



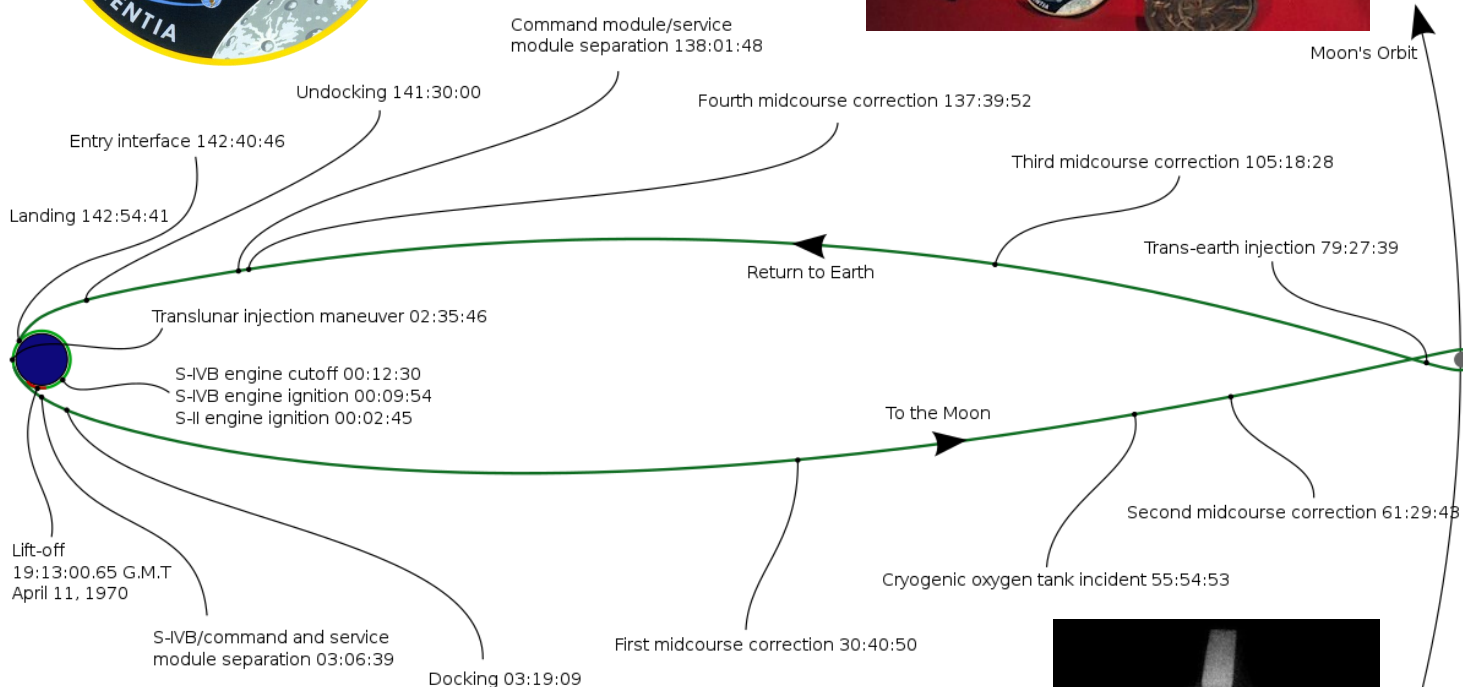
The W.A.S.P.



Vol. 52, no. 4

April 2020

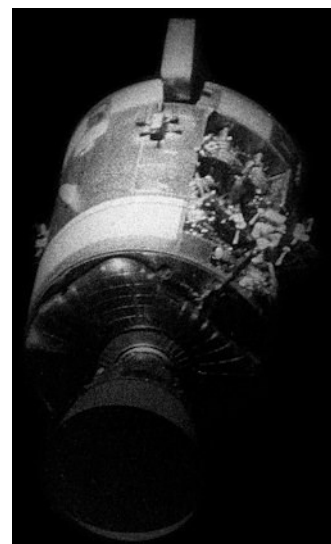
The Warren Astronomical Society Paper



Apollo XIII April 11-17, 1970

Apollo 13 was the third mission meant to land on the Moon. The lunar landing was aborted after an oxygen tank in the service module (SM) failed two days into the mission. The crew instead looped around the Moon, and returned safely to Earth on April 17. The mission was commanded by Jim Lovell with Jack Swigert as command module (CM) pilot and Fred Haise as lunar module (LM) pilot.

Right: Damaged service module



The WASP



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

Dale Thieme, Editor

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

First Monday meeting:	Third Thursday meeting:
Cranbrook: Institute of Science	Macomb Community College
1221 North Woodward Ave	South campus, Bldg. J, Room J221
Bloomfield Hills, Michigan	14600 Twelve Mile Rd.
	Warren, Michigan

Membership and Annual Dues

Student	Individual	Senior Citizen	for families
\$17.00	\$30.00	\$22.00	add \$7.00

Astronomical League (optional)\$7.50

Send membership applications and dues to the treasurer:
c/o Warren Astronomical Society, Inc.
P.O. Box 1505
Warren, Michigan 48090-1505
Pay at the meetings
Also via PayPal (send funds to treasurer@warrenastro.org)

Among the many benefits of membership are

- Loaner telescopes (with deposit). See 2nd VP.
- Free copy of each WASP newsletter.
- Free use of Stargate Observatory.
- Special interest subgroups. See chairpersons.

The Warren Astronomical Society Paper (WASP) is the official monthly

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

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

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

Snack Volunteer Schedule

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



Discussion Group Meeting

Come on over, and talk astronomy, space news, and whatnot!



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President's Field of View

What a difference a month makes. As March opened, we were looking forward to a host of activities—the annual Swap Meet hosted by the Ford Amateur Astronomy Club, the Girl Scout Mall Frenzy, and hopefully an Open House with clear enough skies to pull off a Messier mini-marathon. Several of the officers were gearing up to give presentations at other clubs, ranging from Seven Ponds to RASC: Windsor. The prospect of a new hands-on science museum in Macomb County had Outreach excited. The world had other plans; mere days after the Cranbrook meeting, your officers were discussing ways to make snack break as safe as possible at upcoming meetings. As the coronavirus outbreak escalated into a pandemic and it became clear to all of us in-person events could not continue, the discussion turned to how we could keep amateur astronomy a part of our lives while also staying inside.

I think the W.A.S. has risen to the challenge! In between the live “Open House” parties hosted on the Northern Cross Observatory’s Discord to the Facebook livestreams being given by members to our first-ever online “Macomb” meeting, we’ve had a happening month. It doesn’t replace the intimacy of a real Macomb presentation, or the buzz of activity at a proper snack break, or the free-flowing conversation at a post-meeting gastronomy session, but it’s been wonderful to connect with so many of you on a regular basis as we all weathered a deeply



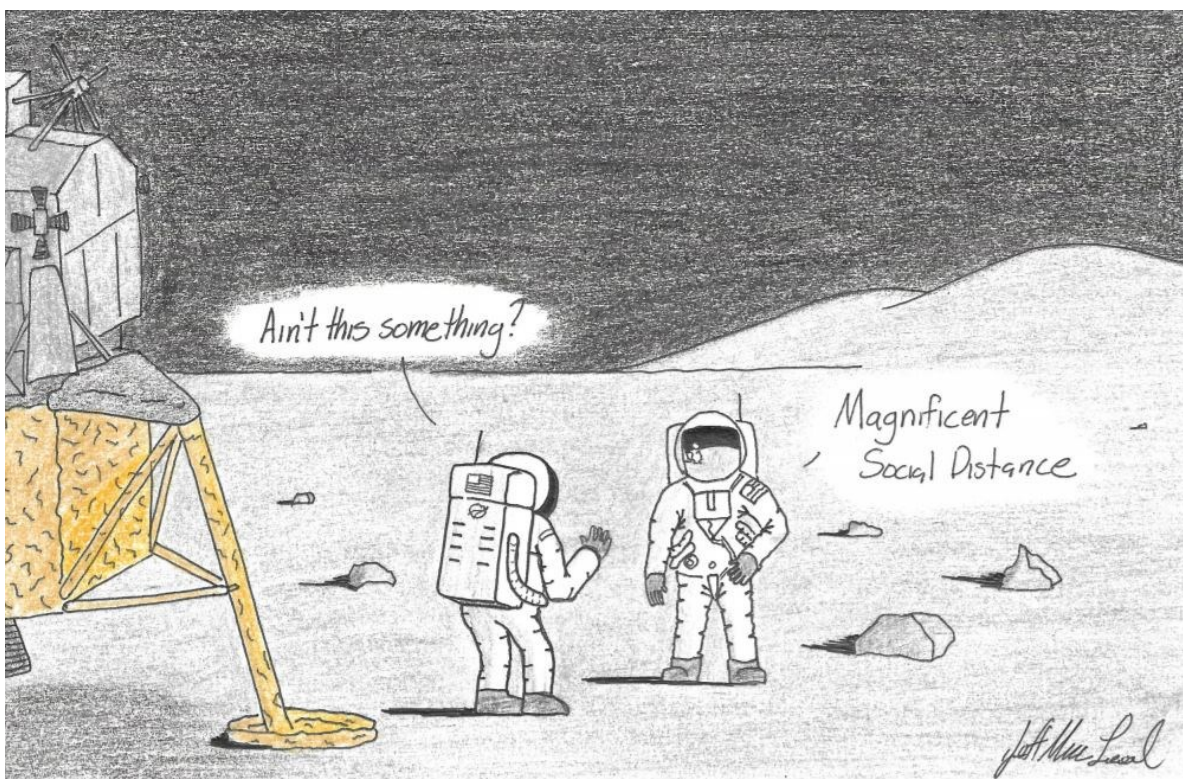
Club Member Name Tags

Email publications@warrenastro.org for your personalized name tag

strange March. I’m looking forward to this month’s “Cranbrook” meeting, which will use a different streaming platform than the “Macomb” one did; every get-together is now an adventure in new technology, and as the sort of astronomer who’s happy with a manual Dob and/or pair of binoculars, I am grateful to everyone in the W.A.S. community who’s stepped up and offered their tech know-how to keep the W.A.S. an active social scene. Special thanks in particular to Doug Bock of the Northern Cross Observatory for helping us make the transition!

April looks to be another month of the W.A.S. exploring new frontiers in how to connect with each other and with the public. Stay inside, stay safe, and I hope to present all of you with a collective Armchair Astronomer award come December.

Diane Hall,
President





Last official image of CH Orionis before NM 03/08/2020

Gary Ross reports:

Vide Joseph P. ("Big Joe") McBride's new astro-rig, commissioned in the last few days for an expedition to the Persha Observatory at La Luz, New Mexico. He has been in communication with Bill Beers thereon, from which a deep spiritual communion has been forged.

The Grand Rapids Association has a bigger observatory, but no thing like the W.A.S.P.!

From Joe:

Hi All...It took a few sessions but I think I got the RASA11 ready for the trip to NM. Spacing is very critical from the optical window to the sensor. After a few camera swaps and configurations I finally got it. It may need a slight collimation adjustment but other than that it is ready to suck all the photons from the sky in a short amount of time.

At 43 lbs I may just turn into a weight lifter.

So much for downsizing.

At right: Son of Joe, showing comparative size of the telescope.



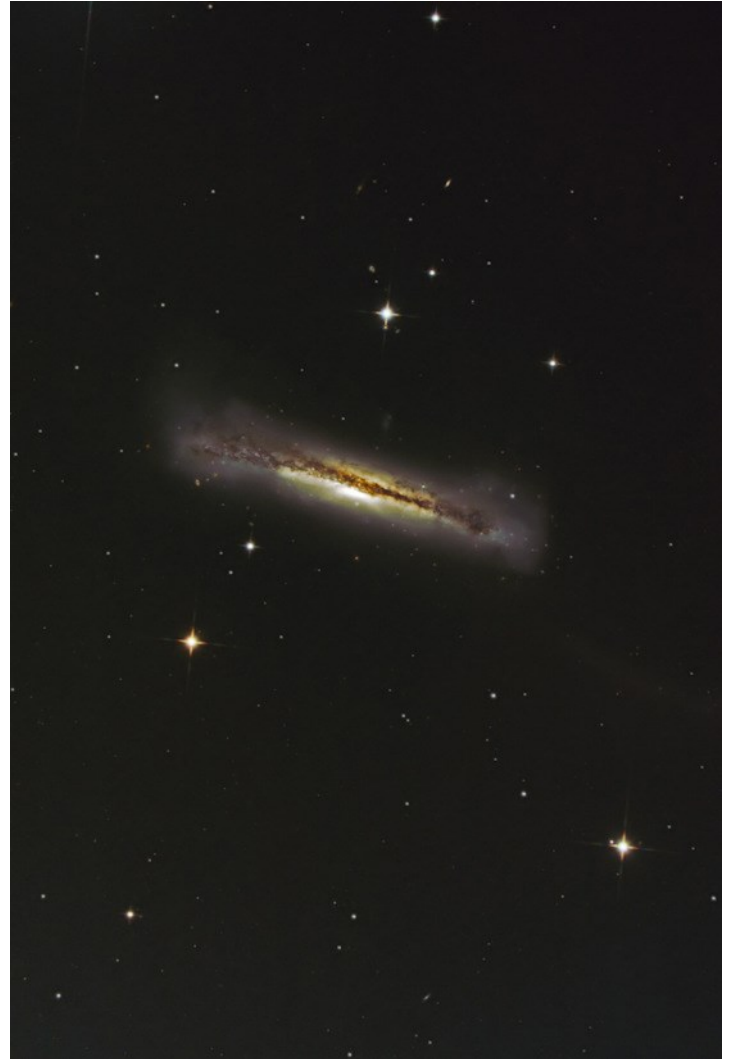
Anyone interested in learning about astrophotography, or any questions regarding equipment, or how to take astrophotos using your iPhones, or any related questions, can contact Bill Beers at: BEEZOLL@AOL.COM

The View From C.W. Sirius Observatory

The Hamburger Galaxy

NGC 3628, also known as the **Hamburger Galaxy**, (because it sort of looks like the side view of a hamburger), is an unbarred spiral galaxy about 35 million light-years away from earth in the constellation Leo. It was discovered by William Herschel in 1784. It has an approximately 300,000 light-years long tidal tail. (A tidal tail is a thin, elongated region of stars and interstellar gas that extends into space from a galaxy). NGC 3628 is considered an “edge-on” galaxy versus the “face-on” spiral galaxies that we sometimes see. Imagine holding a saucer plate so we see only the edge. This is how this galaxy is tipped when we view it, instead of looking at the main face of the plate. Along with the galaxies Messier 65 and Messier 66, NGC 3628 forms the Leo Triplet, a small, well known group of galaxies in Leo. NGC 3628’s most prominent feature is the long dark dust lane that runs the full length of the galaxy. But why does the dust lane on the left side, protrude up and down as well? Per Gary Ross, “something is going on there”. Could it be that the galaxy is actually a “barred” spiral? And why did Charles Messier not catalog this one along with M65 and M66 since it is just slightly dimmer than the other two?

Since NGC 3628 is a fainter galaxy with a magnitude of 9.6, you will need a larger telescope to view it. In real dark skies, an 8” and larger scope will reveal the long dark lane. But you won’t need that large of a telescope to get a nice view of the Leo Trio. The Hamburger galaxy makes an easy astrophotography target. Not a lot of exposure time is needed to get a decent image of it. Lettuce and tomato anyone?



If you are interested in astrophotography, or have any questions on how to get started, or even how to take pictures through your telescope using your iPhone, feel free to contact me at:

BEEZOLL@AOL.COM



About CW Sirius Observatory:

C.W. (Cadillac West) Sirius Observatory is located 15 west of Cadillac Michigan. Owned and operated by WAS member Bill Beers. The dome is an 8’ Clear Skies Inc dome which houses an 11” f/10 SCT telescope, a 102mm f/7 refractor telescope, Celestron CGEM DX mount, and uses an ASI ZWO 071 color CMOS camera, as well as a QHY8L color CCD camera. The telescope can be remotely operated from inside Bills house. Anyone interested in learning about astrophotography, or any questions regarding equipment, or how to take astrophotos using your iPhones, or any related questions, can contact Bill at:

BEEZOLL@AOL.COM





This past month of March 2020 I've been imaging Comet C/2019 Y4 (Atlas). It is getting brighter and is at about 8.3 magnitude at the time of this report. The closest approach to earth will be on May 23, 2020, at about a distance of 0.78 Astronomical Units. Predictions are that it may get bright enough to see it with the naked eye over the next few months, so a nice opportunity for us. Note the coma size and the tail formation. Below are 5 images of it on March 4, 10, 15, 17 and 21st, of 2020, taken through the 10" f/8 RC with the ZWO asi071mc PRO camera. Each image recorded was 20+ x 60 second light frames and stacked on the comets core. The field of view is 40 x 27 arcminutes.



A single stack from March 21, 2020.



You can find this comet using this link for the date of interest. <https://theskylive.com/c2019y4-tracker>

Doug Bock

Presentations

Monday, April 6, 2020 Live Stream Presentations

Main Talk:

“Challenges of Interstellar Travel”

By Bob Trembley

Bob Trembley discusses the challenges of interstellar travel – from traversing the vast distances to the nearest stars, to keeping interstellar explorers functioning properly – be they human or robotic.

Bob Trembley has been an amateur astronomer and has loved astronomy and space his entire life; he is a volunteer NASA/JPL Solar System Ambassador, and the 2020 outreach officer for the Warren Astronomical Society. Bob works for the Vatican Observatory Foundation, writing astronomy and space science posts for the “Sacred Space Astronomy Blog” with Br. Guy Consolmagno and other astronomers. Bob also maintains the VOF website, does social media work, creates newsletters and media... and whatever else gets thrown at him.



Bob is fantastically interested in asteroids, near-Earth objects (NEOs), and meteorites. Bob is a HUGE fan of educational space-related PC software such as: NASA’s Eyes on the Solar System, Universe Sandbox, SpaceEngine and Kerbal Space Program. Bob and his wife Constance, a middle-school science teacher and also a Solar System Ambassador, run

an after-school astronomy and space science club at Connie’s school called the “Endeavour Space Academy.”

Short Talk:

“Your Friendly Neighborhood Astronaut”

Al Worden

By Diane Hall



A brief tribute to Al Worden, the only native Michigander to fly on a Project Apollo mission.

Diane Hall is the current president of the Warren Astronomical Society. She is a Space Race enthusiast and intermittent movie reviewer for the WASP. She and her observing partner Jonathan Kade would like to one day resume their visits to the surviving Apollo-era spacecraft scattered around the world; they are kicking themselves for not paying a proper visit to the Michigan Space & Science Museum in Jackson before it closed.



Thursday, April 23, 2020 Live Stream Presentation

Cosmic Fireworks

By Jerry Dunifer

This presentation will examine some of the events that take place in the Universe that can be described as “Cosmic Fireworks”. These are explosive events that release large amounts of energy, often in relatively short amounts of time. Starting out close to home, we’ll take a look at Solar Flares, ex-

WAS Live Stream PRESENTATIONS

As we deal with the uncertainties of the Covid 19 issues, we are trying ways to stream our presentations. Watch for instructions to connect to the live streams in the email announcements. For further information about this, please email Dale Partin at:

firstvp@warrenastro.org or Jonathan Kade at: publications@warrenastro.org

plosive events on the surface of the Sun, which may last only a few minutes but which may release millions of times more energy than the largest hydrogen bomb ever tested on Earth. Further out in space, among the stars, we'll consider Novae (or Novas), explosions that take place on the surfaces of White-Dwarf stars. Although far more energetic than solar flares, these explosions do not, in general, disrupt the star itself. A given white dwarf may sustain multiple nova events over a period of time. And, going to far more energetic events, we'll consider Supernova explosions, which, in general, lead to the complete destruction of a star. Although these highly-energetic events occur decades to centuries apart in our galaxy, there are examples of other even more colossal events that happen throughout the Universe.



Jerry and his wife, Caroline. Jerry is wearing his LightSail 2 tee shirt.

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.



Letters

Veen at 50

Special event at the JAMES C. VEEN OBSERVATORY, Lowell Township, Kent County.

20 June, instant.



From Muskegon to Capac, amateur astronomers in Michigan have erected mighty works. The Veen is now at half-century, so a great fete.

There is "room at the inn" at Kissing Rock Farm, a mere kilometre away by road. Hospitality at mediæval level is open to all. Coffee and toast in the morning. OPEN BAR. More at the Cranbrook meeting . . .



Space Pirate Radio

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

Classifieds

For Sale to anyone who may be interested in owning this handsome, well-made, fully-equipped robotic observatory. It is in excellent condition and includes an 8" Schmidt-Cassegrain telescope. The observatory is large enough to be equipped with a 16" SC scope. Some Warren Astronomical Society members have visited here.



I have been legally blind since 2002, so I haven't used my observatory in some years. Additional photos and full equipment list available upon email request.

Asking price: \$20K as is, where is

Basic details:

- Clam-shell roof design
- Heavy duty Uni-strut roof structure
- 13' x 13' footprint; 10' high at peak
- Sturdy, 2x4 construction w/ 1/2" marine plywood walls
- Heavy duty DC winch (for remote site operation)
- Heavy duty 12-volt marine battery
- Steel cable and pulley roof operating system
- Aluminum-clad, sealed roof (has never leaked)
- (4) 3" dia. steel guide pin/bronze bushing pivots
- Adjustable roof positioning
- Can be disassembled to fit on a flatbed truck

Approximately 400 astronomy books, charts, atlases, posters and devices available separately.

Location:
Metro Detroit, Michigan
Send email request for more information
to gary@gathen.net.

Clear skies!
Gary Gathen
248.543.5400 (home office)



7' wall (I'm 6' 8")



Cable/pulley system



Movie Review

By Diane Hall

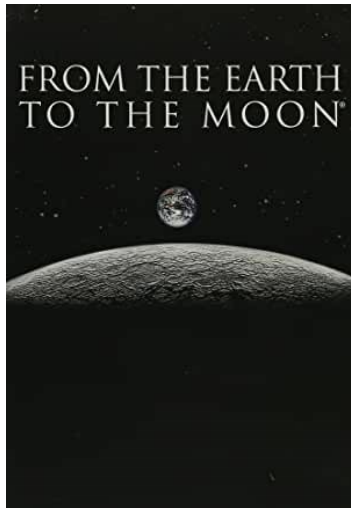
From the Earth to the Moon (1998)

To pass the time during our era of self-distancing, President Diane Hall has resumed last year's series of space themed movie reviews. We pick up this month with...

"Galileo Was Right"

For the final lap of *From the Earth to the Moon*, the producers cut loose a bit. These are less familiar stories to the public; these are the missions many Americans don't remember even happened. Project Apollo's greatest triumphs and gravest crises have already been covered and these lowered stakes give the producers and their slate of directors the leeway to relax and craft a trio of character-driven stories. As we've a lot of time on our hands, I feel we can look at them in a bit more depth than before. We'll take them one episode at a time.

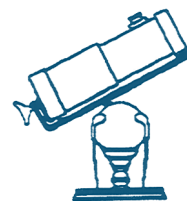
Galileo Was Right covers Apollo 15, the first of the long-duration scientific "J missions" to the lunar surface that employed the famous Lunar Rover and brought back a treasure-trove of moon rocks. The episode opens with Commander Dave Scott (Brett Cullen) and Lunar Module Pilot Jim Irwin (Gareth Williams) finding a promising specimen (spoiler: it's the "Genesis Rock") in the lunar Apennines; the excitement in their voices shines as brightly as the morning sun on their gold-tinted visors. Then we flash back to a classroom wherein the Apollo 15 crew is learning geology alongside their backup crew, which includes scientist-astronaut Harrison "Jack" Schmitt (Tom Amandes). Schmitt takes offense to the boring way in which his passion is being taught to his comrades and gets permission to recruit CalTech prof Lee Silver (David Clennon), who can make field geology exciting enough to turn pilots into enthusiastic scientists.



Silver's unorthodox training wins over Scott and Irwin; meanwhile Command Module Pilot Al Worden (Michael Raynor) meets up with another offbeat geologist, Farouk El-Baz (Isa Totah) to master lunar topography. Once Project Apollo is cut short and Apollo 18 and 19 are scrapped, the Apollo 15 crew realizes how much is riding on their newly awakened scientific skills. Do they rise to the challenge? Of course they do. There's a little forced drama over choosing the landing site, and a little more hand-wringing over a stuck drill bit, but it's nothing compared to, say, a fire in the capsule or a blown oxygen tank. The real challenge is internal, as ruggedly handsome Dave Scott matures from flippant flyboy to a proud commander who stands on the moon with a feather in one hand and a hammer in the other, poised to prove Galileo right for all time. I'm guessing the fact that the real Dave Scott was a consultant on the series had something to do with that character arc? Anyway, unfortunately Worden and Irwin don't really rise above the latest iteration of "those two guys" (see: Donn Eisele and Walt Cunningham in Episode Three, Stu Roosa and Ed Mitchell in Episode Nine). The juicy parts belong to Silver, Schmitt, and El-Baz.

All in all it's a sweet little episode that focuses on the technical triumphs of Apollo 15's mission while side-stepping the career-ending scandal the crew got into on account of taking money from a West German stamp dealer. It doesn't quite hit the heights of "Spider" or "That's All There Is," in part because it's less self-contained. Scott's evolution into a geology student has more resonance if you remember him from his previous appearances, plus at this point we're so deep into the Apollo Program that it's harder to simply leap in and take this episode as a standalone movie. Unfortunately for tidy dramatic resolution, we now believe that the Genesis Rock is not, in fact, a piece of primordial lunar crust... but hey, Scott and the boys tried their best.

Rating: 4 out of 5 Moons. It's solid and seems even better when compared to the previous two episodes.



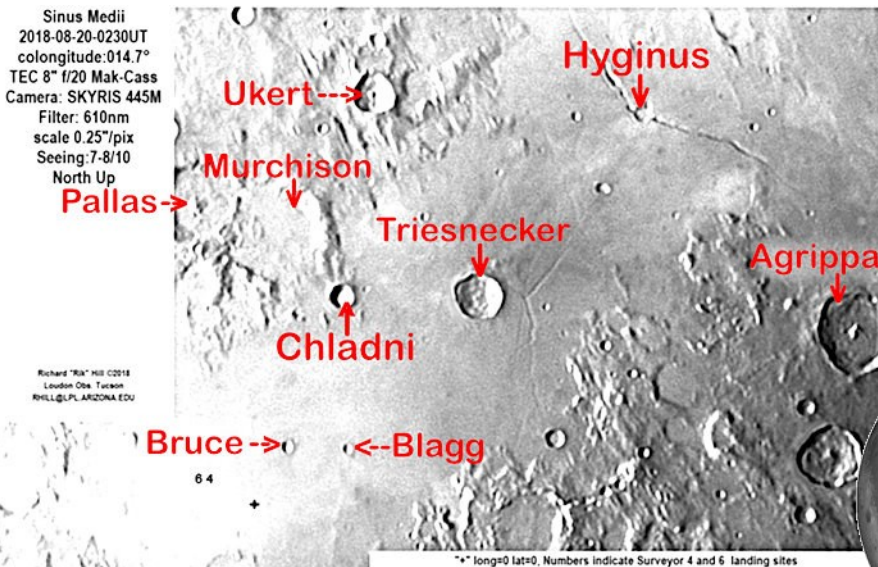
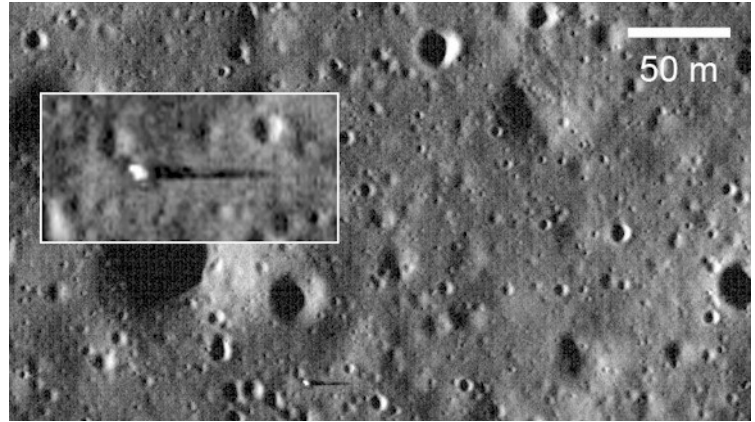


Over the Moon

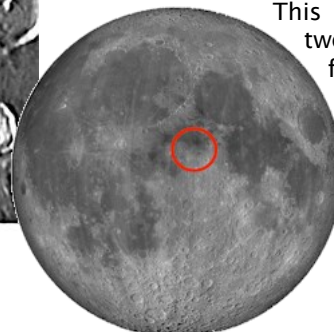
With Rik Hill

Lunar Central

Imagine working on a spacecraft, putting your whole effort into building, launching and guiding of it to its destination (Destination Moon for you old timers) only to lose the telemetry 2 1/2 minutes before the projected touchdown? I've been in a room where that kind of thing happened (on Mars) and everyone looks like a wet dog. It's very depressing. The lunar mission I'm speaking of here is Surveyor 4 which crashed into Sinus Medii very near the Huyginus (10km dia.) and the beautiful squat "V" shaped Rima Huyginus seen in the upper right and Triesnecker (27km) with its complex of rimae in the center. The mean center of the visible disk of the Moon is seen at the "+" symbol. Above it are two similar sized craters, Bruce (7km) on the left and Blagg (5km) on the right. To the left of these are two numbers "4" and "6". The number 4 indicates the supposed crash site of Surveyor 4 on 17 July, 1967. Then just four months later, 10 Nov., 1967, Surveyor 6 successfully landed just a few km to the west of Surveyor 4's resting place indicated here by the number 6 on the image. The LROC orbital imaging spacecraft has even taken image of Surveyor 6 sitting on the surface (attached). I remember as a teenager being disappointed that Surveyor 6 could not see the crashed Surveyor 4 off in the distance but if you think about the curvature of the Moon with its smaller radius than Earth, that simply would not have been possible.



Before leaving this area I have to point out a couple of my favorite craters just north of the landing sites. The larger one is the ruined crater Murchison (60km) just above Bruce and Blagg, which is open to the east towards the younger, smaller crater Chladni (14km). Then to the west (left) of it is Pallas (51km) with a nice central peak. I always spend some time looking at these when I'm in the area. There's so much to commend this region on the Moon!



This montage consists of two images each made from an 1800 frame AVI stacked using AVIStack2 (IDL) and further processed with GIMP and IrfanView.

April 1987

The cover this month is graced with a cartoon that strangely resembles the “Drabble” series. We wouldn’t violate copyright, would we?



We get a congratulations from the Astronomical League for winning the “1986 Community Service Award” from the Michigan Recreation and Parks Association.

Ken Kelly continues his listings of “Minor Planets for March – April”

- Ephemeris for (15) Eudomia
- Ephemeris for (532) Herculina
- Ephemeris for (2) Pallas
- Ephemeris for (1) Ceres

Plus a comet

- Ephemeris for 1987c Nishikawa-Takamizawa
- TagoM 1164

Frank R. McCullough concludes his autobiographical “Part III: in the Beginning”, and of course, because it’s April... “Voyage to the Land of the Strait” by Gemuel Lulliver is reprinted from an earlier WASP (Nov. 1978.) and(?) “Precessional Motion in a Smoke Ring Vortex Shaped Universe” by Arthur J. Johnson.

April 1997

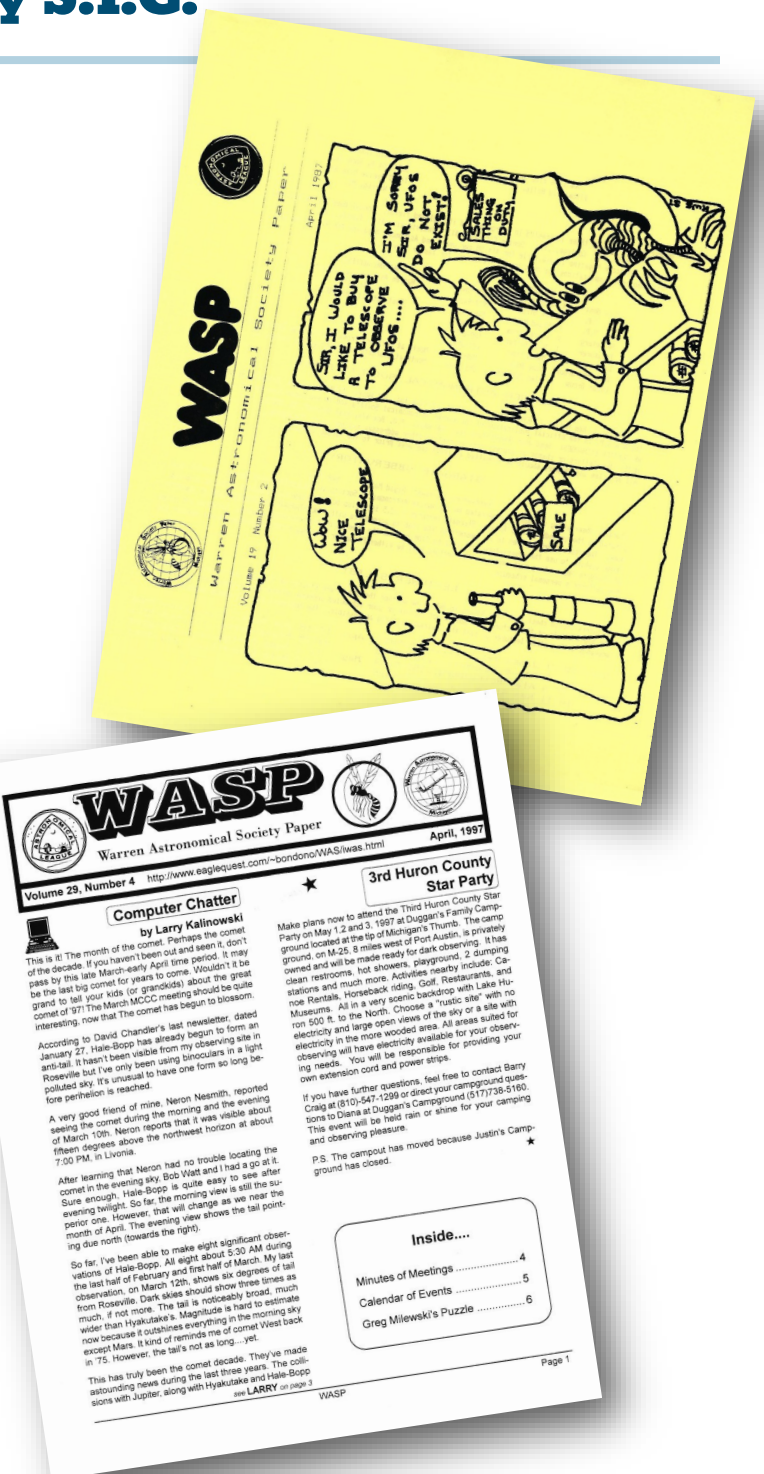
There is a lengthy discourse on comet Hale-Bopp in “Computer Chatter” by Larry Kalinowski, along with an announcement for the “3rd Huron County Star Party”.

Astro-Facts by Greg Milewski, an ongoing feature in this 6-8 page format of the WASP, gives credit to *The Cosmic Mind Boggling Book*, by Neil Macleer, Warner Books, New York, © 1982.

The Minutes of the meetings by Glenn Wilkins Secretary present a great snapshot of the workings of the club. Then we’re treated to another puzzle: “Famous Comets” by Greg Milewski.

From the Scanning Room

This Just In: I started digging through remains of the first cull of the Kim Dyer collection and found a folder of loose pages from an assortment of WASP issues. My guess is that Kim gathered up all the leftover pages from the “assembly party” and took them home. These pages generally come from issues I’ve already scanned (any guesses where this is going?). Buried in the pile, I found some pages that



looked like they came from the same issue – the cover page was [August 1983](#) (a missing month!) Now, these pages were loose, sharing only paper color, but comparing them to the examples of the bracketing months, I am very confident that this is a complete issue with the remote possibility that the August sky chart is missing.

This completes the 1983 set now. Progress!

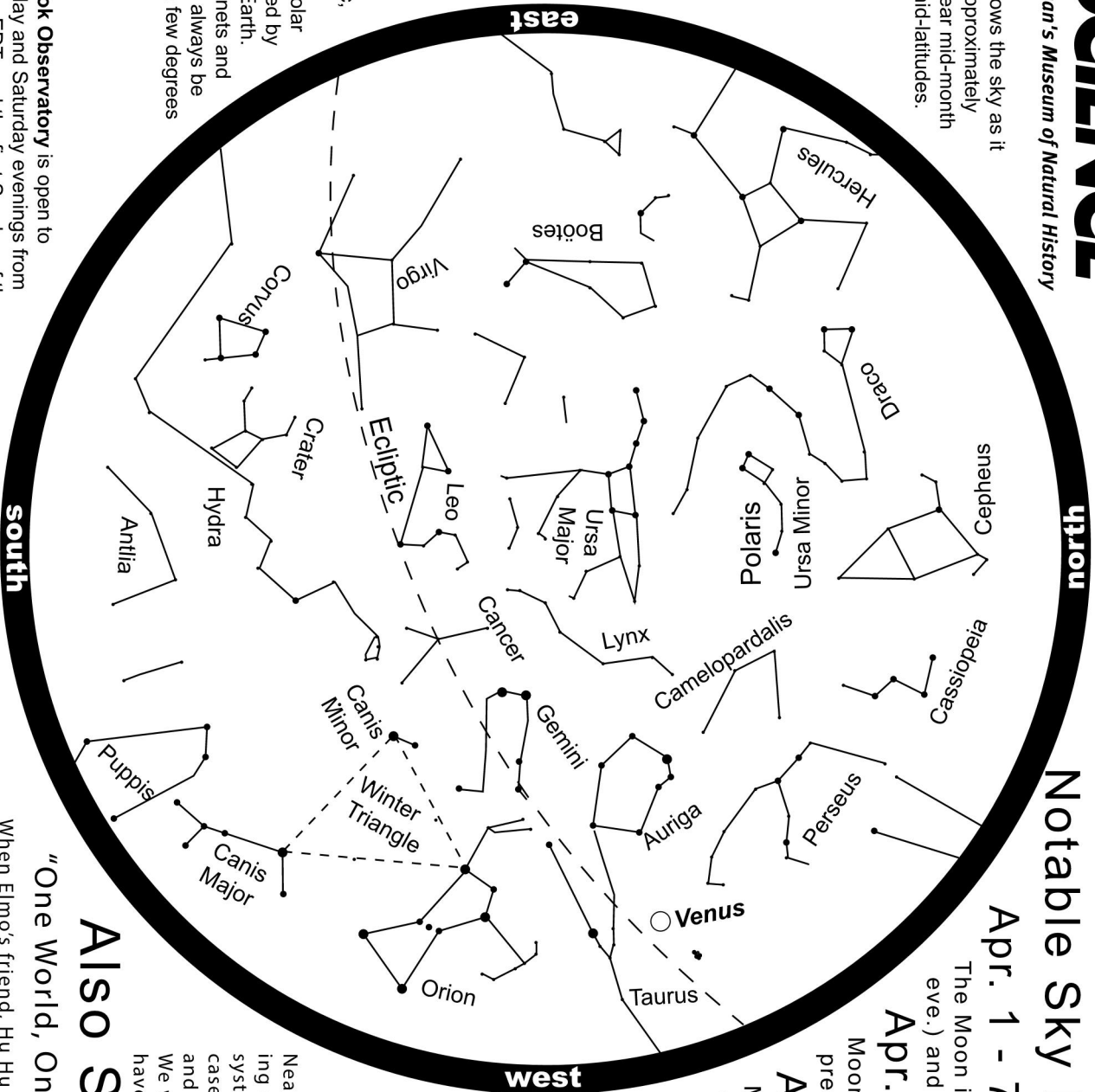
Dale Thieme,
Chief Scanner

APRIL 2020

Notable Sky Happenings



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



Apr. 1 - 7

The Moon is at the lower right of Pollux on the 1st (S eve.) and to the left of Regulus on the 4th (SE eve.).

Apr. 8 - 14

Moon is to the right of Jupiter on the 14th (SE predawn); Saturn and Mars are to the left.

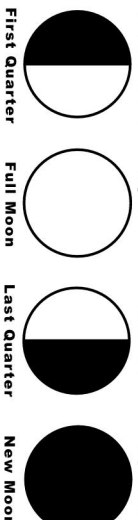
Apr. 15 - 21

Moon is below Saturn on the 15th (SE predawn); Jupiter is to the right, Mars is left.

Apr. 22 - 30

Lyrid meteor shower peaks the evening of the 22nd (15-20 meteors/hour). Moon is to the left of Venus on the 26th and below Pollux on the 28th (W evening).

Apr. 1 & 30 Apr. 7 Apr. 14 Apr. 22



Now Showing

"Robot Explorers"

Near the end of the twentieth century, we began launching unmanned probes into the far reaches of the solar system. What they discovered was amazing and in some cases unexpected. New space missions are underway, and many of these robust spacecraft are still operational. We will pay tribute to these robots and learn what they have taught us about our solar system.

Also Showing

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

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

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

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

The Cranbrook Observatory is open to the public Friday and Saturday evenings from 8:30 - 10:00pm EDT, and the first Sunday of the month from 1:00 - 4:00pm for solar viewing. Come have a look through our 6" telescope! For observatory information visit <http://science.cranbrook.edu/explorer/observatory>



Stargate Observatory

Special Notice

Due to the measures taken during the Covid-19 pandemic On-site Star Parties and group events are cancelled.

During this time, you are encouraged, when the skies co-operate, to join the livestream with Northern Cross Observatory on the open house schedule (4th Saturday of the month)

Past livestream are available on the Warren Astronomical Society's YouTube channel:

<https://www.youtube.com/channel/UC12jUX4Gmweg6fTtUuqa8CQ>

Observatory Rules:

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

Stargate Report

The March open house was hosted by Doug Bock through livestream on YouTube due to the COVID-19 health concerns. Until further notice from the board, all future open house events will be conducted online.

Stargate observatory building and equipment are in good condition as of March 22nd.

Riyad I. Matti

2020 W.A.S. 2nd V.P. Observatory Chairperson

Astronomical Events for April 2020

Add one hour for Daylight Savings Time
Source:

<http://www.astropixels.com/ephemeris/astrocal/astrocal2020est.html>

Day	EST (h:m)	Event
01	05:21	FIRST QUARTER MOON
02	02:59	Pollux 4.9°N of Moon
03	01:25	Beehive 1.3°S of Moon
03	09:36	Venus 0.3°S of Pleiades
04	13:45	Regulus 3.9°S of Moon
07	13:08	Moon at Perigee: 356909 km
07	21:35	FULL MOON
12	21:58	Moon at Descending Node
14	17:56	LAST QUARTER MOON
14	18:04	Jupiter 2.0°N of Moon
15	04:26	Saturn 2.5°N of Moon
15	23:33	Mars 2.0°N of Moon
20	14:01	Moon at Apogee: 406463 km
22	01:00	Lyrid Meteor Shower
22	21:26	NEW MOON
25	22:34	Aldebaran 3.8°S of Moon
26	05:00	Uranus in Conjunction with Sun
27	12:54	Moon at Ascending Node
29	09:19	Pollux 4.7°N of Moon
30	08:18	Beehive 1.6°S of Moon
30	15:38	FIRST QUARTER MOON

Treasurer's Report

Treasurer's Report for 03/30/2020 MEMBERSHIP

We have 78 current members

INCOME AND EXPENDITURES (SUMMARY)

We took in \$1,640 and spent/transferred \$418 We have \$22,104 in the bank \$51 in checks and \$677 in cash, totaling \$22,833 as of 03/30/2020.

INCOME:

Row Labels	Sum of Credit
AL 2020	\$ 45.00
calendar 2020	\$ 150.00
donation	\$ 346.88
membership	\$ 287.00
merch	\$ 84.00
renewal	\$ 727.00

EXPENSES:

Row Labels	Sum of Debit
Calendar Shipping Cost	\$ 30.35
Snack Reimbursement	\$ 70.00
Snack Supplies	\$ 2.12
Speaker Expense, Dinner	\$ 54.23
Speaker Expense, Driving	\$ 261.00

GLAAC REPORT 03/30/2020

Beginning Balance: \$2,237

INCOME

EXPENSES

No activity

Ending Balance: \$2,237



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

Outreach Report

My wife and I sold our house and moved into her parents basement, with the idea of "taking our time" to look for our new home; just a scant few days later, Michigan's shelter-in-place was implemented... so I guess we have plenty of time now. Since we've moved, I've had several Skypes with Br. Guy, an online meeting of the W.A.S., an online meeting of GLAAC, and a video-chat test session with some GLAAC people, and numerous video-chats with my daughter and son-in-law, and my grandbaby!

I've received an email from the NASA/JPL Solar System Ambassador program with a list of libraries looking for online presentations by SSAs or NASA Night Sky Network members - *which we are*. I can send you that list if you are interested, but I think this is something our outreach team might want to consider doing for libraries in the metro-Detroit area. I have a TON of library contacts from when we did all the Apollo 50th presentations - maybe we should have an online meeting to discuss this!

Astronomy at the Beach Planning

GLAAC is requesting that member clubs provide some sort of hands-on activity to be hosted at their tables this year's event. Suggestions are welcome! GLAAC is looking into becoming a 501(c)(3) in their own right. I've included minutes from the Feb. 13 AATB planning meeting below.

AATB Planning Meeting: Thursday April 16, 2020, at 7:00PM

- ***Everyone is Welcome!***

Online at: <https://umich.zoom.us/j/451974838>

(Password: 0000)

W.A.S. Calendar Entry: [\[LINK\]](#)

Even if you can't make it to the April planning meeting, you can join the [groups.io](https://glaac.groups.io/g/main) site to get emails and updates from the planning committee. <https://glaac.groups.io/g/main>.

Member Spotlight

Doug Bock was *instrumental* in getting our first online meeting running and is hosting virtual open houses. *Thanks Doug!*

Doug's DISCORD channel is: <https://discordapp.com/invite/gFxx63h>

Doug's YouTube channel is: https://www.youtube.com/c/DougBock_BoonHill/live

Jeff MacLeod has been live-streaming an Astro Chat program on Facebook. You go Jeff!

Jeff's Facebook Live: <https://www.facebook.com/Jeffs-Astro-Chat-102700051378313/>



Global Astronomy Month

April is Global Astronomy Month (GAM), organized each April by Astronomers Without Borders, is the world's largest global celebration of astronomy. GAM 2020 brings new ideas and opportunities that bring astronomy enthusiasts together worldwide to celebrate "One People, One Sky."

<https://astronomerswithoutborders.org/global-astronomy-month-2020.html>

Yuri's Night: April 12



Yuri's Night is a global celebration of humanity's past, present, and future in space. Yuri's Night parties and events are held around the world every April in commemoration of Yuri Gagarin becoming the first human to venture into space on April 12, 1961, and the inaugural launch

of the first Space Shuttle on April 12, 1981.

<https://yurisnight.net/about/>

Astronomy Day: May 2



Astronomy Day is a world-wide event observed each fall and spring.

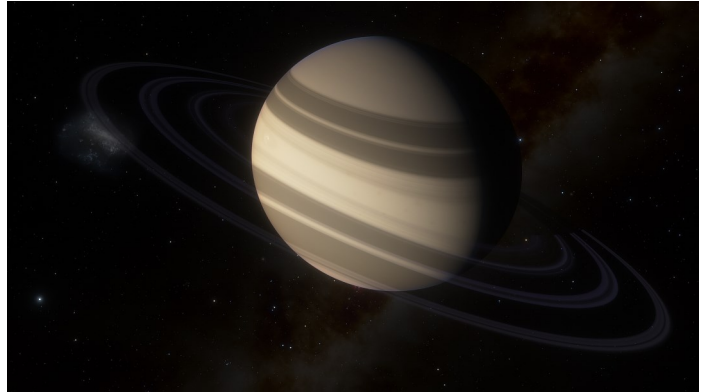
Local astronomical societies, planetariums, museums, and observatories would usually be sponsoring public viewing sessions, presentations, workshops, and other activities to increase public awareness about astronomy and our wonderful universe. I expect to see a lot of online activities this year.

(Continued on page 17)

Absolutely Shameless Plug

I write a weekly "In the Sky" post for the [Sacred Space Astronomy site](#) - the blog of the [Vatican Observatory Foundation](#). In this post I show some features in the sky during the week, Moon phases, asteroid and exoplanet counts, news on various space missions and more. Recently, I started a virtual tour of stars near our Sun - creating imagery of those star systems using the [SpaceEngine](#) app - which I've used during presentations for the W.A.S.

<https://www.vofoundation.org/blog/in-the-sky-this-week-march-31-2020/>



Great Lakes Association of Astronomy Clubs Meeting Minutes 2020-03-12

Attendance

Jeff Kopmanis (Lowbrows)
Adrian Bradley (Lowbrows)
John Walbank (Lowbrows)
Mike Ryan (Ford)
Remote: Geof Vasquez (WAS) (retired, Royal Oak)
Remote: Bob Trembley
Remote: Tim Campbell

Came to order: **7:11 pm**

PRESSING BUSINESS

Covid-19 situation: should meetings move to online-only?

AB: will keep online available, but until situation changes, will continue meeting in-person

Old Business

Status of "Interim" on Secretary position

JK was voted permanent Secretary

Tent rental

Deposit made? *Not yet (~10%)*

Contact Valley regarding flexibility and items

40x80 tent

Tent lighting

Sidewalls, ~12 (20')

White folding chairs, ~60

Scope of event (Telescopes, Demos/Displays)

Participation from each club for a display in the tent

Scavenger Hunt

Demo/Display Tent content

Identify vendors, orgs that can present in tent

Clubs

Companies, groups

Vote on changes

JW/MR - unanimous vote

Bank account transfer from WAS

No docs regarding bank info found

Steps

Incorporate as Domestic Non-Profit

Get tax ID

Open bank account

(Continued on page 18)

(Continued from page 17)

Apply for 501c3

Insurance:

DNR has GLAAC and volunteers sign a volunteer waiver

501c3 status (John, Geof, Diane)

Due to 501c3 status and WAS' EIN, the existing WAS account probably can't be split

Diane will be transferring 501c3 docs and other stuff to the Group.io storage

John: Put together Task Checklist and Donation Letter

Sponsors and Sponsor letters

Theme: 30 Years of Discoveries

5 planets + Moon that night

See actual document (JPG files online on Gdrive)

In the past: DNR has used glow-bracelets to identify "officials"

Food Vendor: South Lyon XC Team - Scott Smith

AB asked for motion to accept checklist with changes as-needed: JW/MR, all aye

Web Updates

Put light management on the web site

Cellphones

Flashlights

Welcome table to cover flashlights

Headlights off!

Update AATB page

"5 Planets": Jupiter, Saturn, Mars, Uranus, Neptune

Pluto will technically be visible, but might be hard to find

Deep space items (Planewave or big scope)

Moon w/ craters

PRE-DUSK: Solar viewing!

Telescope field planning and management

Parking Lot: expanded fence (addl. 500ft)

Looking for solutions to barrier on parking lot lights

Safety issues with path lighting: solar lights

Considerations for big scope logistics and power (Mike Ryan)

West side of beach isn't as populated, probably due to obstructions or orientation;

freeway light

Big telescopes generate large lines, and congest the area

Pre-registration of large or heavy equipment can help plan - Mid-April, "Special Accommodations"

Astroimaging Demos? Planewave

GLAAC/DNR can assist with transport and setup/teardown

Telescope Signs

Contain (eg.)

Club and/or group being represented

what is being viewed,

what type of scope

???

Taking possession of all signs. **Tony**

New Business

Solar Observing at AATB - *continue with yellow balloons/flags*

Astroimaging demos - Interesting and timely addition, but needs power

Information table - location: centrally located

Contact Volunteer groups (JK task)

Pleiades group - retry

JK: KAS is struggling, especially with outreach

UM Astronomy Club

Telescope owner check-in, location map

Visitors info

Motion to Adjourn: JW/MR - all in favor, **9:37pm**

Meeting Minutes

CRANBROOK BOARD MEETING

March 2, 2020

Members present: Diane Hall, Dr. Dale Partin, Riyad Matti, Glenn Wilkins, Mark Jakubisin, Jonathan Kade and Bob Trembley. Diane called the meeting to order at 6:39.

OLD BUSINESS

Diane and Jonathan will have a table at the Ford Amateur Astronomy Club Expo at the STEM School at the Henry Ford College in Dearborn on Saturday, March 21. Jonathan will give a talk. (Note: meet may be cancelled due to virus fears)

Riyad reported a new concern with light pollution from the public lavatory entrance. He will prepare a memo to the Park authority asking for a solution to our needs which will not compromise Park needs for safety and a site locator. This memo will also highlight ongoing safety issues with loose rocks on the observatory walkway. Temporary improvements were discussed. Suggestions are welcomed.

Promo Plaque for Stargate - no report

Diane indicated that progress is expected this week on the proposed Dark Sky event.

Jonathan reported that he intends to push for completion of the 2019 Year in Review project and initiate the 2020 mailer this month.

Speaker reimbursement guidelines - the Board agreed that the WAS will offer **non-member** speakers up to \$50 cash for those traveling up to 150 miles one way. The total reimbursements for those traveling over 150 miles will be capped at \$100. Either way, a free dinner will also be offered.

NEW BUSINESS

Diane & Bob attended a pre-opening review of the Macomb Discovery Center in Mt. Clemens and it seems like it will be a prominent attraction in the area. Management appears to be enthusiastic & ambitious.

Diane reported that GLAAC has a mostly new management team and will need some support to quickly get up to speed. A regular secretary would be helpful. Diane will help with the necessary 501C forms. Many of the new officers are from the Lowbrows. Bob noted that hands-on events are needed for the annual event. Speakers will likely come from local clubs.

Diane reported on Pat Brown's funeral (report elsewhere in the WASP) and offered WAS assistance to his family in selling Pat's equipment. She also noted that the Lowbrows have an extensive amount of equipment that needs to be sold.

OFFICER REPORTS

Dale reported that he is searching for a banquet speaker and wondered if we should consider instead the showing of our 40-year history video of the WAS? If not, then we may consider showing the video at a regular WAS meeting. Dale also noted that we should consider bringing some of our own scopes to Cranbrook on April 6. If it is cloudy, we will have a movie night.

Riyad reported a successful Open House with good viewing and almost 60 visitors attending.

Diane & Bob reported that sufficient commitment has been made for WAS support for the girl scout event at the mall; however, additional WAS support is needed for Astronomy Day at Cranbrook on May 2.

The Board agreed with Diane that we should actively support the nomination of Dale Thieme as the Astro League Astronomer of the Year!

Mark reported there is confusion regarding payment of a \$225 invoice from Canada. Jon will investigate.

CRANBROOK MEETING

March 2, 2020

Diane called the meeting to order at 7:32 for 57 members and 2 guests.

In the News/Sky was enthusiastically presented by Bob Trembley. Ken Bertin remarked that these types of reports can also be found at earthsky.com.

Jonathan reported that publication of the WASP again beat the deadline!

Mark summarized the financial report that the WAS has \$22,800 in the bank, and we did not suffer any stock losses in the recent mini-crash! Details in the WASP.

Marty Kunz reported no significant sunspots but still recommended watching the sun for other ongoing interesting displays.

SHORT TALK - In support of the main talk, Dr. Partin presented a report on how the heavy elements are synthesized in the stars.

SNACK BREAK - Supplied by Dr. Jerry Dunifer with apple slice support by Bob Trembley at 8:30

MAIN TALK - Dr. Partin introduced special guest Theodore Gray, author and a founder of Wolfram Research. His subject was "The Periodic Table: A Work of Ages". His talk was both entertaining and informative leaving the audience wishing there was additional time to hear more from Mr. Gray drawing from his extensive experiences!

The meeting was closed at 10:02 with the usual invitation to continue discussions at the Red Coat Tavern in Royal Oak.

MACOMB “VIRTUAL” MEETING

March 19, 2020

Due to National public assembly restrictions related to growing concerns about the new Corona virus, the WAS board decided to suspend our regular meetings and other events until further notice. However, due to the pro-active efforts of the board and many others in our society, it was decided to try a virtual meeting. (Further details below).

Diane Hall called this meeting to order at 7:30 PM for 42 viewers on You Tube, and an unknown number of additional viewers on Discord, a video conference format.

Diane reported that all scheduled group events have been postponed until Federal & State restrictions are removed. This includes Outreach and the Ford swap meet on 3-21. Depending on the success of this meeting, we may consider virtual gatherings for some planned events.

March minutes and the treasurer’s report are expected to be reported in the next W.A.S.P., as usual. Dues payments can still be made through the U.S.P.S. or online to Mark Jakubisin, Treasurer.

IN-THE-NEWS presented by Diane

Moon astronaut, Al Worden has died. He was born in Michigan and famous for being part of the team that brought moon rocks back to earth.

The Mars rover known as the “mole” has been re-activated through some creative engineering. The important mission is to measure sub-surface temperatures. Perseverance is expected to be ready for a summer launch.

IN-THE-SKY presented by Diane

Spring officially arrived today, the earliest date for this event in 124 years due to leap year and other long-term adjustments.

Betelgeuse is getting brighter again thus disappointing some hoping for a super nova, but pleasing others who enjoy Orion just as it is!

Comet Atlas is currently 8 to 9 magnitude but offering promise that it might be special in June.

OBSERVING REPORTS

Doug Bock showed his image of Comet T2, currently at 8.5 magnitude.

Diane reported that C&G Newspapers today published a nice astronomy story with comments from WAS members including astro pictures with credits. If possible, please pick up a copy and maybe an extra for our achievers.

A viewer asked: Why do comets sometimes appear green? Some members answered that it was related to cyanogen (O3) being activated when energy from the sun frees electrons from organic molecules.

Catherine asked if spectra can be confused due to red/blue shifting related to relative velocity toward or away from us? Ken Lord noted that this

just requires a simple adjustment as the entire spectrum is shifted but remains relatively intact.

MAIN PRESENTATION – Satellites of Love, Missions to Venus updated version presented by Jonathan Kade.

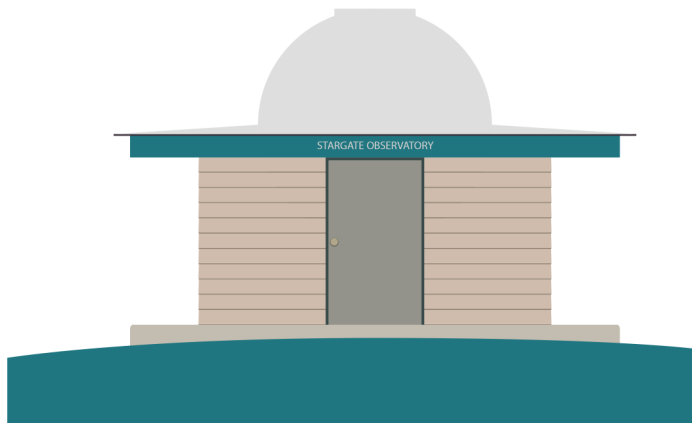
Jon started with physical and chemical comparisons between Earth & Venus. He then presented pictures of the many flybys and landings attempted over decades. Clearly the early explorers were on a steep learning curve and were definitely persistent! However, the final results have been dramatic.

Jon also posed some questions to the viewers to test the ability for interactions through the two software programs.

This meeting was closed at 9:05.

When the board decided a week or so ago that it would not be feasible to have our normal meeting at Macomb, Doug Bock immediately came forward and offered to link us to his Discord app at his Northern Cross observatory. Diane and Jonathan agreed to attempt this proposal and arranged a test with various members of the WAS. The original trial was rough but promising, so an all-out effort was made to set up the program for the entire membership and prepare presentations for Thursday. By most accounts, our first virtual meeting was a success! There were, of course, some minor start-up problems on Thursday, but they were quickly resolved, and the day was saved with promise of a bright future for the concept. Most viewers (42) chose to watch via our You Tube link which worked well but only allowed chat type questions and input from the viewers. However, the audio and video output feeds through You Tube were generally excellent. Congratulations to all those who put this miracle together!

Glenn Wilkins,
Secretary



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

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

GLAAC Club and Society Meeting Times

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

GLAAC Club and Society Newsletters

Warren Astronomical Society: <http://www.warrenastro.org/was/newsletter/>
 Oakland Astronomy Club: <http://oaklandastronomy.net/newsletters/oacnews.html>
 Ford Amateur Astronomy Club: <http://www.fordastronomyclub.com/starstuff/index.html>
 Sunset Astronomical Society: <http://www.sunsetastronomicalsociety.com/>
 University Lowbrow Astronomers: <http://www.umich.edu/~lowbrows/reflections/>

WAS Member Websites

Jon Blum: [Astronomy at JonRosie](#) Bob Trembley: [Balrog's Lair](#)
 Bill Beers: [Sirius Astro Products](#) Bob Trembley: [Vatican Observatory Foundation Blog](#)
 Jeff MacLeod: [A Life Of Entropy](#)

Doug Bock: <https://boonhill.org>
 Facebook: Northern Cross Observatory <https://www.facebook.com/NorthernCrossObservatory>
 Boon Hill and NCO Discussion <https://www.facebook.com/groups/369811479741758>
 YouTube channel: <https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w>



This article is distributed by NASA Night Sky Network

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

Hubble at 30: Three Decades of Cosmic Discovery

David Prosper

The **Hubble Space Telescope** celebrates its 30th birthday in orbit around Earth this month! It's hard to believe how much this telescope has changed the face of astronomy in just three decades. It had a rough start -- an 8-foot mirror just slightly out of focus in the most famous case of spherical aberration of all time. But subsequent repairs and upgrades by space shuttle astronauts made Hubble a symbol of the ingenuity of human spaceflight and one of the most important scientific instruments ever created. Beginning as a twinkle in the eye of the late Nancy Grace Roman, the Hubble Space Telescope's work over the past thirty years changed the way we view the universe, and more is yet to come!

We've all seen the amazing images created by Hubble and its team of scientists, but have you seen Hubble yourself? You actually can! Hubble's orbit -- around 330 miles overhead -- is close enough to Earth that you can see it at night. The best times are within an hour after sunset or before sunrise, when its solar panels are angled best to reflect the light of the Sun back down to Earth. You can't see the structure of the telescope, but you can identify it as a bright star-like point, moving silently across the night sky. It's not as bright as the Space Sta-

tion, which is much larger and whose orbit is closer to Earth (about 220 miles), but it's still very noticeable as a single steady dot of light, speeding across the sky. Hubble's orbit brings it directly overhead for observers located near tropical latitudes; observers further north and south can see it closer to the horizon. You can find sighting opportunities using satellite tracking apps for your smartphone or tablet, and dedicated satellite tracking websites. These resources can also help you identify other satellites that you may see passing overhead during your stargazing sessions.

NASA has a dedicated site for Hubble's 30th's anniversary at bit.ly/NASAHubble30. The Night Sky Network's "Why Do We Put Telescopes in Space?" activity can help you and your audiences discover why we launch telescopes into orbit, high above the interference of Earth's atmosphere, at bit.ly/TelescopesInSpace. Amateur astronomers may especially enjoy Hubble's images of the beautiful objects found in both the Caldwell and Messier catalogs, at bit.ly/HubbleCaldwell and bit.ly/HubbleMessier. As we celebrate Hubble's legacy, we look forward to the future, as there is another telescope ramping up that promises to further revolutionize our understanding of the early universe: the James Webb Space Telescope!

Discover more about the history and future of Hubble and space telescopes at nasa.gov.

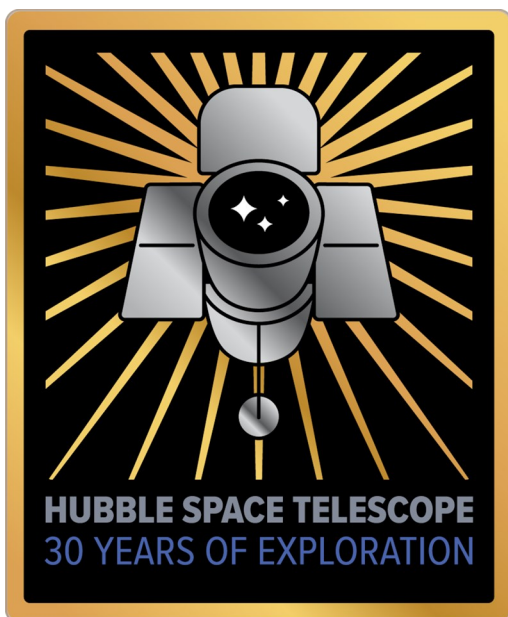
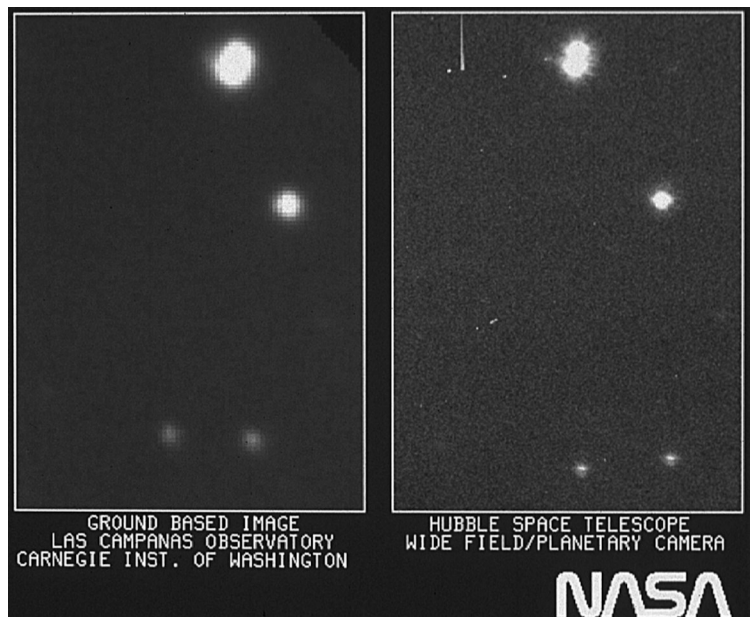


Image Credit: NASA



Hubble's "first light" image. Even with the not-yet-corrected imperfections in its mirror, its images were generally sharper compared to pho-

The Last Word

Making the most out of sheltering in place

Greetings from my fourth week of sheltering at home! I don't think anybody expected that we'd be spending the whole spring season, the best time for seeing outside our home galaxy, cooped up in our houses, but here we are. For those of you who live in darker skies than I, I hope you're taking advantage of all these cancelled plans and all this time of solitude to work on your observing. I have a yard full of trees, making it hard to point my telescope anywhere except the zenith, and that only from the front yard; and a pretty dense neighborhood, which makes it hard to keep social distance from joggers and dog walkers. But I'm trying!

It's also a great opportunity to work on looking through past observing logs and putting together your Astronomical League award applications! I want to call out again, in particular, the [Outreach Award](#), which dozens of W.A.S. members qualify for. The basic level requires 10 hours of outreach work, the "Stellar" Outreach award 60 hours, the "Master" Outreach award 160 hours. I'm pretty sure I can rattle off at least three dozen outreach masters off the top of my head!

And, of course, it's a great time to take the astronomy subjects you care about and can't currently experience. Like star parties, open houses, and observing with friends, and turn those feelings of longing into articles for the WASP or presentations for the club!

As for me, I'm working through projects I've delayed for too long. Near the top of the heap is a rebuild of the warrenastro.org site. If there's something you'd like to see on the site that isn't there, or especially something you'd like to contribute, drop me a line!

One thing we will not be doing is giving up on our community. We're determined to make the best of this situation and to be ready to leap back into in-person action once the coast is clear. As this societal shutdown wears on, we're trying to find ways to stay connected. If you see opportunities we're missing, please let us know.

Be well, and clear skies.

Jonathan

Join the Astronomical League!



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

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

alcor@warrenastro.org



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.