The Warren Astronomical Society

Founded: 1961
P.O. Box 1505
Warren, Michigan 48090-1505
www.warrenastro.org

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Publications
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Entire board
board@warrenastro.org

The W.A.S.P
The Warren Astronomical Society Paper

W.A.S Inter-club Picnic 2017

Photo credit: Jon Blum
Society Meeting Times
Astronomy presentations and lectures twice each month at 7:30 PM:

First Monday at Cranbrook Institute of Science.

Third Thursday at Macomb Community College - South Campus Building J (Library) Note: for the summer, we are meeting in room 151, lower level of the library.

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

The Discussion Group for August 24th, from 7:30-9:30 Eastern, will be hosted by Joe Tocco.

MCMI Corporate Office
6540 Diplomat Drive
Sterling Heights, MI 48314

The office is located just south of M-59 and just East of Mound Road.

Email or call for directions...or ask Siri Park in the lot behind the building and enter back door next to the large roll-up door.

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Space Pirates
Tune in to Captains Marty Kunz and Diane Hall for live radio Wednesday nights at 9:00pm ET
There is no escaping the hype of the Great American Solar Eclipse 2017—certainly not in the pages of this newsletter.

It’ll be my first total solar eclipse (weather permitting of course), so a degree of hyperventilation and hyperbole is warranted. I witnessed my first-ever solar eclipse, a partial in July of ‘91, from the backyard of my parents’ house in Tennessee using the hole-punch method. I took two pieces of typewriter paper, used a manual single-hole puncher to make the hole, and projected a fat crescent sun onto the lower page. It wasn’t very satisfying but it was all I could afford. In 2002, I was walking across the lawn of The Loop at my university when a friend of a friend showed me a partial solar eclipse through the white-light filter of his telescope. That was decidedly more impressive. A decade later I was fortunate enough to see the “ring of fire” annular eclipse from Utah, a splendid event from the moment that sunbeams crystallized into tiny crescents under the sagebrush to the last red glow of an eclipsed sun slipping below the horizon. Each eclipse has been better by an order of magnitude than the last, so if the pattern holds it’ll be a fine day indeed for those of us in Grand Island, Nebraska.

Clear skies, everybody, wherever you may be-- Oregon, Wyoming, Nebraska, Missouri, Illinois, Tennessee, South Carolina, or anywhere else your travels take you that day. Clear skies as well to those of you holding down the metaphorical forts here in Michigan, whether you’re volunteering at Cranbrook and other institutions to show the public a partial eclipse in style or viewing it privately. Clear skies, safe travels, and we’ll be toasting everyone’s collective success from Nebraska with the traditional shot of Amarula. See you on the dark side of the moon... sort of.

Diane Hall
President

Astronomical Events for August 2017

<table>
<thead>
<tr>
<th>Day</th>
<th>EST (h:m)</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>13</td>
<td>Mercury at Aphelion</td>
</tr>
<tr>
<td>02</td>
<td>17:55</td>
<td>Moon at Apogee: 405026 km</td>
</tr>
<tr>
<td>03</td>
<td>07:31</td>
<td>Saturn 3.5°S of Moon</td>
</tr>
<tr>
<td>07</td>
<td>18:11</td>
<td>FULL MOON</td>
</tr>
<tr>
<td>07</td>
<td>18:20</td>
<td>Partial Lunar Eclipse; mag=0.246</td>
</tr>
<tr>
<td>08</td>
<td>10:56</td>
<td>Moon at Descending Node</td>
</tr>
<tr>
<td>12</td>
<td>19</td>
<td>Perseid Meteor Shower</td>
</tr>
<tr>
<td>15</td>
<td>01:15</td>
<td>LAST QUARTER MOON</td>
</tr>
<tr>
<td>16</td>
<td>06:39</td>
<td>Aldebaran 0.4°S of Moon</td>
</tr>
<tr>
<td>18</td>
<td>13:14</td>
<td>Moon at Perigee: 366129 km</td>
</tr>
<tr>
<td>19</td>
<td>04:45</td>
<td>Venus 2.2°N of Moon</td>
</tr>
<tr>
<td>20</td>
<td>07:15</td>
<td>Beehive 3.2°N of Moon</td>
</tr>
<tr>
<td>20</td>
<td>18:08</td>
<td>Venus 7.2°S of Pollux</td>
</tr>
<tr>
<td>21</td>
<td>10:34</td>
<td>Moon at Ascending Node</td>
</tr>
<tr>
<td>21</td>
<td>18:26</td>
<td>Total Solar Eclipse; mag=1.031</td>
</tr>
<tr>
<td>21</td>
<td>18:30</td>
<td>NEW MOON</td>
</tr>
<tr>
<td>25</td>
<td>13:00</td>
<td>Jupiter 3.5°S of Moon</td>
</tr>
<tr>
<td>26</td>
<td>21</td>
<td>Mercury at Inferior Conjunction</td>
</tr>
<tr>
<td>29</td>
<td>08:13</td>
<td>FIRST QUARTER MOON</td>
</tr>
<tr>
<td>30</td>
<td>11:25</td>
<td>Moon at Apogee: 404307 km</td>
</tr>
<tr>
<td>30</td>
<td>14:23</td>
<td>Saturn 3.6°S of Moon</td>
</tr>
</tbody>
</table>

If Daylight Saving Time is in effect, add one hour to the times listed.
Source: http://www.astropixels.com/ephemeris/astrocal/astrocal2017est.html

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.
Jon Blum presents “Maui Astronomy”

At the Cranbrook meeting on August 7, the main talk will be Maui Astronomy, by Jon Blum.

Maui is a Hawaiian island with astronomy clubs, public astronomy events, and famous professional observatories. Jon will discuss all of these, including what types of research are being done in those big domes on the top of the mountain.

Jon has been interested in astronomy since childhood and still has his first cardboard telescope. But he didn’t have time for a real telescope, and never heard of astronomy clubs, until he retired at the end of 2001. He has lived his whole life in the Detroit area, and spent his career as a dermatologist with an office in Farmington Hills. In addition to astronomy, his other hobbies are grandchildren, digital photography, and creating the largest website about Maui. He is a past vice president and past president of the Warren Astronomical Society. Everything he knows about astronomy, he learned from the many helpful and friendly members of the WAS and the seven other astronomy clubs he has belonged to in Michigan and Maui. That’s why he joined to learn to use his telescope, continued to come to learn about astronomy, and now just comes to meetings to socialize.

Bob Trembley presents “Solar Eclipse”

Bob Trembley will be presenting a slightly expanded version of his lecture about the Sun, which he has given frequently at Stargate, and at schools. Bob has been observing the Sun since 2000, when his got his 40mm Coronado PST solar telescope, and 8 inch Orion Dobsonian with a solar filter. His first astrophoto was of the partial solar eclipse of Christmas 2000, taken with a cheap digital camera held up to his Dob. Now, he holds his smartphone (with a much better camera) up to the telescope at Stargate Observatory. Bob was taking his telescopes to his wife’s school before he joined the W.A.S., now he is this year’s W.A.S. outreach officer, and schedules volunteers to take their telescopes to schools and lecture about space science.
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 Mark Kedzior at: firstvp@warrenastro.org. We have open dates at both Cranbrook and Macomb meetings. Also, if you may have any contacts of possible presenters, please send them along - that would be greatly appreciated. See you at the next WAS meeting!

From the Program Chair

September     Cranbrook    Jim Shedlowsky (also short) - Evolution of Giant Telescopes
              Macomb       Sandra Macika Pt. 1 - Meteorites
October       Cranbrook    Diane Hall (Bob Berta - short) - TBD
              Macomb       Sandra Macika Pt. 2 - Meteorites
November      Cranbrook    Prof. Jerry Dunifer - LIGO - also WAS Elections
              Macomb       Mark Kedzior - ATM Topic TBD
December      Cranbrook    Ken Bertin - Tycho Brahe
              Banquet      Prof. Emily Rauscher

Now accepting individuals to sign up and present to the WAS for the 2018 calendar year. All dates available except for April 2 at Cranbrook. Let’s get a head start on the presentation schedule for next year!

Mark Kedzior
1st VP/Program Chair

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.
NGC 4565 (also known as the Needle Galaxy or Caldwell 38) is an edge-on spiral galaxy about 30 to 50 million light-years away in the constellation Coma Berenices. Taken June 17, 2017

NGC 6946, (also known as the Fireworks Galaxy, Arp 29, and Caldwell 12), is an intermediate spiral galaxy about 18 million light-years away, in the constellations Cepheus and Cygnus. Taken July 4, 2017

The supernova discovered April 14, 2017 is still there.

Taken at the Northern Cross Observatory
A HIGHLAND FLING

There is so much going on in the lunar highlands that it is sometimes hard to navigate. In the center of this image is the crater Maurolycus (117km diameter) with a central peak off center to the north. It sits on top of another much older crater that sticks out to the south. East (right) of these is the crater Barocius (85km) with an interesting crater Barocius B (39km) on it’s north wall. Due west (left) deep in shadow is the largest crater in this image, Stofler (129km) with the smaller Faraday (71km) on its east wall, also deep in shadow. Below is another shadow filled crater, Licetus (77km). Note the funny tail hanging off Licetus to the south. This is the western wall of Heraclitus a rather odd “crater” that is a composite of several. The wall is peppered, as is most of the region, with 2-4km secondary craters, making it appear to sparkle. East (right) of this is the half shadow filled crater Cuvier. There’s nice detail in the walls of this crater. Due north of Maurolycus is Gemma Frisius (90km). It is about one third in shadow with an isolated peak on its floor offset to the west. There are some interesting walls in this crater and the one just to the east (right) that are worth a few moments of scrutiny.

Rik Hill
Object of the Month: NGC 6818

NGC 6818 is a planetary nebula in the constellation Sagittarius that is often denoted by its popular name, the Little Gem Nebula. The name comes from its diminutive size, notable blue-green coloration, and overall attractive appearance. It has an integrated apparent magnitude of 9.3, an angular diameter of approximately 17", and is Type 4 on the Vorontsov-Velyaminov classification system, indicating that it has a ring-like structure. Compared with most deep sky objects, NGC 6818 is positively tiny, being little more than half the diameter of Jupiter's disk at opposition. The planetary nebula contains a central white dwarf star of 15th magnitude brightness, is about 6000 light years distant, and is comprised of an expanding gas cloud shed from its parent star that now extends to more than half a light year across. The object resembles what the final stage of our own sun's lifecycle is expected to look like after all stellar fuel is consumed.

NGC 6818 is in a region of the sky that is relatively devoid of signpost stars, which may increase the difficulty of manually locating the nebula. It is about 9° to the west of the star β Capricorni (mag. 3.0), and is about 6.5° east-northeast from ρ1 Sagittarii (mag. 3.9), which can provide some ability to locate it, albeit with a very long star-hop. Under darker skies, the Little Gem can be more easily found using the 5th magnitude stars 54 and 55 Sagittarii (0.5° apart), from which the nebula lies about 2° to the north-northeast. At low power, NGC 6818 will appear star-like and is easily overlooked. At magnifications of 70-120x, the object should readily reveal an eye-catching and strongly colored oval disk. With suitable conditions, 8" of aperture and 120-160x power should reveal finer details, including annularity which becomes more conspicuous with the use of a narrow-band nebula filter.

Chuck Dezelah
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

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.
July Open-House
The July Open-house was the night of the first timers. We didn’t have great skies, the night started and ended completely overcast, but for almost two hours we had nice hazy skies. Besides a few diehard members, most in attendance were new to astronomy and using telescopes for the first time. Members like Riyad Matti, Pat Brown, and others spent the night helping visitors get the best view of Jupiter & Saturn that could be gotten under the conditions, everyone had a great time.

Attendance was 15

August Open-House
The regular Open-house for August is scheduled for Saturday the 26th, five days after the eclipse across America. We will have a waxing crescent Moon setting at 11:09pm. Sunset is at 8:18pm with astronomical twilight ending right around 10pm. 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.

Observatory update
The Stargate committee is communicating to find what it feels is the best course of action regarding the stones around the observatory.

Jeff MacLeod
Second Vice President
Eclipse month is here, and a good number of W.A.S. members will be fanning out across the country to various locations in the path of totality; some of the members staying home will be assisting at local eclipse events: Ralph DeCew has volunteered to help Cranbrook on August 21st (thanks Ralph!); if you are staying home on eclipse day, more help would be appreciated. Bob and Connie Trembley will be helping the Chesterfield library with an event they are hosting at Chesterfield’s Brandenburg Park. Good luck to you all, and here’s hoping for clear skies!

The W.A.S. will be helping out Wolcott Mill Metropark with their annual a Perseid party at Camp Rotary on Aug. 11 from 7:00 PM – 10:00 PM; if you’d like to come out to help, be sure you have your W.A.S. badge with you – the public is being charged for park entry, unless they have a pass. We’re not sure how many meteors visitors will be able to see before it gets dark… but that’s when the event is planned. We’ll likely be doing several presentations with the projector.

The W.A.S. has been offered a table at the Hobby Day event at Crosswinds Marsh event from 9:00 AM - 1:00 PM on August 12. They’d like to introduce the public to astronomy, and maybe have some observing. If you are interested, please contact Bob.

We have a request for an eclipse lecture for those who are blind or visually impaired by the Macomb Library for the Blind and Physically Handicapped (MLBPH) – Gary Ross said he is provisionally interested; If anyone else might be interested too, please contact Bob.

We have a request for astronomy lecturers at the Colombiere Center in Clarkston – this is a Jesuit retirement center, and several of the folks there know Br. Guy. They are looking for dates in August, and September. Ken Bertin has expressed interest, if anyone else would like to lecture for them, please let Bob know.

Mark Kedzior continues with his telescope classes and observing sessions throughout the summer in Grosse Pointe.

**July 2017**

- **7/12/2017 - Telescope Class + PowerPoint in Grosse Pointe** - Mark Kedzior
- **7/15/2017 - Annual W.A.S. Picnic at Camp Rotary**
- **7/22/2017 - Monthly Stargate Open House**
- **7/26/2017 - Telescope Class + PowerPoint in Grosse Pointe** - Mark Kedzior
- **7/26/2017 – Beginning Rocketry Lesson + Sun/Eclipse Lecture at Starbase One** – Bob Trembley ran two half-hour sessions with 10 students each through sub-orbital and orbital missions in Kerbal Space Program in the computer lab at Starbase One – located within Selfridge ANGB. After the two sessions, he gave his lecture about the Sun to all the students while they ate lunch. He also handed out a bunch of solar glasses.
- **7/29/2017 – Stargate Observatory** - Pat Brown reports that about 10 visitors showed up having confused the fourth Saturday with the last Saturday of the month. The weather was good however; there was a 6 inch f12 triplet refractor, an 11 inch SCT. They discussed the meeting times and places and Astronomy at the Beach.

**August 2017**

- **8/2/2017 - Eclipse Lecture** - Brandon Township Library - Ken Bertin lectured to 50+ people; he said it went great, and had lots of questions.
- **8/2/2017 – Beginning Rocketry Lesson + Sun/Eclipse Lecture at Starbase One** – Bob Trembley ran another set of two half-hour KSP sessions, and gave
his Sun lecture at Starbase One.

8/9/2017 - Telescope Class + PowerPoint in Grosse Pointe – The Amazing Mark Kedzior

8/11/2017 - Perseid Party - 7:00 PM - 10:00 PM
Our monthly open houses are free, but the Perseid Party will require buying a Metroparks day pass if you don't already have an annual pass.

8/12/2017 - Hobby Day event at Crosswinds Marsh - 9:00 AM - 1:00 PM
Introduce the public to astronomy – solar observing, maybe a W.A.S. table.
Contact: Jennifer Panek jpanek@waynecounty.com
NEED volunteers

8/15/2017 - Telescope Class + PowerPoint in Grosse Pointe - Mark Kedzior

8/21/2017 - THE GREAT AMERICAN SOLAR ECLIPSE OF 2017!

Live Eclipse Broadcasts:

Exploratorium: https://www.exploratorium.edu/eclipse
Stream: http://eclipse.stream.live – from an atmospheric balloon!
Slooh: https://live.slooh.com

Online Eclipse Resources:
NASA Eyes Web App: https://eyes.nasa.gov/eyes-on-eclipse-web-detail.html
NASA Eyes Desktop App: https://eyes.nasa.gov/eyes-on-eclipse-detail.html
NASA's Eclipse Website: https://eclipse2017.nasa.gov
Eclipse Fly-Over Video: https://youtu.be/cvE4lY5RGqQ

8/26/2017 - Monthly Stargate Open House
A Cub Scout pack 252 is coming to this open house. Cubmaster Bob Dewar has offered to promote our event with the Macomb councils.

We have an outreach volunteer mailing list – if you would like to be added, please see Bob.

Bob Trembley
Outreach

Perseid Meteor Shower Star Party – Camp Rotary
August 11 @ 7:00 pm - 10:00 pm

This event is held at Camp Rotary. The Perseid meteor showers will peak during this timed event. The Warren Astronomic Society will have the observatory open and ready to answer your questions. Weather permitting, please call ahead to confirm. (586) 752-5932.

Time: 7 p.m. – 10 p.m.
Cost: $10 a car

Location: Wolcott Mill Historic Center – Map Me
20505 29 Mile Road
Ray, MI 48096

Contact:
Phone: (586) 752-5932
E-Mail: Wolcott.Farm@metroparks.com

A Metroparks vehicle entry permit is required to enter any Metropark and is only $35 annually for regular admission, $21 annually for seniors or $10 daily.
History SIG Report
Aug 1979

A search for an August issue with an eclipse topic came up empty, but this first entry in my report stood out for another reason. First, however, we come face to face with a striking Editor’s request for articles, and he names names. Pretty strong stuff. But the articles that really caught my attention were two on E. John Searles: “In Loving Memory of My Dear Friend, John Searles” by Diane Bargiel and “A Last Goodbye to Our Friend, John Searles” by Frank McCullough, memorializing the recent passing of their friend and club member. E. John Searles, of course is the namesake of the highest award we offer our members.


Aug 1987

The cover of this issue features a drawing of a sun-centered solar system by Kepler following Galileo’s theories. This is the all Ken Kelly issue. He leads off with a “Revision of The Precession Program”, with several corrections and additions on the original posting the previous month (July 1987). He then follows up with a start of a series, “Interesting Minor Planets”, Part I-(2062) Aten. Ken rounds out this month’s contribution to the WASP by posting a chart of “Minor Planets for July - Aug.” that he calculated:
- EPHEMERIS FOR (1) CERES
- EPHEMERIS FOR (6) HEBE
- EPHEMERIS FOR (7) IRIS
- EPHEMERIS FOR (8) FLORA

Report from the Scanning Room

The chief scanner is on a summer break, but will dive back in come August.

Dale Thieme,
Chief scanner
BOARD MEETING - July 3, 2017

Present: Diane Hall, Mark Kedzior, Jeff MacLeod, Ruth Huellmantel

Absent: Joseph Tocco, Robert Trembley, Brian Thieme

Meeting convened at: 6:35 PM

Officer’s reports

President - Diane welcomed the Board, discussed final picnic preparations.

1st Vice President - Mark noted that there are two open spots for presentations at Macomb Meetings.

2nd Vice President - Jeff mentioned that the Wolcott Mills Metro-park is moving forward with removing the concrete apron at Stargate. (Jeff, can you add a brief summary from the open-house?)

Treasurer - Ruth summarized the financial standings and included that the Treasury report is in the WASP.

Secretary - Absent, but as usual the meeting minutes are published in the current issue of the WASP.

Outreach - Absent, but a detailed list of outreach activities was emailed prior to the Board Meeting that was reviewed by the Board.

Publications - Absent, but the WASP is on-line!

Old Business

Discussion Group - Ruth and Parker Huellmantel are hosting the July Discussion Group. Future dates are available so please contact the Board if you are interested in hosting.

New Business

Club Picnic - Final preparations were discussed for the club picnic.

MOTION: A motion was made by Mark Kedzior to adjourn which was seconded, and approved by all members.

Meeting adjourned at: 7:27 PM

CRANBROOK MEETING - July 3, 2017

Meeting called to order at 7:31 PM by Diane Hall, President.

37 members present.

Jeff MacLeod presided over the meeting in Diane’s absence and the members enjoyed the movie, “What is Space?”, from the Nova series. Jeff’s Q&A period and the juggling finale.

Meeting was adjourned at 9:57 PM

MACOMB MEETING - July 20, 2017

Meeting called to order at 7:32 PM by Diane Hall, President

38 members present

Diane Hall, President, made announcements the general announcements. Diane also summarized the Officer’s reports from the June Board meeting.

In lieu of the main talk the club held a Round-table Discussion regarding the Great American Eclipse in July. Diane Hall, Jonathan Kade and Ken Bertin hosted. They drew insight from veteran members, created a list of questions and then spend the remainder of the evening answering all of them.

Meeting was adjourned at 9:24 PM

Joe Tocco
Secretary
TREASURER’S REPORT FOR 7/31/2017

MEMBERSHIP
We currently have 105 memberships, of which 25 are Family memberships.

INCOME AND EXPENDITURES (SUMMARY)
We took in $1,285.65 and spent $1,343.69. We have $19,465.88 in the bank and $202.80 in cash, totaling $19,668.86.

INCOME
394.06  Membership/renewals
60.00   AL memberships
62.93   Snacks
25.00   Paul Strong Scholarship
9.00    General fund
13.81   Amazon Smile Donation
120.85  Merchandise
600.00  Astronomy at the Beach

EXPENSES
45.24   Snack reimbursement
298.45  Picnic supplies
1000.00 Transfer funds to GLAAC account

GLAAC REPORT  5/31/2017
Beginning balance: $5,319.80

INCOME
400.00  Lowbrows donation
300.00  FAAC donation
300.00  Seven Ponds donation

EXPENSES
300.00  Deposit for tent
Ending balance: $6,019.80

Ruth Huellmantel
Treasurer

The W.A.S. Library

Come visit the breathtaking WAS library, located in the scenic rendering-server room at Cranbrook Institute of Science! In our library, you’ll find six shelves of books about:

• Observing every celestial object imaginable;
• Using and making telescopes;
• Popular and unpopular science;
• Science biography, science history, science fiction;
• Archives of our fifty-year history;
...and other stuff we can’t classify.

To check out a book, you simply have to be a member in good standing. At Cranbrook, see our librarian, Jonathan Kade, at the break. To have a book delivered to Macomb, simply request a book from the library list from Jonathan. Where do you see the list? It doesn’t exist yet! Hassle Jonathan to post it.
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>
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<tbody>
<tr>
<td>Astronomy Club at Eastern Michigan University</td>
<td>Ypsilanti/EMU</td>
<td>Every Thursday at 7:30PM in 402 Sherzer</td>
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<tr>
<td>Capital Area Astronomy Club</td>
<td>MSU/Abrams Planetarium</td>
<td>First Wednesday of each month 7:30 PM</td>
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<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 5:30 PM</td>
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<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, see club website for times</td>
</tr>
<tr>
<td>Sunset Astronomical Society</td>
<td>Bay City</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>

For information, contact: waynestateastronomyclub@gmail.com

GLAAC Club and Society Newsletters

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

WAS Member Websites

Jon Blum:  MauiHawaii.org
Bob Trembley:  Balrog’s Lair
Bill Beers:  Sirius Astro Products

Jon Blum:  Astronomy at JonRosie
Bob Trembley:  Vatican Observatory Foundation Blog
Jeff MacLeod:  A Life Of Entropy
Twenty Years Ago on Mars…
By Linda Hermans-Killiam

On July 4, 1997, NASA’s Mars Pathfinder landed on the surface of Mars. It landed in an ancient flood plain that is now dry and covered with rocks. Pathfinder’s mission was to study the Martian climate, atmosphere and geology. At the same time, the mission was also testing lots of new technologies.

For example, the Pathfinder mission tried a brand-new way of landing on Mars. After speeding into the Martian atmosphere, Pathfinder used a parachute to slow down and drift toward the surface of the Red Planet. Before landing, Pathfinder inflated huge airbags around itself. The spacecraft released its parachute and dropped to the ground, bouncing on its airbags about 15 times. After Pathfinder came to a stop, the airbags deflated.

Before Pathfinder, spacecraft had to use lots of fuel to slow down for a safe landing on another planet. Pathfinder’s airbags allowed engineers to use and store less fuel for the landing. This made the mission less expensive. After seeing the successful Pathfinder landing, future missions used this airbag technique, too!

Pathfinder had two parts: a lander that stayed in one place, and a wheeled rover that could move around. The Pathfinder lander had special instruments to study Martian weather. These instruments measured air temperature, pressure and winds. The measurements helped us better understand the climate of Mars.

The lander also had a camera for taking images of the Martian landscape. The lander sent back more than 16,000 pictures of Mars. Its last signal was sent to Earth on Sept. 27, 1997. The Pathfinder lander was renamed the Carl Sagan Memorial Station. Carl Sagan was a well-known astronomer and science educator.

Pathfinder also carried the very first rover to Mars. This remotely-controlled rover was about the size of a microwave oven and was called Sojourner. It was named to honor Sojourner Truth, who fought for African-American and women's rights. Two days after Pathfinder landed, Sojourner rolled onto the surface of Mars. Sojourner gathered data on Martian rocks and soil. The rover also carried cameras. In the three months that Sojourner operated on Mars, the rover took more than 550 photos!
Pathfinder helped us learn how to better design missions to Mars. It gave us valuable new information on the Martian climate and surface. Together, these things helped lay the groundwork for future missions to Mars.

Learn more about the Sojourner rover at the NASA Space Place: 
https://spaceplace.nasa.gov/mars-sojourner

Caption: The Mars Pathfinder lander took this photo of its small rover, called Sojourner. Here, Sojourner is investigating a rock on Mars. Image credit: NASA/JPL-Caltech

For Sale

The following pieces of astronomical equipment are for sale from Russell Tanton, on behalf of Margaret Meyer. 
Please send your inquiries to: board@warrenastro.org

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>Televue 7mm Nagler</td>
<td>$135</td>
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<tr>
<td>Televue 22mm Panoptic</td>
<td>$225</td>
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<tr>
<td>Televue 32mm Plossl</td>
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<td>Televue 40mm Plossl</td>
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<td>Televue 15mm Plossl</td>
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<td>University 32mm Konig</td>
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<td>Meade eyepiece moon filter 07531</td>
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<tr>
<td>Meade 1.25” camera adapter 07356</td>
<td>$15</td>
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<tr>
<td>Orion skyglow filter 1.25”</td>
<td>$45</td>
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<tr>
<td>Lumicon 1.25” OIII filter</td>
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<tr>
<td>Orion ultrablock filter 1.25”</td>
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<tr>
<td>Meade 10” Starfinder, Magellan 2, camera mount, and GEM Meade 6x30 finder scope Telrad</td>
<td>$450</td>
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<tr>
<td>Orion 90mm f/11 refractor with GEM Taiwan w/ Telrad finder</td>
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<tr>
<td>Telrad base spare</td>
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<tr>
<td>Orion 90mm solar filter</td>
<td>$40</td>
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<tr>
<td>Pentax T-ring</td>
<td>$10</td>
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<tr>
<td>Orion Megaview 15x80 binocular - Japan</td>
<td>$200</td>
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<tr>
<td>Night Observers Guide Volumes 1&amp;2</td>
<td>$35</td>
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For sale: Handmade reflector and equatorial mount
I have a 6 inch reflector telescope that my father made in his spare time while raising and family and doing all the stuff a father does. He made his own mirror, tube, gearing and other details necessary to couple the scope to a precision motor to drive the scope. Note the timing marks on the assembly as shown in one of the photos. My father was a tool maker by profession and found the time to make this telescope.

I also have a 10 inch telescope mirror that he received from Polaris Telescope store which was on Michigan Ave. in Dearborn and relocated to Arizona sometime in the late 1970’s. He had plans to make a 10 inch scope but never got the time to design and make the scope.

I am selling the telescope as shown in the pictures and the 10 inch mirror. If there is any interest that your organization or members have in either of these items I can be reached via my email address dwarmus@comcast.net.

Dan
For Sale

For sale: Fiberglass Dome
I have a 6 foot diameter fiberglass dome that I would like to sell. I am only asking $250. I live in the Oxford area. I can be contacted either by e-mail at cw41000@aol.com, or by cell. My number is 248-802-0408.

Chuck Ward

Seven Ponds Open Invitation

WAS members are invited to The Seven Ponds Astronomy Club monthly meetings.

More information about upcoming meetings, maps to Seven Ponds Nature Center, etc. are available at http://www.sevenpondsac.com

Please let John Lines know if you might attend so that appropriate plans can be made: (248) 969-2790, or jelines1@gmail.com