathered at the activity center at Wolcott Mill on November 16 to commemorate Brian’s life and contributions to our communities. Therese Oldani kicked off a sharing of memories that featured anecdotes from Diane Hall, Bob Trembley, Bob Berta, Jonathan Kade, Therese Oldani, and Gary Ross and Sandra Macika by proxy, as well as Brian’s sisters, brothers, brother in law, neighbors, and colleagues from the North Maccumb Democratic Club. We all learned a lot about our late friend, and saw sides of him we’d never seen before. (I for one did not realize he was a dead ringer for Clint Eastwood as the Man with No Name back in the day.)

Brian’s sister Gretchen masterminded an amazing spread of food and desserts. Jonathan and Diane set up a Personal Solar Telescope in the parking lot and kept showing attendees the unusually active sun (with three significant prominences) until the sun was gone. After the memorial was over, Jonathan and Diane relocated up the hill to Stargate where a snowy and icy roof and a shroudless Big Dob forced them to spend the evening, along with fellow volunteer John Pannuto, showing approximately forty scouts, parents, and visitors the wonders of the late fall sky in memory of Brian.

Mike O’Dowd was kind enough to send along these images from the memorial.

On the next page are more photos from the occasion by Jonathan Kade.
Celebrating 50 years of the Warren Astronomical Society Paper
Orion Nebula

The Orion Nebula (also known as Messier 42, M42, or NGC 1976) is a diffuse nebula situated in the Milky Way, being south of Orion’s Belt in the constellation of Orion. It is one of the brightest nebulae, and is visible to the naked eye in the night sky. M42 is located at a distance of 1,340 light years and is the closest region of massive star formation to Earth. The M42 nebula is estimated to be 24 light years across. Older texts frequently refer to the Orion Nebula as the Great Nebula in Orion, or the Great Orion Nebula.

The first discovery of the diffuse nebulous nature of the Orion Nebula was credited to French astronomer Nicolas-Claude Fabri de Peiresc, on November 26, 1610 when he made a record of observing it using a refracting telescope. Charles Messier later observed the nebula on March 4, 1769, and he also noted three of the stars in the Trapezium. Messier published the first edition of his catalog of deep sky objects in 1774. As the Orion Nebula was the 42nd object in his list, it became identified as M42.

The Orion Nebula is an example of a stellar nursery where new stars are being born. Observations of the nebula have revealed approximately 700 stars in various stages of formation within the nebula.

The Nebula is visible with the naked eye even from areas affected by some light pollution. It is seen as the middle “star” in the “sword” of Orion, which are the three stars located south of Orion’s Belt. You can use any size telescope to observe a very nice image of M42. But using a 12” or larger telescope will really enhance the beauty of this Great Nebula in Orion. A “must see” object in late fall and winter!

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.
NGC 2403 (also known as Caldwell 7) is an intermediate spiral galaxy in the constellation Camelopardalis. It is an outlying member of the M81 Group, and is approximately 8 million light-years distant.

**Data taken:** November 16, 23, 2019, Asi071mc pro camera, 90 x 300 second subs, 24 darks, 50 flats, 10" f/8 RC, Losmandy G11 mount

-Doug Bock
Presentations

Monday, December 2, 2019
Cranbrook Presentations

Special Night at Cranbrook

We have a special and unusual evening ahead of us! Here's the schedule for the evening:

7:30-7:45 - intro, officer reports
7:45-8 - in the news / in the sky
8-8:15 - short talk: the Launch of Lightsail 2
8:15-8:30 - snacks / trip to planetarium
8:30-9 - planetarium show
9-9:30 - observatory tour (observing if possible) - group 1 (other group snacks/talks)
9:30-10 - observatory tour (observing if possible) - group 2 (other group snacks/talks)

Short Talk:
"The Launch of Lightsail 2"
by Professor Jerry Dunifer

The Planetary Society was started in 1980 by Carl Sagan and others to advocate for space and planetary science funding in government, to inspire and to educate people around the world, and to develop and fund groundbreaking space science and technology. The organization is supported by over 50,000 members in over 100 countries and by hundreds of volunteers around the world. The CEO of the Society is currently Bill Nye, the Science Guy. One of the long-term projects supported and funded by The Planetary Society has been the launch of a reflective sail into orbit around the Earth. The sail is designed to reflect light from the Sun in such a manner that energy acquired from the sunlight is used to boost the sail into a higher orbit, further from the Earth. Three attempts to launch an orbiting sail have taken place over the years with the last two being successful. The most recent launch, that of LightSail 2, took place on June 25, 2019 using the SpaceX Falcon Heavy, the most powerful rocket currently available in the USA.

The talk will present an eye-witness account of the launch, a discussion of the science of sailing on sunlight, and report on the success of the mission.

Jerry Dunifer is a Professor Emeritus at Wayne State University. He was a member of the faculty in the Department of Physics & Astronomy for 35 years before retirement. While active in the Department he served as a Professor and Associate Chair of the Department for several years. His research program there involved the study of the electrical and magnetic properties of high-purity metals at a temperature of 1 Kelvin. He also played an active role in the astronomy programs of the Department, including the WSU Planetarium and telescopic observing facilities. Since retirement, one of Jerry’s hobbies has been visiting a number of the major and historic astronomy observatories around the World. He has visited dozens of different sites and has traveled as far as the geographic South Pole and the geographic North Pole, and many places in-between. With this talk, he’s expanded his focus to include space-flight events as well!

(Continued on page 14)
Thursday, December 5, 2019
Awards Banquet

Skylore & Mythology
Stories from Around the World

By Don Klaser

Don presents the stories told about the constellations by many cultures around our world and across time. While many of these tales are unique to the culture they are found in, a good number are surprisingly similar; so similar that one might wonder—how can this be the case in cultures continents apart in the days before books, fax machines and the internet.

“We’ll look at the stories we’re familiar with—Greco/Roman—and then venture into how the Sumerian, Babylonian, Egyptian, Aboriginal Australian & Native American cultures tried to understand their place beneath the heavenly sphere.”

Don has been interested in astronomy since he first went out in his parents’ backyard with a map of the night sky from National Geographic. He says, “The skies in Roseville were much darker then, which made finding things easier (although I did use a white light flashlight—who knew!). I took a couple of courses in astronomy at Macomb College, but didn’t do much after that, until one weekend—I was up north, in a canoe out on a small lake during new moon; the Milky Way shone so brightly overhead. From then on I was hooked, and I haven’t looked back.”

Don works for Cranbrook Institute of Science and Michigan Science Center, primarily giving presentations in the planetariums, and is a member and former president of the Ford Amateur Astronomy Club. He also is the driving force behind the “Astronomy for Everyone” television show, shown on many local cable channels and also on YouTube!
Movie Review
By Diane Hall

From the Earth to the Moon (1998)

To celebrate the 50th Anniversary of Apollo 11’s Moon landing, former President Diane Hall will be contributing a series of space-themed movie reviews to the WASP in upcoming months. We continue this month with...

Disc Three:
“That’s All There Is”
“We Interrupt This Program”
“For Miles and Miles”

The challenge of the second half of From the Earth to the Moon is keeping the audience engaged throughout what the series itself dubs “the world’s greatest anticlimax”—the next steps on the Moon, and the next, and the next... before it all ground to a halt and humans consigned themselves to Low Earth Orbit for the next five decades.

That’s All There Is steps up to the challenge and gives it a big hug. The story of Apollo 12, the most tight-knit of all moon-shot crews, is a poignant comedy after the tense drama of Mare Tranquilitatis. Narrated by Lunar Module Pilot Alan Bean (Canadian comic Dave Foley), That’s All There Is shows us Project Apollo through the eyes of one of its least likely heroes. Bean, modest and sensitive by Navy fly-boy standards, hails from the third class of astronauts, the Next Fourteen. Of those fourteen, four die in various accidents and Bean is the very last of the survivors to earn his gold astronaut’s pin. He owes his elevation to the lunar surface to both stark tragedy (Bean literally replaces a fallen comrade in the crew rotation) and to the power of friendship, specifically his friendship with Commander Charles “Pete” Conrad and Command Module Pilot Dick Gordon. Bean provides a wide-eyed appreciation for our universe at its most sublime and most mundane, while Conrad (Paul McCrane) and Gordon (Tom Verica) show that while flying to the Moon and back did entail essentially being trapped in a three-man outhouse for a two weeks at a stretch, being trapped with your best friends could be a fine adventure nonetheless.

After 12, of course, comes 13, and producers Ron Howard and Tom Hanks already had given Apollo 13 the full-length cinematic treatment in the film of the same name. To avoid replicating what they’d already done in Hollywood, Howard and Hanks make the choice to focus entirely on Earthbound drama during We Interrupt This Program. Do we get to see the missile men in Mission Control apply their craft to bringing the 13 crew safely? No, we get this hour-long movie on... ethics in journalism. It’s intended as the payoff to the time the series has invested thus far on fictional newsman Emmet Seaborn (Lane Smith), pitted here against a smooth young puppy of a sports reporter (Jay Mohr) who disregards newsroom convention in his chase for juicy human interest stories. Since we’re from the future, there’s little mystery to us in who’s going to triumph when staid reporting that relies on chummy relations with the NASA brass goes mano-a-mano with the scoops that emerge from ambushing anguished parents of imperiled astronauts at Houston Hobby airport. I will say that this episode does a much more faithful job in depicting the mission transcripts than Apollo 13 the feature film did.

Then we get For Miles and Miles, which takes us back to the early 1960s. Alan Shepard (Ted Levine), the First Amer-

(Continued on page 16)
ican in Space, is looking forward to a plum assignment for Project Gemini. He’s pure Kennedy-era glamor with his shades and fancy car and is out inspecting an oil field he plans to buy (a nod to his status as a well-to-do man among the astronaut corps) when a bout of Ménière’s disease takes him out of the crew rotation. Shepard gets shunted to a desk job running the astronaut corps, where he threatens junior astronauts with nixing their flight assignments if they get out of line. Still, he longs to fly again, particularly since his first mission amounted to fifteen minutes in a tin can. A tip from junior astronaut Tom Stafford (Steve Hofvendahl) leads to experimental surgery, and Shepard is back in the running for command. He’s been grounded so long that Gemini and Apollo veterans express skepticism that Shepard is up to the task. “It’ll be like three rookies up there,” one astronaut says of Shepard and his prospective crew mates Stuart Roosa (George Newbern) and Ed Mitchell (Gary Cole, who’s played everything from Mike Brady to the sleazy boss from Office Space). The trio is bumped from Apollo 13 to Apollo 14 out of concerns Shepard won’t have time to get in shape for the earlier mission. Of course, by the time 14 does take off with Shepard-Roosa-Mitchell on board, Apollo 13 has gone pear-shaped and the Fra Mauro highlands are Shepard’s to explore. And here we reach a curious point of synergy between the challenges of the actual Apollo program and the challenges of dramatizing it. Al Shepard hitting a golf ball on the Moon just isn’t… that… marvelous, all things considered. The technical challenges that the 14 crew face feel routine. Maybe this episode should’ve focused on Roosa’s solitary sojourn in the command module while Shepard was down there hitting golf balls, or on Ed Mitchell’s paranormal awakening in space, or maybe it should’ve doubled down on the backstabbing and “empire building” inside the astronaut corps that’s alluded to here but never fully explored.

There’s three missions left to cover; what artistic tricks will Hanks, Howard, and company have in play to keep us engaged?

Rating: 3.5 out of 5 Moons. The first episode is a classic and the others are skippable.
A Crater Worth Watching

Because of the geometry, changes in the terminator happen more slowly near the lunar poles and shadow phenomena happen more slowly. The deep crater near the center of this image is Scoresby (58km dia.). Above this crater are a pair of similar sized craters. The one closest is Challis (58km) with Main (48km) a bit farther out. They don’t look that dissimilar in size, do they? A line through them leads further north to a much larger crater, Byrd (97km). Further on is the extremely foreshortened crater Peary (77km) looking like a gash on the limb. The far wall of this crater which is literally the limb here, is the lunar north pole!

Going back to Scoresby we look below it to a very identifiable cloverleaf of overlapped craters forming a large flat plain. The large central circular region is Meton (126km) with the surrounding lobes (or petals on the cloverleaf) being lettered satellite craters of Meton. Above Meton is Euctemon (65km) and above this is De Sitter (66km). But the crater worth watching is on the other side of Meton below and to the left of Scoresby. It is a large circular ‘walled plain’ Barrow (95km) with the obviously younger Barrow A (28km) on its left wall. Like the Meton complex, this crater has been flooded with lavas making it’s floor a perfect projection screen. Notice the shadow projected on the floor of Barrow. It forms a rough “V” shape as the sun rises on this crater. The inset image shows it at an earlier colongitude on a different date showing the dramatic “V” formed when the first rays of the rising sun flood through a breach in the eastern wall of this crater. It is quite a stark shadow and enjoyable to watch as the sun rises higher.

This was a single image made from one 1800 frame AVI stacked with AVIStack (IDL). Further processing was done with GIMP and IrfanView.

Image mapping by Ralph DeCew.
NGC 869 & 884

NGC 869 is an open cluster in the constellation Perseus that together with its partner, NGC 884, form the famous Double Cluster. NGC 869 is the brighter of the two objects and has an integrated apparent magnitude of 5.3, an angular diameter of approximately 29', and a Trumpler classification of I3r, which indicates that it has a strong central concentration and is richly inhabited with stars that vary widely in brightness. Although of similar size, NGC 884 is classified as II2p since it possesses a less condensed core, is more sparsely populated and has a narrower range of stellar magnitudes. The clusters are faintly visible to the naked eye under dark skies as a hazy patch of light slightly separated from the autumn Milky Way. The Double Cluster has been known since ancient times as a “nebulous star” and was often depicted as the scimitar that Perseus used to slay the Medusa. NGC 869 and 884 are 7,200 and 7,500 light years away, respectively, and likely formed from the same cloud of interstellar material.

Finding the location of the Double Cluster is a simple task due to the large number of bright and easily recognized stars in the area. The duo sit about halfway between γ Persei and δ Cassiopeiae, the latter of which marks the southeastern most corner of the “W” shape for which the constellation is known. NGC 869 and 884 are easy to observe and are impressive in nearly any instrument, although using low power and a wide angle provide the most pleasing views. The two clusters are separated by about half a degree and collectively contain several hundred stars ranging in brightness from 6th to 14th magnitude. Although NGC 869 contains mostly blue and white stars in a concentrated tight formation, NGC 884 has a more scattered appearance and is sprinkled with a number of red giant stars that provide a striking color contrast. They deliver a spectacular sight in binoculars and small telescopes. Although large apertures may reveal more members and provide richer star fields, the accompanying longer focal lengths may limit the field of view. Overall, the Double Cluster is arguably the best object to not make the Messier list.

(Continued on page 19)
All good things...

It occurred to me not long ago that I’ve been writing the Object of Month (OOTM) article for the WASP since April 2012. This month’s contribution will be the last. The end of an era, as people sometimes say. Usually at times like these, some sort of retrospective is in order... some sort of statement that takes stock or summarizes it all in some way. Often times, such a look back compares past to present so that the reader can see the continuity and gradual evolution of events across the timeline of whatever it is that’s being looked at. I guess I could do that, but I’m struck with a much different feeling.

The Object of the Month article has been the one constant, my North Star if you will pardon the pun, in life over the past seven years. More time has passed since my last time in person at a WAS meeting than had elapsed while writing the article as an actively participating member of the group. This period was one of drastic change. After living in the Detroit area for about eight years and as a WAS member for four of them, I moved to Haverhill, MA in the spring of 2015 to take a position as R&D Manager at a company specializing in chemicals for the microelectronics industry. It was the kind of opportunity I could not ignore, especially as it marked a return to science for me. Although moving to a new city in a new state far away from friends and family to chase some crazy notion was hardly a new thing for me (and in hindsight has become somewhat of a theme), it required a large amount of struggle and self-reflection. Through it all, however, the OOTM was something to which I had always looked forward to writing. It was a familiar formula that brought comfort. Introduce some common repeated elements, a new selection each month, and some creative ingredients to provide variety and colorful descriptions—and voila—a new article is ready. And so it went for another four years as a sort of “foreign correspondent” for the WAS.

Despite being elsewhere, astronomy and the WAS were never far from my thoughts. I had attended Stellafane in 2016 and the Great Eclipse in 2017, and always wondered if maybe I would have a chance encounter with an old acquaintance. Meanwhile, OOTM went on as always and time marched on. Yet, in first few months of 2019, my life was set for another drastic change. A combination of occupational malaise and an unexpected, roll-the-dice kind of offer to work in a dream job caused me to fly the coop to the land of the midnight sun. So here I sit, at my desk in Helsinki, Finland, writing my last entry for OOTM. Part of me is swept with a wistful yearning to go on with writing it forever. Another part of me says the best days of it are behind us and it is time to pass the torch. After thoughtful reflection, it’s time for this astronomer to move on.

Chuck Dezelah

(Thanks for all the articles over the years. Just be sure to send us pictures of auroras, OK? - just sayin’-ed.)
December 1989

Sky Diagram graces the front page of this issue, perhaps it should be called Sky Timing Diagram as it shows the times of several events regarding the Sun, Moon and Algol. Next, Jeff Bondono takes us on “A Guided Tour of Several Open Clusters”. Filed under That didn’t last long, “Ask the WASP” is answered with “we’re quitting this column.”

December 1999

Looking at the cover, we see that the editor used a desktop publishing technique of starting articles on the front page as a teaser and continuing elsewhere in the publication. Of note, too, is that this is one of many issues that appeared in both print and online form. We are fortunate that we have the print version as some of the links to articles lead nowhere now (“404 - page not found” as the result). Other instances of dual media publication show differing content.

We lead off with “Astro Chatter by Larry Kalinowski. Al Vandermarliere submits this article (presumably with permission?): a “Rebuttal to Timpane’s Essay by Mike Spinak. This rebuttal refers to an article in the November 1999 issue. Joe Van Poucker reminds us of the “WAS Annual Winter Banquet.” LoriAnn Skonieczny does something like what I’m doing here with “The WASP 25 Years Ago” We also have a brief letter “From the President” by Steve Greene and elsewhere in the issue New Members are welcomed by Joe Van Poucker (and acknowledgement of membership anniversaries.)

From the Scanning Room

Editor’s Desk

I’m delighted to report that I regained the software that I use for scanning the newsletters. I won’t bore you with the details, suffice it to say the workflow I developed with it is so ingrained, I didn’t want to start casting about for a new solution. So, if any ‘new’ issues pop up, I’m ready...

Looking back over my second “first year” as editor, I find it is quite an animal of a different sort. Editing a newsletter from 800+ miles away poses some challenges. Dale Partin, as Publishing Chair, has been a boon (his eagle eye for typos is a great plus) and I appreciate the latitude he has given me in producing the WASP. I also appreciate the help he’s given by being my “boots on the ground” and ferreting out much needed information. Which reminds me, I also want to thank Jonathan Kade (and congrats on your election to WASP Publisher), Diane Hall, Brian Thieme, Joe Tocco, Chuck Dezelah, Rik Hill, Bill Beers, Doug Bock, and Ralph DeCew for providing additional information, articles, artwork and photos. Nothing makes my day like seeing ‘something for the WASP’ in my in-box.

I look forward to working with Jonathan in producing next year’s edition of the WASP.

Dale Thieme,
Chief scanner
December 2019

Notable Sky Happenings

**Mystery of the Christmas Star**

Now Showing

**Also Showing**

For astronomy information visit: https://science.cranbrook.edu

For observatory information visit: https://science.cranbrook.edu/explore/observatory

The Cranbrook Observatory is open to the public Tuesday and Sunday evenings from 7:00 PM to 10:00 PM EST and the first Sunday of the month from 1:00 PM to 4:00 PM EST. See the back of this page for more observatory details.

This chart shows the sky as it

would appear at northern mid-latitude.

The south celestial pole is not visible.

This month's Moon phases:

New Moon

First Quarter

Last Quarter

Full Moon

- Dec. 1 - 7: Look for Venus near the SW horizon in evening twilight.
- Dec. 8 - 14: Venus is below Saturn in the SW horizon in evening twilight. This first week, binoculars will help.
- Dec. 9: This week's Moon will interfere this year.
- Dec. 15 - 21: The moon is at the upper left of Regulus.
- Dec. 20 - 31: The moon is in the SW this week (SW Pension), where Venus is below Mars on the 22nd; lower in the SW.
- Dec. 22 - 31: You can see the evening of the 22nd (SW) and below left on the 23rd (SE Pension) and below left on the 24th (SE Pension).

Enjoy the night sky and see the beauty of the stars and planets!
Stargate Observatory

Monthly Free Astronomy Open House and Star Party
4th Saturday of the month!
Wolcott Mill Metropark - Camp Rotary entrance

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

Contact: outreach@warrenastro.org
Find us on MeetUp.com

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

Observatory Rules:
1. Closing time depends on weather, etc.
2. May be closed one hour after opening time if no members arrive within the first hour.
3. Contact the 2nd VP for other arrangements, such as late arrival time. Call (586) 634-6240.
4. An alternate person may be appointed to open.
5. Members may arrive before or stay after the scheduled open house time.
6. Dates are subject to change or cancellation depending on weather or staff availability.
7. Postings to the Yahoo Group and/or email no later than 2 hours before starting time in case of date change or cancellation.
8. It is best to call or email the 2nd VP at least 2 hours before the posted opening with any questions. Later emails may not be receivable.
9. Generally, only strong rain or snow will prevent the open house... the plan is to be there even if it is clouded over. Often, the weather is cloudy, but it clears up as the evening progresses.
Astronomical Events for December 2019
Add one hour for Daylight Savings Time

<table>
<thead>
<tr>
<th>Day</th>
<th>EST (h:m)</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>04</td>
<td>01:58</td>
<td>FIRST QUARTER MOON</td>
</tr>
<tr>
<td>04</td>
<td>23:09</td>
<td>Moon at Apogee: 404447 km</td>
</tr>
<tr>
<td>11</td>
<td>06:40</td>
<td>Aldebaran 3.0°S of Moon</td>
</tr>
<tr>
<td>12</td>
<td>00:12</td>
<td>FULL MOON</td>
</tr>
<tr>
<td>13</td>
<td>09:15</td>
<td>Moon at Ascending Node</td>
</tr>
<tr>
<td>14</td>
<td>12:51</td>
<td>Pollux 5.3°N of Moon</td>
</tr>
<tr>
<td>14</td>
<td>13:00</td>
<td>Geminid Meteor Shower</td>
</tr>
<tr>
<td>15</td>
<td>10:54</td>
<td>Beehive 1.0°S of Moon</td>
</tr>
<tr>
<td>16</td>
<td>23:41</td>
<td>Regulus 3.8°S of Moon</td>
</tr>
<tr>
<td>18</td>
<td>15:30</td>
<td>Moon at Perigee: 370260 km</td>
</tr>
<tr>
<td>18</td>
<td>23:57</td>
<td>LAST QUARTER MOON</td>
</tr>
<tr>
<td>21</td>
<td>23:19</td>
<td>Winter Solstice</td>
</tr>
<tr>
<td>22</td>
<td>20:49</td>
<td>Mars 3.5°S of Moon</td>
</tr>
<tr>
<td>22</td>
<td>22:00</td>
<td>Ursid Meteor Shower</td>
</tr>
<tr>
<td>26</td>
<td>00:13</td>
<td>NEW MOON</td>
</tr>
<tr>
<td>26</td>
<td>00:18</td>
<td>Annular Solar Eclipse; mag=0.970</td>
</tr>
<tr>
<td>26</td>
<td>08:01</td>
<td>Moon at Descending Node</td>
</tr>
<tr>
<td>27</td>
<td>13:00</td>
<td>Jupiter in Conjunction with Sun</td>
</tr>
<tr>
<td>28</td>
<td>20:32</td>
<td>Venus 1.0°N of Moon: Occn.</td>
</tr>
<tr>
<td>30</td>
<td>00:00</td>
<td>Mercury at Aphelion</td>
</tr>
</tbody>
</table>

Next Month Events
Saturday, December 28th:
Stargate Observatory Open House

Sunset : 5:02pm
Astronomical Twilight Ending : 6:44pm
Moonrise : 10:02am

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

Remember to dress warm and in layers!

Dave Baranski
2nd VP, Observatory

Join the Astronomical League!
Only $7.50 (membership starts July 1)

- Get the Reflector
- Participate in the Observing Program
- Avail yourself of the League Store
- Astronomy Books at a discount
  alcor@warrenastro.org
Outreach Report - December 2019

I started doing astronomy outreach when I was eight years old; I had a cheap refractor telescope and a scary green-glass solar filter - that I used a LOT! I showed the neighborhood the Moon, Jupiter and Saturn. I frequently get gasps of astonishment when first-time telescope users view the Moon through my Dob; it makes me distraught that so many adults have never looked through a telescope.

Doing astronomy outreach can be as simple, or as complicated as you’d like to make it! If you have a ‘scope, set it up and get the neighborhood looking through the eyepiece! If you have a favorite topic, make a presentation about it – we have members that can help. If you have a computer with astronomy software, show that to people! And let me know about it so I can tell the rest of the Society about it!

Mercury Transit - November 11, 2018

The 2019 Mercury transit was a complete bust for Michigan, and for much of the continental U.S. – to add insult to injury, Michigan got snow! This image shows cloud cover over a large percentage of the U.S. on Nov. 11th.

I watched the transit from NASA’s Solar Dynamics Observatory website; space telescopes don’t care about clouds...

Astronomy at the Beach NEEDS Your Help!

Astronomy at the Beach is fortunate to have a highly supportive host (Michigan’s DNR) and a good location (Island Lake State Rec Area). We have great momentum, with 23 straight years of success. However, the event is at risk. The workload to plan and execute the event has fallen on fewer and fewer shoulders, causing the current GLAAC leadership board to step down.

Therefore, in order to continue, this event needs a fresh infusion of enthusiastic volunteers.

There is a great well of experience to draw from – previous volunteers are available for answers and perspective. Previous volunteers are happy to provide their documents so that new volunteers can “hit the ground running.”

Here are the jobs to be done on the GLAAC planning committee:

- **PRESIDENT** – presides over meetings, helps establish direction, coordinate and oversees activities, etc.
- **VICE PRESIDENT** – assists the president with governance of GLAAC and fills in when necessary. Maintains connection to host DNR and institutions that support GLAAC (Michigan Science Center, Cranbrook, universities and others).
- **SECRETARY** – keeps records/minutes, sets up and notifies of meetings.
- **TREASURER** – keeps records of income and expenditures, including donations, and gives reports
- **COMMUNICATIONS DIRECTOR** – responsible for getting the word out of the event (Facebook, websites, press releases, emails to teachers, public relations of all types).

Not up to being on the committee? Here are some of the key tasks that require help:

- **PLANNING the PROGRAM** – speakers, club tables, printed programs, science demonstrations, scavenger hunt, communicating, confirming with people.
- **PLANNING the TENT LOGISTICS** – dealing with tent vendor, coordinating location with DNR, payment, who goes where, arranging A/V and electricity.

(Continued on page 25)
PLANNING OTHER LOGISTICS – signs, parking, volunteers, Ham radio helpers, telescope field ambassadors, Girl Scout volunteers, getting the many supplies beforehand, getting help with setup and takedown.

SOCIAL MEDIA – updating GLAAC website, creating Facebook event, doing Facebook promotions of all types, using other social media to increase awareness.

PUBLIC RELATIONS – sending emails to STEM teachers, getting articles written, mentions on event calendars, mentions on radio/TV.

GETTING MONEY – sending invoices to clubs and sponsors, chasing down checks.

WORKING WITH DNR – setting date, planning the event, planning logistics, getting volunteer forms completed by everyone on committee, food vendor, last-minute questions and issues.

TELESCOPE FIELD PLANNING – communicating with clubs, recruiting as many telescopes as possible, working with DNR on unloading/loading/parking plans, creating maps, improving guest experience, telescope volunteer satisfaction, on-site managers, keeping things safe.

ACTUAL SETUP and TAKEDOWN – the tents, chairs, tables, stage, electrical cords, speakers, projectors, amps, mixers, screens, many street signs, other signs, balloons, blow-up aliens, etc.

CUSTOMER EXPERIENCE SURVEY – designing, distributing, collecting, analyzing, reporting.

The GLAAC leadership board meets each month via online/phone teleconference in the evening. As the event gets closer, meetings in July and August can be bi-monthly.

The current volunteer board is committed to seeing this wonderful event continue. However, the new slate of volunteers will be free to decide what they want the event to be. Please forward this to anyone you think might be interested. Your opportunity to take the first step is to be part of the January GLAAC planning meeting in January 2020 (date TBD).

Presenters/Volunteers Wanted:

Girl Scout Mall Frenzy, Mission: Space
Saturday, March 21-22, 2020 at Lakeside Mall (Sterling Heights) from 10pm-3am.
The Girl Scouts have released new Space badges and will be working on them throughout the night. They would like the W.A.S. to help us out again. I’ve emailed the organizer asking that our table be located in or around a storefront with power. I also asked if they wished me to contact other astronomy clubs via the Great Lakes Association of Astronomy Clubs, and see if they can set up too.
Contact: Caroline Feathers <Cfeathers@gssem.org> (313) 870-2511

WAS Outreach Calendar Entry: [Link]

Sunday Outreach
at the Detroit Public Library
They would like to have speakers on Sundays starting in December. Open dates are: 12/15, 1/19, 2/16, 3/15, 4/19, and 5/17 (These link to the W.A.S. Outreach Calendar.)
Contact: Jennifer Dye <jdye@detroitpubliclibrary.org>

City for Frazer
We recently had a successful event with them; they would like to do quarterly events with us.
Contact: Christina Woods <christinaw@micityoffraser.com> 586.296.8483

Lake St. Clair Metropark Nature Center
(Metrobeach)
They would like to plan something with us in 2020 – possibly Astronomy Day, and a couple of days when the Moon will be viewable.
Contact: Samantha Volz Samantha.Volz@metroparks.com 586-463-4581

If you are interested in presenting at any of these locations, please let me know at: outreach@warrenastro.org.

-Bob Trembley
Outreach Chair
BOARD MEETING – November 4, 2019

Members present: David Baranski, Jeff MacLeod, Jonathan Kade, Mark Jakubisin, Glen Wilkins, Bob Trembley, Dr. Dale Partin, and Jerry Voorheis.
The meeting was called to order by Jeff MacLeod at: 6:38 PM.

Officers’ reports
President Jeff MacLeod gave the President’s report. He reported on the event to honor the late WAS member Brian Klaus, the upcoming transit of Mercury, and the WAS banquet.
Jonathan Kade gave the 1st Vice President’s report. He reported that the presentation calendar is full for 2019 and about half full for 2020.
David Baranski gave the 2nd Vice President’s report. The Open House was rained out.
Jerry Voorheis gave the Secretary’s report. The minutes are in the WASP.
Mark Jakubisin gave the Treasurer’s report.
Bob Trembley gave the Outreach report. The big Girl Scout event at Wolcott Metropark went well. There will be a transit of Mercury on November 11th. Many other events are listed in the WASP.
Dr. Dale Partin gave the Publications report. The WASP is up.

Old Business
Eyepieces and a tripod are needed for the WAS solar telescope.
There was a discussion about selection of WAS award nominees
There was a discussion about Paul Strong Scholarship candidates.

New Business
There was a motion by Jonathan Kade seconded by Jeff MacLeod to change the date of the 2020 WAS picnic to August 22nd from July to observe the 50th anniversary of Stargate. Motion passed.
There was a discussion of the WAS banquet beg letters.
The 2020 WAS calendars were discussed.
The event to honor Brian Klaus will be Saturday, November 16th at Stargate.
Jeff MacLeod agreed to be the snack volunteer coordinator.
There was a motion by Dale Partin seconded by Jeff MacLeod to buy a 1979 Solar Eclipse Expedition film for $225.00. Motion passed.
The meeting adjourned at: 7:28 PM.

CRANBROOK MEETING – November 4, 2019

Meeting called to order at 7:32 PM by Jeff MacLeod, President.
Roll call: 44 persons were present.
Jeff MacLeod gave the President’s report. He announced that there would be an event to honor the late WAS member Brian Klaus on Saturday, November 16th from 1 to 6 PM at Camp Rotary.
Marty Kunz presented In the News and In the Sky.
A bad joke was told by Jeff MacLeod.

Officers’ Reports
Jonathan Kade gave the 1st Vice President’s report. He reported a full schedule for 2019 and that 30% of the calendar was full for 2020.
David Baranski gave the 2nd Vice Presidents report. He reported a crappy Open House due to weather. The next Open House will be November 23rd.
Mark Jakubisin gave the Treasurer’s report. WAS banquet tickets are $30 and WAS calendars are $15. Details are in the WASP.
Secretary Jerry Voorheis reported that the minutes are in the WASP.
Bob Trembley gave the Outreach report. He reported many events. Details are in the WASP.
Dr. Dale Partin reported that the WASP is up.
Marty Kunz gave the Solar report. Technically there was one spot on the sun.
The next discussion group will be hosted by Jon Blum at his new residence.
Gary Ross requested for someone to take a GPS reading of his location in Royal Oak near Main street and 12 Mile road.

The WAS elections for 2020 officers were run by Ken Ber
tin. The results were:
President Diane Hall elected unanimously.
1st Vice President Dale Partin elected unanimously.
2nd Vice President Riyad Matti elected unanimously.
Secretary Glenn Wilkins elected unanimously.
Treasurer Mark Jakubisin elected unanimously.
Outreach Bob Trembley elected unanimously.
Publications Jonathan Kade elected unanimously.

There was a proposal to change the WAS bylaws to change the maximum length of office for WAS officers from 2 to 3 years. The proposal passed.
Jeff MacLeod gave a call for Astronomy questions. A question was asked by Jim Shedlowsky about how the (Continued on page 27)
(Continued from page 26)

transits of Mercury and Venus compared. Other astronomy questions were asked.

Snack/Break Time.

The Main Presentation was given by Professor W. J. Llope - “The Photograph that Changed Gravity”.

The meeting was adjourned at 10:13 PM.

MACOMB MEETING – November 21, 2019

Meeting called to order at 7:30 PM by Jeff MacLeod, President.

Jeff MacLeod gave the President’s report.

Jeff MacLeod gave the 1st Vice President’s report.

Jeff MacLeod gave the 2nd Vice President’s report. The open house was cancelled due to weather. The next open house will be on November 23rd.

Jeff MacLeod gave the Secretary’s report. The minutes are in the WASP.

Jeff MacLeod gave the Treasurer’s report. There are 115 memberships.

Jeff MacLeod gave the GLAAC report.

Bob Trembley gave the Outreach report.

Jeff MacLeod gave the publications report. The WASP is up.

2020 WAS calendars are on sale.

Bob Trembley presented In the News and In the Sky.

Observing Reports: Photos of the transit of Mercury were reported on.

Roll call. 31 persons were present.

A Solar report was given by Bob Berta.

Astronomy Jokes and astronomy questions were called for by Jeff MacLeod.

Snack/Break Time.

The Main presentation was given by Dave Bailey - “Neutron Stars (and Pulsars?) (or Spinners?)”.

The meeting was adjourned at 9:32 PM.

Jerry Voorheis
Secretary

Treasurer’s Report

Gobble Gobble, Treasurer’s Report for 11/30/2019

MEMBERSHIP

We have 123 current members.

INCOME AND EXPENDITURES (SUMMARY)

We took in $4,272 and spent/transferred $4,790. We have $19,326 in the bank, $224 in checks and $1,148 in cash, totaling $20,698 as of 11/30/2019.

INCOME

$570 Banquet 2020

$2,368 Memberships/renewals

$167 Astronomical League

$619 Snacks

$255 Calendars

$49 Paul Strong Scholarship

EXPENSES

$380 Snacks / Supplies

$90 Meetup Fees 2019

$30 Library Storage Boxes

$500 Banquet Deposit

$274 Library Telescope

$500 Paul Strong Scholarship Donation

$500 Ha Solar Telescope

$300 Donation to AATB 2019

$1,146 Club Insurance 2019

$706 Calendars 2020

GLAAC REPORT 11/30/2019

Beginning Balance: $5,151.34

INCOME

$1,949 Donations for AATB 2019

EXPENSES

$514 Reimbursement for printing 2018 Flyers

$2627 AATB 2019 Tent Rental

$1074 Miscellaneous expenses for AATB

$485 Sound System for AATB

Ending Balance: $2,399

Mark Jakubisin
Treasurer

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

Celebrating 50 years of the Warren Astronomical Society Paper
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

<table>
<thead>
<tr>
<th>Club Name &amp; Website</th>
<th>City</th>
<th>Meeting Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astronomy Club at Eastern Michigan University</td>
<td>Ypsilanti/EMU</td>
<td>Every Thursday at 7:30PM in 402 Sherzer</td>
</tr>
<tr>
<td>Capital Area Astronomy Club</td>
<td>MSU/Abrams Planetarium</td>
<td>First Wednesday of each month 7:30 PM</td>
</tr>
<tr>
<td>Farmington Community Stargazers</td>
<td>Farmington Hills</td>
<td>Members: Last Tuesday of the month Public observing: 2nd Tuesday of the month</td>
</tr>
<tr>
<td>Ford Amateur Astronomy Club</td>
<td>Dearborn</td>
<td>Fourth Thursday of every month (except November and December) at 7:00 PM</td>
</tr>
<tr>
<td>Oakland Astronomy Club</td>
<td>Rochester</td>
<td>Second Sunday of every month (except May)</td>
</tr>
<tr>
<td>Seven Ponds Astronomy Club</td>
<td>Dryden</td>
<td>Monthly: generally the Saturday closest to new Moon</td>
</tr>
<tr>
<td>Sunset Astronomical Society</td>
<td>Bay City/Delta College Planetarium</td>
<td>Second Friday of every month</td>
</tr>
<tr>
<td>University Lowbrow Astronomers</td>
<td>Ann Arbor</td>
<td>Third Friday of every month</td>
</tr>
<tr>
<td>Warren Astronomical Society</td>
<td>Bloomfield Hills/ Cranbrook &amp; Warren/ MCC</td>
<td>First Monday &amp; third Thursday of every month 7:30 PM</td>
</tr>
</tbody>
</table>

# GLAAC Club and Society Newsletters

Warren Astronomical Society: [http://www.warrenastro.org/was/newsletter/](http://www.warrenastro.org/was/newsletter/)
Oakland Astronomy Club: [http://oaklandastronomy.net/newsletters/oacnews.html](http://oaklandastronomy.net/newsletters/oacnews.html)
University Lowbrow Astronomers: [http://www.umich.edu/~lowbrows/reflections/](http://www.umich.edu/~lowbrows/reflections/)

# WAS Member Websites

Jon Blum: [MauiHawaii.org](http://www.mauihawaii.org)
Bob Trembley: [Balrog’s Lair](http://www.balgoslair.com)
Bill Beers: [Sirius Astro Products](http://www.siriusastro.com)
Jon Blum: [Astronomy at JonRosie](http://www.jonrosie.com)
Bob Trembley: [Vatican Observatory Foundation Blog](http://www.vaticanobservatory.org/blog)
Jeff MacLeod: [A Life Of Entropy](http://www.alifeofentropy.com)
Doug Bock: [https://boonhill.org](https://boonhill.org)
Facebook: Northern Cross Observatory [https://www.facebook.com/NorthernCrossObservatory](https://www.facebook.com/NorthernCrossObservatory)
Boon Hill and NCO Discussion [https://www.facebook.com/groups/369811479741758](https://www.facebook.com/groups/369811479741758)
YouTube channel: [https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w](https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w)
The Orion Nebula: Window into a Stellar Nursery
By David Prosper

Winter begins in December for observers in the Northern Hemisphere, bringing cold nights and the return of one of the most famous constellations to our early evening skies: Orion the Hunter!

Orion is a striking pattern of stars and is one of the few constellations whose pattern is repeated almost unchanged in the star stories of cultures around the world. Below the three bright stars of Orion’s Belt lies his sword, where you can find the famous Orion Nebula, also known as M42. The nebula is visible to our unaided eyes in even moderately light-polluted skies as a fuzzy “star” in the middle of Orion’s Sword. M42 is about 20 light years across, which helps with its visibility since it’s roughly 1,344 light years away! Baby stars, including the famous “Trapezium” cluster, are found inside the nebula’s whirling gas clouds. These gas clouds also hide “protostars” from view: objects in the process of becoming stars, but that have not yet achieved fusion at their core.

The Orion Nebula is a small window into a vastly larger area of star formation centered around the constellation of Orion itself. NASA’s Great Observatories, space telescopes like Hubble, Spitzer, Compton, and Chandra, studied this area in wavelengths we can’t see with our earthbound eyes, revealing the entire constellation alight with star birth, not just the comparatively tiny area of the nebula. Why then can we only see the nebula? M42 contains hot young stars whose stellar winds blew away their cocoons of gas after their “birth,” the moment when they begin to fuse hydrogen into helium. Those gas clouds, which block visible light, were cleared away just enough to give us a peek inside at these young stars. The rest of the complex remains hidden to human eyes, but not to advanced space-based telescopes.

We put telescopes in orbit to get above the interference of our atmosphere, which absorbs many wavelengths of light. Infrared space telescopes, such as Spitzer and the upcoming James Webb Space Telescope, detect longer wavelengths of light that allow them to see through the dust clouds in Orion, revealing hidden stars and cloud structures. It’s similar to the infrared goggles firefighters wear to see through smoke from burning buildings and wildfires.

Learn more about how astronomers combine observations made at different wavelengths with the Night Sky Network activity, “The Universe in a Different Light,” downloadable from bit.ly/different-light-nsn. You can find more stunning science and images from NASA’s Great Observatories at nasa.gov.

Caption: This image from NASA’s Spitzer missions shows Orion in a different light – quite literally! Note the small outline of the Orion Nebula region in the visible light image on the left, versus the massive amount of activity shown in the infrared image of the same region on the right. Image Credit: NASA/JPL-Caltech/IRAS /H. McCallon. From bit.ly/SpitzerOrion