



Vol. 50, no. 6

The W.A.S.P.



June, 2019

The Warren Astronomical Society Paper

M 51 and LBV 2019abn

Original 36 x 5 minute subs
Zoomed, Cropped and LBV 2019abn identified
Doug Bock | Northern Cross Observatory | Pro-
cessed April 4, 2019

Object Information

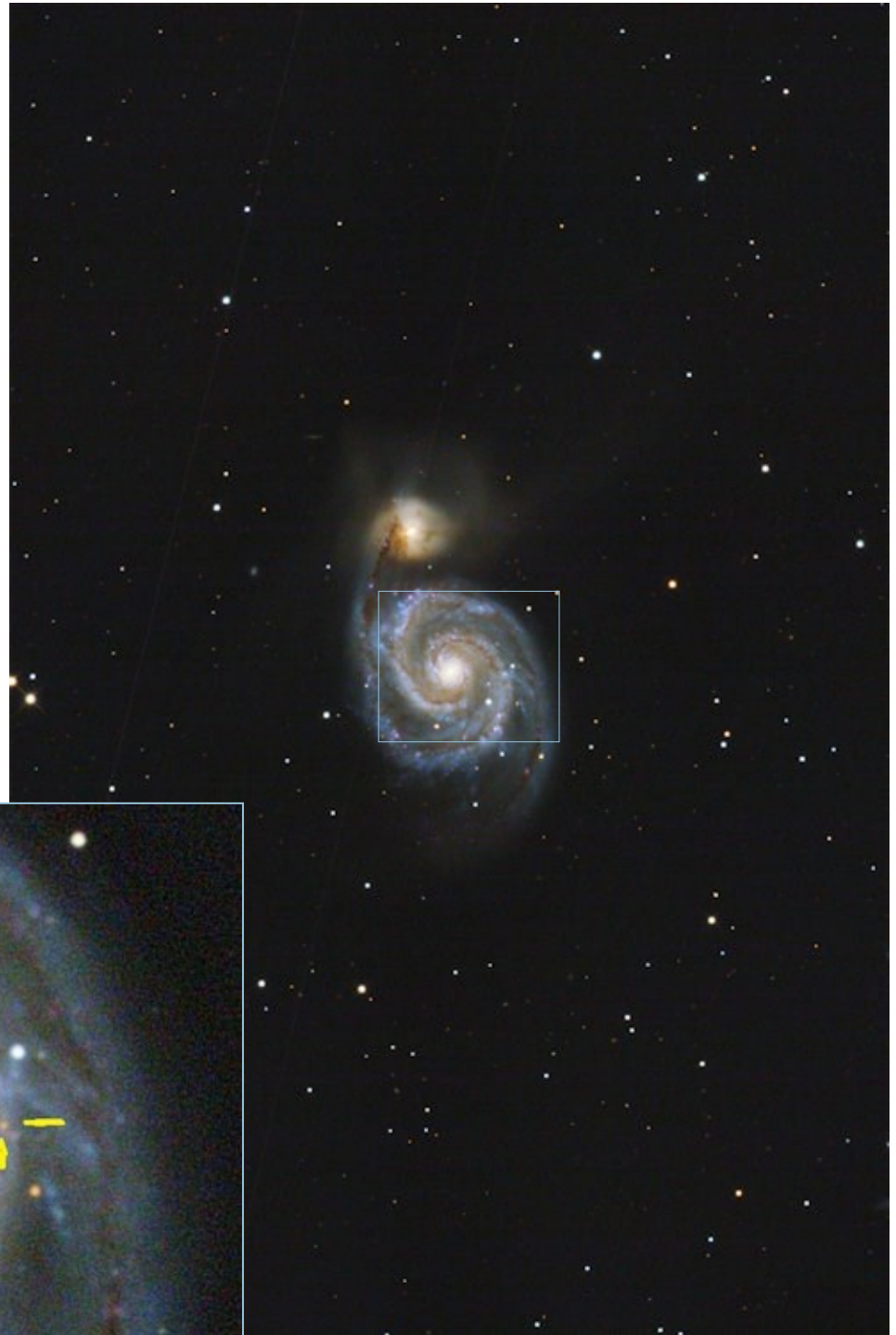
The Whirlpool Galaxy, also known as Messier 51a, M51a, and NGC 5194, is an interacting grand-design spiral galaxy with a Seyfert 2 active galactic nucleus. It lies in the constellation Canes Venatici, and was the first galaxy to be classified as a spiral galaxy.

The LBV 2019ABN identified in this image, is a Luminous Blue Variable originally thought to be a Supernova in January of 2019.

- **Distance to Earth:** 23.16 million light years
- **Radius:** 30,000 light years
- **Age:** 400.3 million years
- **Apparent size (V):** 11'.2 x 6'.9
- **Stars:** 100 billion

Northern Cross Observatory information

10" f/8 RC
ZWO asi071mc one shot color camera
Losmandy G11 mount w/gemini 2 controller



The WASP

Published by
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.
- Free use of W.A.S. library. See librarian.

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.

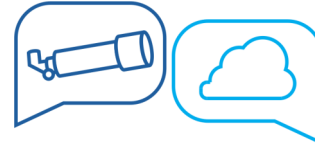
Stargate Observatory is owned and operated by the Society. Located on the grounds of Camp Rotary on 29 Mile Road, 1.8 miles east of Romeo Plank Road, Stargate features an 8-inch refractor telescope under a steel dome. The observatory is open according to the open house schedule published by the 2nd VP.

Library. The Society maintains a library of astronomy-related books and periodicals at the Cranbrook meeting location. See the librarian, Jonathan Kade, to check out a book.

Snack Volunteer Schedule

Jun 3	Cranbrook	Bob Berta
Jun 20	Macomb	Riyad Matti
Jul 1	Cranbrook	Cliff Jones
Jul 18	Macomb	Glenn Wilkins

If you are unable to bring the snacks on your scheduled day, or if you need to reschedule, please email the board at board@warrenastro.org as soon as you are able so that other arrangements can be made.



Discussion Group Meeting

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

Joe Tocco will host the June Discussion Group on Thursday, the 27th, 7:00-9:30:
MCMI Corporate Office
6540 Diplomat Drive
Sterling Heights, MI 48314
joetocco0921@gmail.com
586-634-6240 cell

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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Letters



President's Field of View

May Issue a Hit!

Hello WAS board..
 I might have met the senior discount this month.
 Something I think makes me ponder..
 ..but not as much as the great read of the WASP this morn-
 ing.
 WOW. Fantastic job.
 We have continued to raise the bar.
 Great images.
 Great articles.
 So packed.
 And I head for Cadillac today.

Today is a great day....thanks for greeting it with a great start!

Therese

Spectacular issue.
 Any one who can produce that kind of lunar rendition is a unique sort!

G.M. Ross

I heartily agree! –Ed.

From our Intrepid Field Reporter

Gary Ross forwarded an email:

No further comment.
 One recalls the beautiful "Beneath the Southern Cross" from Victory At Sea suite.

----- Original Message -----

Subject: Enjoying the evening sky in the Galapagos
 Date: 2019-05-16 12:03
 From: Raymond Rea
 To: Gary Ross

Only 140 inhabitants of the island and they NEED this?



I am starting to see a lot, and I mean *a lot* of Apollo stuff. There are some new documentaries coming out on the Science Channel and National Geographic's, there is a party in Detroit called Apollo 69, Trip to the moon, on July 20th, Lego has just released a Lunar Lander set (yes, I bought it), and I'm sure there will be some new T-shirt to be had by the end of all this hoopla. I like to think we all loved the moon landing before it was cool! The library season of outreach events is upon us, it's a great opportunity for the Warren Astronomical Society to get some exposure. We are a hot commodity right now, but it's not going to last, so as they say, get while the gettin's good. I really hope that Apollo 11 is released in IMAX for the anniversary, I only saw it once at a regular theatre earlier in the year. In other club news we got lucky this past week and had an Open house that was not only clear skies, but wonderful temperatures. I stayed for social hours and felt just as it was really starting to get dark, but I was still able to get some nice views through the scope. There were plenty of visitors and it looked like everyone was having a great time, Ken gave sky tours, David and Riyad were running the observatory, it was a blast.

Personally, I got a lot of work to finish on some projects I've been building for an upcoming festival. One is a ten-foot-tall sand pendulum, not sure what that is? Don't worry I will bring it to the WAS picnic this year for all to play with. The second project is a double-sided whiteboard, sixteen feet long, picture an old timey changing wall only it's a massive whiteboard, oh the math we will fit onto it 64 square feet of writable surface.

Homework: We had two members solve the first homework assignment, Mark Jakubisin and Gary Ross, $\tan(0.25) = 2.5/h \rightarrow .004363 = 2.5/h \rightarrow h = 2.5/.004363 \rightarrow h = 572.95$

gratulations to you both.

For the rest, here is the solution. where theta is the angular size of the moon, because we are looking from the center of the hole, the angle I will use is 0.25 degrees, $\sin(\theta)$ is the radius of the hole (2.5ft) and $\cos(\theta)$ is the height we are looking for.

So, the hole was 572.95 ft deep! WOW you probably didn't survive that fall.

(Continued on page 12)

SPECIAL MOVIE EVENT: APOLLO XI



Join your fellow WAS members for a special group screening of Apollo XI on a Giant Screen on Sunday June 30th at 4 PM at The Henry Ford. We'll be reserving 20 tickets so you can experience this stunning film as it was meant to be seen.



RSVP to info@warrenastro.org so we know we'll have enough tickets for everyone. Please arrive at least half an hour before the screening begins.

Sunday June 30th 4 PM

The Henry Ford's Giant Screen Experience
20900 Oakwood Blvd, Dearborn, MI 48124

Classifieds

Orion 8" telescope, Atlas EQ-G GoTo Mount & Accessories for sale

Included in the sale is:

203mm f/4.9 Ref OTA w/Crayford 8" Orion telescope
Atlas EQ-G w/HC Computerized Go-To Mount
Baader Planetarium MPCCIII
Sirius Plossl 10mm 1.25"
Mini 50mm Guide Scope
StarShoot AutoGuider
5 Amp AC to 12V DC Power Adapter
2" Zero Profile Focus Cam. Adapter
T-ring, Nikon
Moon Filter, 13% T, 1.25"
Shorty 2x Barlow 1.25"
Sirius Plossl 32mm 1.25"
Tube Rings, 235mm ID
3 of 11 lb. Counterweight Atlas/Sirius
Dovetail Mounting Plate 13"
Sirius Plossl 25mm 1.25"
8x40 Finder Scope Black
Lenovo Z51 laptop computer
All instruction manuals

Everything was purchased from Orion, invoices attached, with exception of the laptop. We paid just over \$2,500 plus the laptop and are asking \$1,750. See attached pictures.



This was set up but never used. Will send more pictures if interested.

Please contact Jeremy by email to j_m_myer@yahoo.com or call/text 248-830-0896.

WE WANT YOU

to join the Astronomical League!



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

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

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

If you would like to join or renew, and your W.A.S. dues are paid up for 2019, please:

immediately let me know at alcor@warrenastro.org

AND

pay our treasurer, Mark , at a meeting this month

OR

send a check for \$7.50 to:

Warren Astronomical Society
22712 Nona St.
Dearborn, MI 48124

OR

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

Thanks!

Jonathan Kade
Astronomical League Coordinator
Warren Astronomical Society

Sample award pins





Messier 90 Galaxy
59 million light-years from earth
Member of the Virgo Cluster
Bill Beers 5/4/19

Sketching at the Eyepiece

The early morning of May 24th had a waning gibbous moon within Capricorn, or so I'm told—from my location the stars of the constellation are mostly undetectable. On the evening before, I took a rough guess of where I thought the moon would be around 4am-5am and arranged my telescope accordingly. The trap was set.

I returned the next morning to find a moon set low in the sky, but conveniently caught between some nearby pines. The target was crater Bürg, which sat along the terminator. It was narrowly lit, with only a few areas of the crater walls picking up bright highlights. There were more nearby features that I wanted to record, but sunrise approached quickly and left me scrambling to get the pair of craters to the south, Plana and Mason.

-Brian Thieme





From the Desk of the Northern Cross Observatory Doug Bock

NGC 5353 and SN 2019ein

12 x 5 minute subs

Zoomed, Cropped and SN 2019ein identified

Doug Bock | Northern Cross Observatory | Data acquired the morning of May 15, 2019



Object Information

Supernova SN 2019ein in the lenticular galaxy NGC 5353.

It was discovered on May 1, 2019 by the Atlas Team.

Distance to Earth: 110 million light years

Magnitude: 11

Several other galaxies in the FOV. NGC 5350, NGC 5358, and several PGC galaxies.

Northern Cross Observatory information

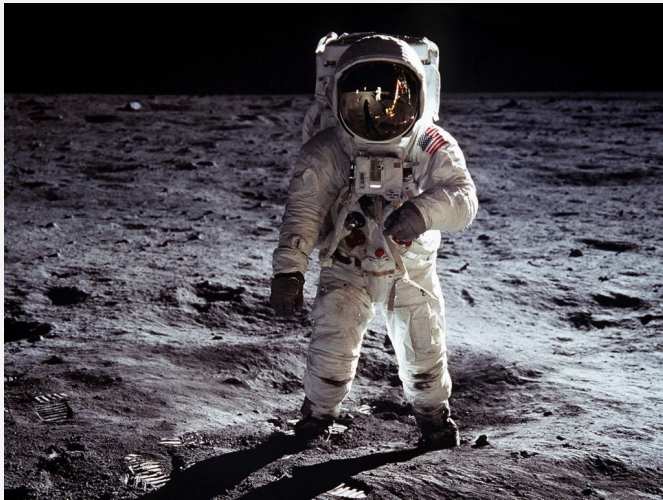
10" f/8 RC

ZWO asi071mc one shot color camera

Losmandy G11 mount w/gemini 2 controller

Simulating the First Moon Landing

Saturday, July 20, 2019,
1:00-2:00 p.m.



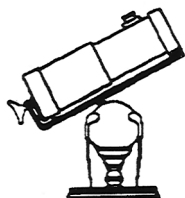
Join us as we celebrate the 50th anniversary of the first moon landing. Astronomer Mike O'Dowd will be showing a computer simulation of the first moon landing by Apollo 11. From inside the Lunar Module we will fly down to the lunar surface while dodging boulders and craters. He will also go over some little known facts about the Lunar Module, provide historical context and answer questions.

RSVP: <https://firstmoonlanding.eventbrite.com>

**Main Library
Old Fine Arts**
5201 Woodward Avenue
Detroit, MI 48202

313/481-1391

www.detroitpubliclibrary.org



An Evening With the Real Commander of the Enterprise



Photo: Diane Hall

On May 17th, one of the few remaining astronauts of the heroic age (Mercury/Gemini/Apollo) touched down briefly in Michigan, and with encouragement from my observing partner Jonathan, I drove two and a half hours to experience it. Glen Oaks Community College out in Southwest Michigan invited Fred "Freddo" Haise, Apollo 13's LEM pilot and the first commander of "space shuttle" Enterprise, to speak to a group of Phi Theta Kappa members. As a proud graduate of community college and PTK member, Haise accepted... and thus the guy played by Bill Paxton in Apollo 13 spoke to a crowd gathered in the auditorium of Three Rivers High School.

Haise still has the wide smile seen in photos of his astronaut days; he gave words of encouragement to the community college students in the front rows before segueing from the overall theme of "Failure is not an option" to the movie that put that phrase into common circulation. Haise let us know his own quibbles with Ron Howard's film, in particular the omission of many unsung heroes of Mission Control who were not immortalized alongside Gene Krantz and his team in the movie. He also took issue with the way the onscreen astronauts engage in dramatics that the real-life Haise and his Apollo 13 crew mates Jim Lovell and Jack Swigert did not. Haise said Howard's rebuttal was that he'd listened to hours of NASA transcripts and couldn't tell from their words and voices that there was even a problem, much less a series of life-threatening crises, and he'd had to humanize the astronauts for the sake of the film. Haise had a bit of a laugh at himself and his fictional counterpart and then covered some less-publicized moments in his career.

While the Convair BT-13 crash that left Haise badly burned in 1973 made for some gripping (and graphic) anecdotes, I was thrilled to have Freddo's own recollections of the Ap-

(Continued on page 10)

Presentations

Monday, June 3, 2019 Cranbrook Presentations



Ed Cackett grew up in the suburbs of Manchester, England and studied Physics at the University of Durham before pursuing his PhD in Astrophysics at the University of St Andrews in Scotland. After that he spent 4 years as a post-doctoral researcher at the University of Michigan where he was a NASA Chandra Fellow, and 1.5 years as a research fellow at the Institute of Astronomy, University of Cambridge. In 2012 he made the permanent move back to south-east Michigan to become a faculty member at Wayne State University, where he is currently an Associate Professor. He has published over 150 articles in peer reviewed journals. He is an expert in X-ray observations of black holes and neutron stars.

Short Talk

Last Call at Yerkes Observatory

Diane Hall

Diane says, "Many astronomers have a bucket list. Mine included a visit to the world's largest refractor telescope, housed at the historic Yerkes Observatory. When I learned last year that the University of Chicago was following through on their intention to shut Yerkes down, I made a last-minute strike on Lake Geneva, Wisconsin in hopes putting an eye to that legendary 40-inch telescope."

Main Talk

Mapping a Black Hole

Strong observational evidence confirms the existence of black holes – objects whose gravity is so strong even light cannot escape. But, how do we observe them? The vast majority of black holes have angular sizes that are far too small to be imaged directly, so indirect methods must be used. One way is to rely on the fact that as a black hole

sucks up surrounding gas, that gas get extremely hot and emits large numbers of X-rays. X-ray observations of black holes therefore give us a glimpse of gas just before it passes the Event Horizon – the point of no return. I will discuss the different types of black holes and how using X-rays we can try and map out the region surrounding black holes.

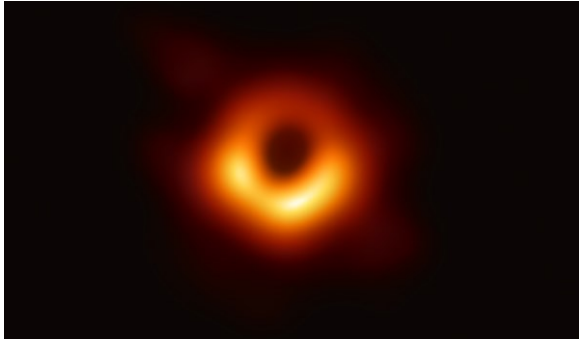


Diane Hall is a past president of both the Warren Astronomical Society and the Great Lakes Association of Astronomy Clubs. She likes binocular observing and globular clusters. She also likes traveling around to pay tribute to big planes, big rockets, and big telescopes, often in the company of her favorite observing partner Jonathan Kade.

(Continued on page 10)

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Thursday, June 20, 2019 Macomb Presentation



Photographing a Black Hole The Event Horizon Telescope and Virgo A*

Professor Jerry Dunifer and Ben Coughenour

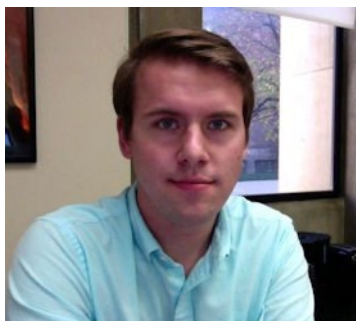
In April 2019, scientists announced that they have created an image on a black hole for the first time using the Event Horizon Telescope. We're happy to host a two-part presentation about this scientific discovery.

Dr. Jerry Dunifer (Emeritus - WSU Physics & Astronomy) has



visited nearly all of the telescopes used in this research, and will start us with a guided tour of the telescopes, showing us where they are located, what they look like and how they work.

Planetarium Coordinator and Doctoral Candidate in Physics and Astronomy Ben Coughenour will then discuss the findings of the Event Horizon Telescope and the significance of this discovery within the field of astrophysics. Ben has a research focus on the astrophysics of compact objects, which include black holes.



(Continued from page 8)

proach and Landing Tests for Enterprise in 1977. These ranged from a lighthearted memory of pilot Gordon Fullerton struggling with a circuit breaker mid-flight to the sense of having the entire Space Shuttle program on their shoulders as they prepared to fly an experimental prototype with no other copies extant. Haise reminded us that the Air Force usually has six copies of a prototype lined up before they test-fly any. The shuttle program had only Enterprise, so losing it would've likely ended the program itself. This downbeat moment led into Haise's thoughts on the newly-unveiled Project Artemis, which also proved somewhat melancholy. Haise didn't seem to think the timeline to return to the moon was very realistic (neither do I!).



Haise then fielded questions from the audience, including a groaner about his thoughts on UFOs, before our hosts from Glen Oaks called it a night. While none of us had a chance for an actual meet & greet with Fred Haise, it was a thrill to see him talk. The sweetest moment of the night for me had

nothing to do with Apollo 13 or the shuttle, but with the comment that Haise was going to spend the following day in Oklahoma with Tom Stafford to commemorate the 50th anniversary of Apollo X. Stafford's own crew mates both passed on in recent years, so the image of two astronauts who almost touched the moon lending each other support on a golden anniversary is a lovely humanizing moment. Take that, Ron Howard.

Oh, and here's the most quotable quote of the night: "I'm popular with Trekkies. I'm a real commander of the Enterprise!"

Diane Hall

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 Jonathan Kade at:

firstvp@warrenastro.org.



Movie Review

By Diane Hall

Apollo 13 (1995)

*To celebrate the 50th Anniversary of Apollo 11's Moon landing, former President Diane Hall is writing a series of space-themed movie reviews. Originally this month was going to be *The Right Stuff* but after seeing Fred Haise in person, *Apollo 13* has been bumped ahead in the rotation.*

I remember the first time my dad showed me his complete set of Apollo mission patches. I was drawn to the stories of Apollo 1 and Apollo 11—the starkest tragedy and most historic success—but in terms of design I lingered over the patch for Apollo 13, with its three horses and motto of “Ex Luna, Scientia.” My father told me that something bad happened and the mission never landed on the Moon, which made me quite sad, but as a nine-year-old with no way to get to the library on my own and no Internet, I had no means of learning more about the crises experienced by astronauts Jim Lovell, Jack Swigert, and Fred Haise on their way to the Moon.

Then in 1995 director Ron Howard released *Apollo 13*, “Houston, we have a problem” entered the popular vocabulary, and the gregarious Lovell became one of the most celebrated astronauts alive. Howard and his leading man Tom Hanks brought a genuine space-geek passion to the production, using Apollo 15 Commander Dave Scott as technical adviser. NASA allowed Hanks and company to film their zero-G scenes in the KC-135 “Vomit Comet” and main actors shadowed their real-life counterparts. So, how does the film stand up nearly a quarter of a century after my fourteen-year-old self deemed it a masterpiece?



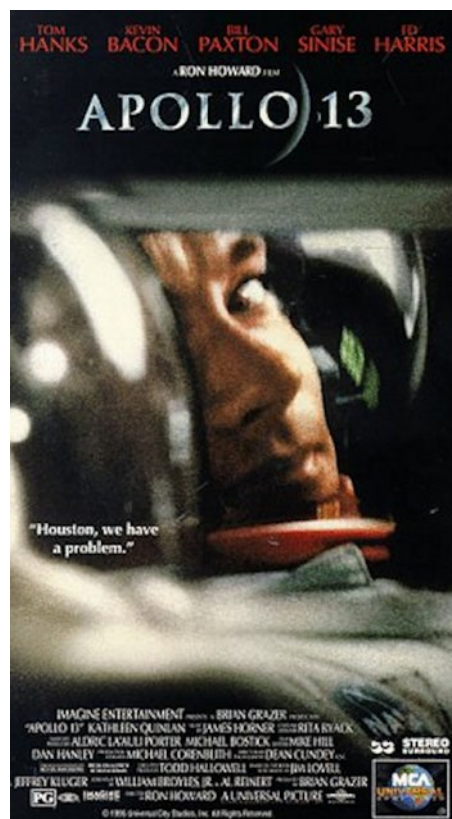
Well... it's very much a product of its era, and in that era Tom Hanks dominated Hollywood following back-to-back Oscar wins for *Philadelphia* and *Forrest Gump*. I doubt anyone else could've pulled off the role of wholesome family man/cool-headed test pilot like Hanks did, but at no point did I forget I was watching Tom Hanks playing Commander Jim Lovell. Casting Gary Sinise as fellow astronaut Ken Mattingly just a year after he and Hanks played off one another in *Gump* in one sense is brilliant because they have real chemistry but likewise makes it difficult to not see this as “A Gary Sinise(™) Role,” especially as Sinise plays the balding, teetotaling Mattingly with a full head of hair and an apartment full of liquor bottles.

This “Mattingly,” like the role of Gene Kranz (Ed Harris in a vest), is a composite, with one shift of Mission Control representing the four shifts that shepherded Apollo 13 to safety and Mattingly standing in for all the astronauts who lent their skills to the effort.

As for the other two guys trapped in the dying spacecraft with Lovell, they're arguably done a disservice for the sake of drama. Command Module Pilot Jack Swigert (Kevin Bacon) and Lunar Module Pilot Fred Haise (Bill Paxton) are given a prickly relationship that bursts into outright confrontation more than once, and all the remaining Apollo 13 crew members agree that simply never happened. Bacon plays Swigert as a swaggering pretty-boy with “a girl in every port” and a vote of partial confidence from his crew-mates on his pilot-

ing skills. Given Swigert was known as the guy who wrote the malfunction manual for the Command Module, this seems less than fair. Meanwhile Paxton's Haise comes across as the crew's resident Everyman who reacts to disasters like a normal human being and not a preternaturally disciplined NASA astronaut. The real Haise has taken issue with the inter-crew drama in the film—and with the scene where Haise pukes in the Command Module. Haise swears he didn't make a mess like that.

One real-life person who's professed herself happy with the film is Marilyn Lovell, and it's worth taking a look at Kathleen Quinlan's role as Marilyn. The enduring marriage of Jim and Marilyn Lovell is a genuine Space Race love



(Continued from page 11)

story and the rising action of *Apollo 13* gives time to build up the warmth and affection the Lovells have for each other and for their four children so that when the “problem” turns into a mission-ending crisis, Marilyn’s own trials on the home front feel like a true counterpoint to what Jim is going through in the capsule. On the one hand, it’s refreshing to have a Hollywood film handle the oft-thankless role of The Hero’s Wife with that much respect and attention to her as a human being while the astronaut sidekicks are characterized via tropes. On the other hand, if one is going to that much effort, why use tropes and dramatic clichés like “Swigert earns his wings” at all? Even “Houston, we have a problem” was originally “Houston, *we’ve had* a problem,” and that tense change tells you something about the difference between NASA and Hollywood.

It’s a beautiful movie, tense and touching and darkly humorous in turn, a loving tribute to the era and its heroes. Little character moments shine, like Ben Marley’s understated role as astronaut John Young and the scene where Jim Lovell’s ailing mother is distracted by a visit from two nice lads named Neil Armstrong and Buzz Aldrin. That said, honest to Pete (Conrad) I think I would’ve preferred things if Howard had ratcheted the drama down a little; it’s possible to humanize astronauts without fabricating conflicts. Howard can do that if he tries, as in the scene where Lovell embraces a fever-stricken Haise, warming his comrade with his own body heat as they weather one more improbable crisis. Hanks went and did exactly that with his miniseries *From the Earth to the Moon* a few years later.

On a closing note, one point of conflict in the film is Swigert’s panicked hypothesis that they’re actually doomed and Mission Control knows and isn’t telling them—a terrible premonition of the fate of the shuttle *Columbia*. That’s one movie nobody’s rushing to make.

Rating: 4 out of 5 Moons and please read *Lost Moon aka Apollo 13*, Jim Lovell’s memoir (co-written with Jeffrey Kluger).



Next month we’ll celebrate the anniversary month of Apollo 11 with First Man, a look at the enigmatic Neil Armstrong, whom no one ever accused of dramatics.



The real Apollo 13 crew: Jim Lovell, Jack Swigert, and Fred Haise

Field of View

(Continued from page 3)

HW-6/19: Now for the second problem we are going to fix a mistake from the first problem, we are switching to the metric system. Ok, so you fell down a hole last month, and we saw from the last problem that the hole was 572ft deep or 174.635 meters. What I didn’t tell you in the first problem is that you recorded how long the fall took on your watch, 9.72 seconds. The question now is, where are you? Hint. Its not Earth.

Jeff MacLeod
President

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.



Over the Moon

With Rik Hill

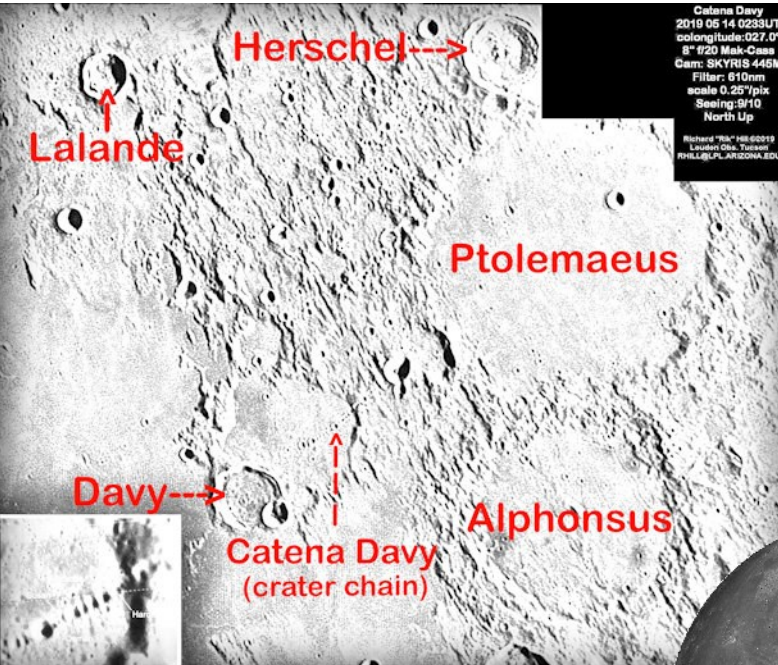
Catena redux

Last year I posted an image of this region that was pretty good but a few nights ago I had 9/10 quality seeing and got an image of Catena Davy just about at the resolution limit of my 8" f/20 Mak-Cass telescope (1 km). The great walled plain taking up the upper right quarter of this image is, of course, Ptolemaeus (158km dia.) with the more recent crater Ammonias' (9km) prominent on its northern floor. Above this crater is the smaller crater Herschel (43 km) with it's slumped walls and complex infilling. Below Ptolemaeus is Alphonsus (121km) with its dark haloed craters. The crater Davy is the flooded 21km diameter crater near the inset image with Davy A on it's southeastern (lower right) wall. The Catena can be seen as a string of craterlets just left of center to the northeast of the crater. The inset



Catena Davy
2019 05 14 0233UT
colongitude:027.0°
8" f/20 Mak-Cass
Cam: SKYRIS 445M
Filter: 610nm
scale 0.257/pix
Seeing:8/10
North Up

Richard "Rik" Hill ©2019
Louden Obs., Tucson
RHILL@PL.ARIZONA.EDU



Catena Davy
2019 05 14 0233UT
colongitude:027.0°
8" f/20 Mak-Cass
Cam: SKYRIS 445M
Filter: 610nm
scale 0.257/pix
Seeing:8/10
North Up

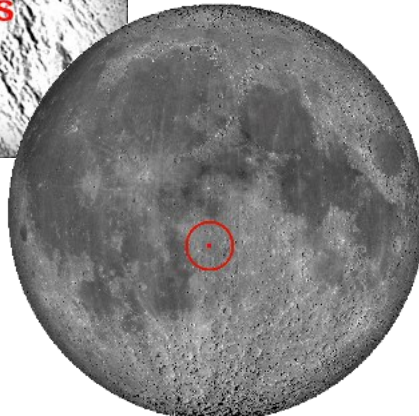
Richard "Rik" Hill ©2019
Louden Obs., Tucson
RHILL@PL.ARIZONA.EDU

(spacecraft) image shows some of the craterlets in the chain that were named in 1974 during mapping of this area. Their sizes are:

- Susan 1.0km
- Osman 2.0km
- Priscilla 1.8km
- Alan 2.0km
- Delia 2.0km
- Harold 2.0km

All of them can be easily identified in this image. This catena is sited as an example of an impact of a tidally disrupted body, similar to the SL9 impact on Jupiter, but because of the much slower rotation of the moon they occurred much closer to each other.

This is a composite of two images stacked with AviStitch2, assembled with AutoStitch and finally processed with the new GIMP 2.10 and IrfanView.



Mapping images prepared by Ralph DeCew



Object of the Month

By Chuck Dezelah

June- Delta Lyrae Cluster



The Delta Lyrae Cluster, also known as Stephenson 1, is an open star cluster in the constellation Lyra. The object has an integrated apparent magnitude of 3.8 and an angular diameter of approximately 20'. It has a Trumpler classification of IV3p, indicating that the cluster has no clear central concentration, is only weakly separated from the surrounding star field, and contains only a few members that vary widely in magnitude. It is one of the nearest open clusters, lying about 800 light years away. The stellar grouping was first identified as a potential cluster by the American astronomer Charles Stephenson in 1959, although this designation was questioned in later publications. Subsequent photometric studies, however, showed that at least 30 stars could be confirmed as meeting the criteria for belonging to a cluster, i.e. age, metallicity, relative motion, and evolutionary progression.

The Delta Lyrae Cluster is simple to both locate and observe, especially given that the combined light of its two brightest members, δ^1 and δ^2 , are visible to the naked eye, comprising the northeastern corner of Lyra's parallelogram. About a half-dozen or so member stars should be visible in 10x50 binoculars, including δ^1 and δ^2 , which

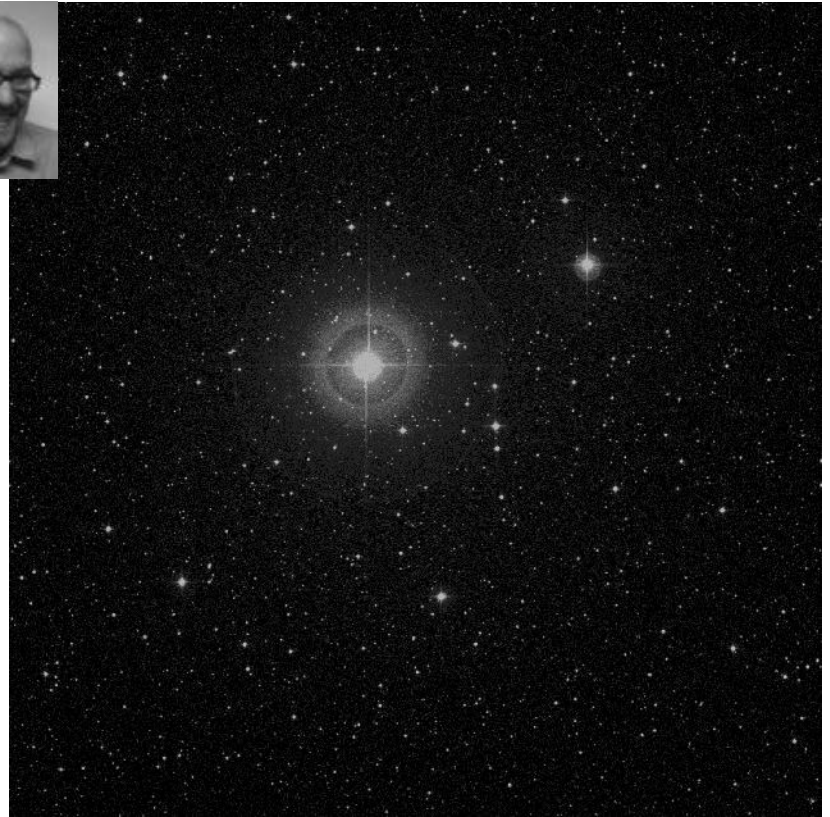
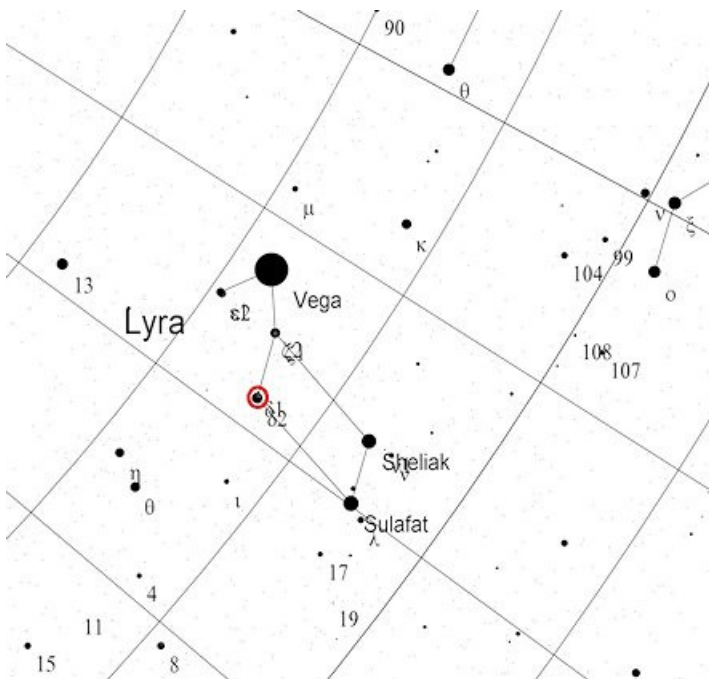


Image from Digitized Deep Sky

form a dazzling and starkly color-contrasting pair, separated by about 10'. An orange-red M4 giant, δ^2 is the brighter of the two at magnitude 4.5, whereas δ^1 is a slightly dimmer magnitude 5.5 blue-white B3 main-sequence star. Viewing through small telescopes (3-6 inches) at moderate power (40-70x) should reveal at least a dozen additional members loosely scattered about the bright central pair. Overall, the Delta Lyrae Cluster provides an eye-catching target that is effortless to find and easily accessible in modest instruments.

Chart created from
Cartes du Ciel



Club Member Name Tags

Email publications@warrenastro.org for
your personalized name tag

June 1982

This issue starts out with an invitation to the 1982 Astronomical League's Great Lakes Regional Convention, which took place on July 16, 17, and 18, 1982. Followed by hotel locations, instructions and forms for attendance. My favorite line is, "This year, we are returning to the magnificent Cranbrook Institute of Science where the League was founded in 1938." I find it fascinating that the A.L. was formed right here in our backyard.



Never one to back away from controversy, Ken Kelly has an issue with the organizers of the Star Bowl in the article "Incorrect Star Bowl Questions". Larry Kalinowski continues to lead the way with programmable calculator interest in "PRESSING KEYS: A Program for Positive Projection Photography". Finally, in "Some Astronomical Reflections: Part V", John Wetzel ruminates on a comparison of Atomic weights and Bode's Law.

June 1992

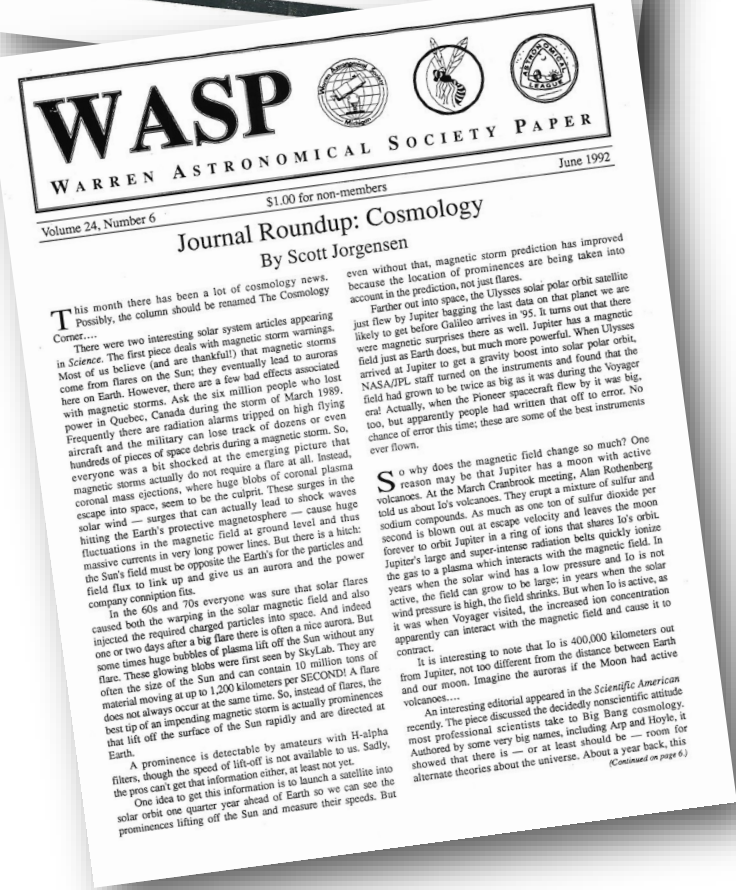
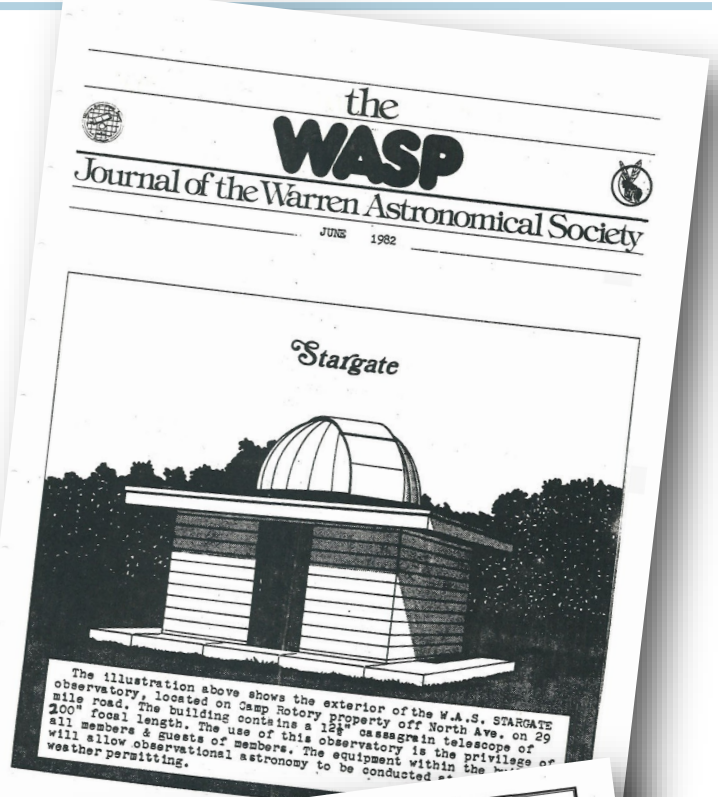
"Journal Roundup" is a column effort by Scott Jorgensen. It enjoyed a good run, albeit sporadically for several years in the early 90s. This one tackles cosmology.

Then we come to the king of the WASP columnists, Larry F. Kalinowski, with his "Computer Chatter". NASA supplies some more subject matter, including the "Hubble Space Telescope Monthly Status Report" for March 1992. "Club Update" by Marty Kunz is of interest, especially the second paragraph about our adventures at the "Star Bowl". "Stars of Interest, Part 2", by Steve Franks, covers Alpha Geminorum (Castor). In a contest of sorts, "First Observing Challenge Results (Steve Hughes)" is announced by Jeff Bondono. Elsewhere Jeff announces the details for the third observing challenge and a grand prize: a Celestron Ultima II (11-inch Schmidt-Cassegrain telescope, fully loaded*).

*strings attached, of course.

Dale Thieme,
Chief scanner

On the next page, Lifetime Member, Robin Bock has an asteroid named for her, courtesy of the efforts of Rik Hill to get asteroids named in honor of WAS members, and a post on Facebook by Kitt Peak Observatory prompts a stroll down memory lane from Doug Bock.



Journal Roundup: Cosmology
By Scott Jorgensen

This month there has been a lot of cosmology news. Possibly, the column should be renamed The Cosmology Corner....

There were two interesting solar system articles appearing in *Science*. The first piece deals with magnetic storm warning. Most of us believe (and are thankful!) that magnetic storms come from flares on the Sun; they eventually lead to auroras on Earth. However, there are a few bad effects associated with magnetic storms. Ask the six million people who lost power in Quebec, Canada during the storm of March 1989. Frequently there are radiation alarms tripped on high flying aircraft and the military can lose track of dozens or even hundreds of pieces of space debris during a magnetic storm. So everyone was a bit shocked at the emerging picture that magnetic storms actually do not require a flare at all. Instead, coronal mass ejections, where huge blobs of coronal plasma escape into space, seem to be the culprit. These surges in the Earth's protective magnetosphere — cause huge fluctuations in the magnetic field at ground level and thus massive currents in very long power lines. But there is a hitch: the Sun's field must be opposite the Earth's for the particles and power field flux to link up and give us an aurora and the power company conundrum fits.

In the 60s and 70s everyone was sure that solar flares caused both the warping in the solar magnetic field and also injected the required charged particles into space. And indeed one or two days after a big flare there is often a nice aurora. But these glowing blobs were first seen by Skylab. They are often the size of the Sun and can contain 10 million tons of material moving at up to 1,200 kilometers per SECOND! A flare does not always occur at the same time. So, instead of flares, the best tip of an impending magnetic storm is actually prominences that lift off the surface of the Sun rapidly and are directed at Earth.

A prominence is detectable by amateurs with H-alpha filters, though the speed of lift-off is not available to us. Sadly, the pros can't get that information either, at least not yet.

One idea to get this information is to launch a satellite into the solar orbit one quarter year ahead of Earth so we can see the prominences lifting off the Sun and measure their speeds. But even without that, magnetic storm prediction has improved because the location of prominences are being taken into account in the prediction, not just flares.

Further out into space, the Ulysses solar polar orbit satellite just flew by Jupiter tagging the last data on that planet we are likely to get before Galileo arrives in '95. It turns out that there were magnetic surprises there as well. Jupiter has a magnetic field just as Earth does, but much more powerful. When Ulysses arrived at Jupiter to get a gravity boost into solar polar orbit, NASA/JPL staff nerved on the instruments and found that the field had grown to be twice as big as it was during the Voyager era. Actually, when the Pioneer spacecraft flew by it was big, too, but apparently people had written that off to error. No chance of error this time; these are some of the best instruments ever flown.

So why does the magnetic field change so much? One reason may be that Jupiter has a moon with active volcanoes. At the March Cranbrook meeting, Alan Rothenberg told us about Io's volcanoes. They erupt a mixture of sulfur and sodium compounds. As much as one ton of sulfur dioxide per second is blown out in a ring of ions that shares Io's orbit forever to orbit Jupiter in the magnetic field. In Jupiter's large and super-intense radiation belts quickly ionize the gas to a plasma which interacts with the magnetic field. In years when the solar wind has a low pressure and Io is not active, the field can grow to be large; in years when Io is active, the field can shrink. But when Io is active, as it was when Voyager visited, the increased ion concentration apparently can interact with the magnetic field and cause it to contract.

It is interesting to note that Io is 400,000 kilometers out from Jupiter, not too different from the distance between Earth and our moon. Imagine the auroras if the Moon had active volcanoes....

An interesting editorial appeared in the *Scientific American* recently. The piece discussed the decidedly nonscientific attitude most professional scientists take to Big Bang cosmology. Authored by some very big names, including Arp and Hoyle, it showed that there is — or at least should be — room for alternate theories about the universe. About a year back, this

(Continued on page 6)

Gleanings from Facebook

Awards and Memories



From Rik Hill:

I am pleased to announce the new asteroid name (43283) Robinock. Robin, you are now a place.....and consecutively numbered with (43282) Dougbock, both of Warren Astronomical Society so I hope you two are still on speaking terms! ;^)

From Kitty Peak-

If you've been to Kitt Peak recently, you may have noticed that our donut mural was being repainted. The new mural is now complete! We thank Tohono O'odham artist Michael Chiago for our beautiful new art at the observatory.

If you take a picture with the donut, we'd love to see your photos! You can share them in the comments below, or post on

your own to Facebook or Instagram. Use #KittPeak, or tag us in your post so we can find them. We love to see your photos.

Reply from Doug Bock

1986 trip for Comet Halley #KittPeak Kitt Peak National Observatory. A scan of a slide we took back then.

(Facebook posts)



Photo: Kitt Peak

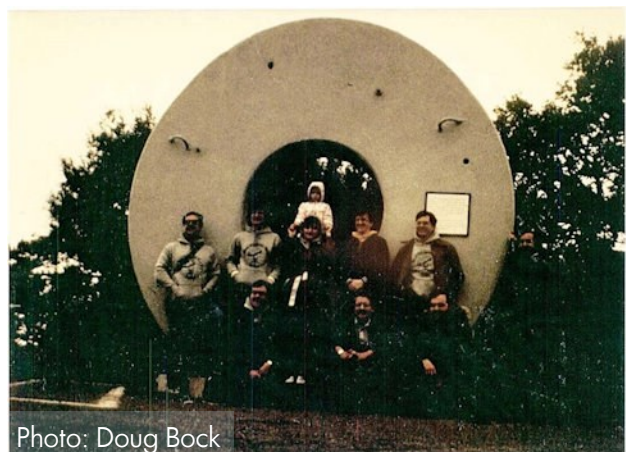
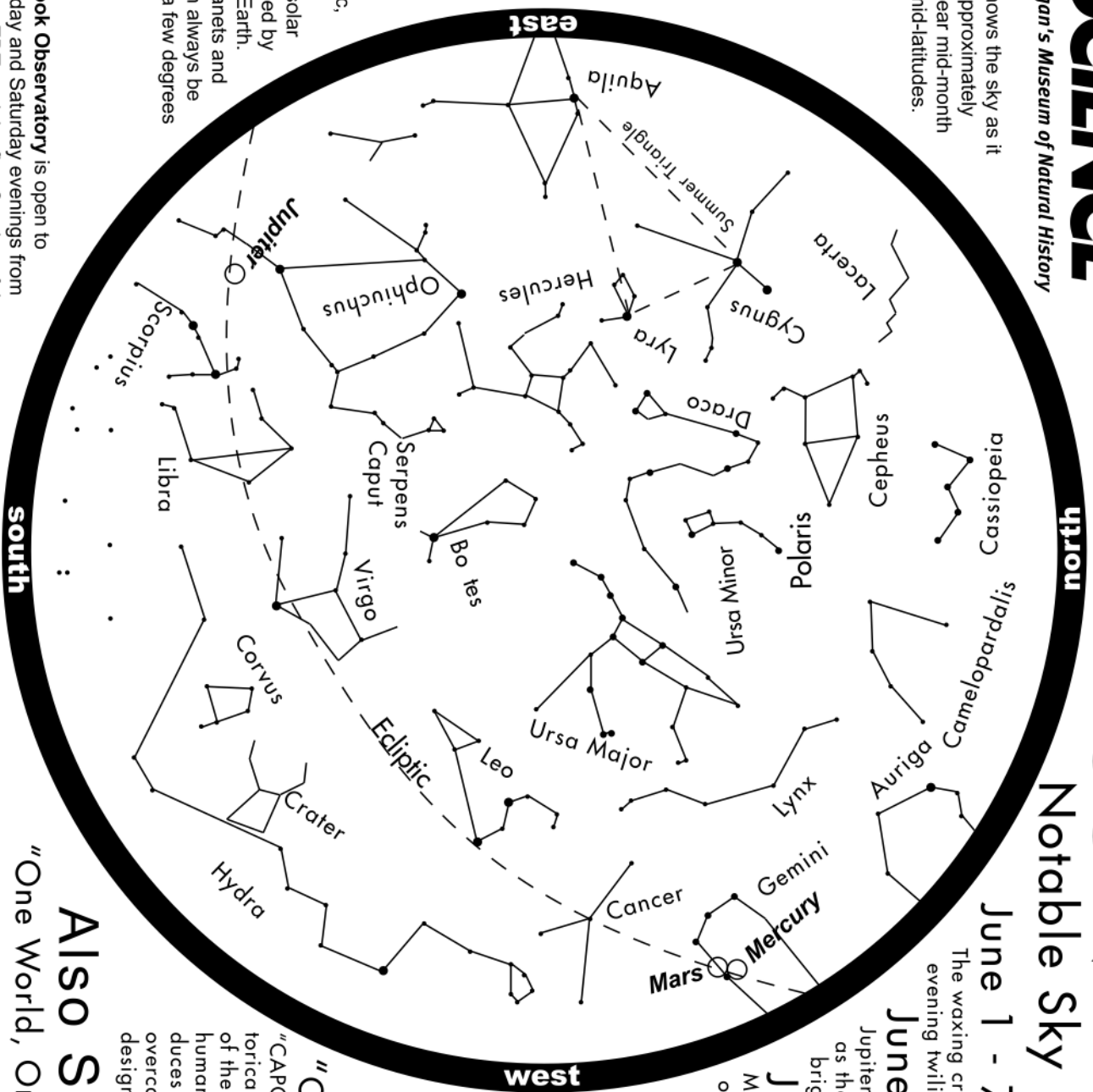


Photo: Doug Bock



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



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

The Cranbrook Observatory is open to the public Friday 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/explore/observatory>

June 1 - 7

The waxing crescent Moon is to the left of Mercury in the WNW evening twilight on the 4th and upper left of Mars on the 5th.

June 8 - 14

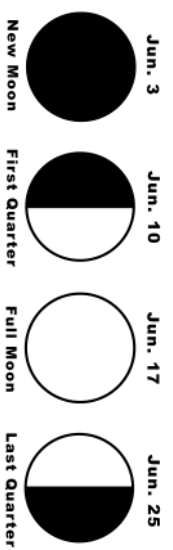
Jupiter is at opposition on the 10th. It will rise in the SE as the Sun sets in the NW, be closest to Earth and brightest for the year.

June 15 - 21

Mercury is above Mars in the WNW evening twilight on the 18th (use binoculars), and the Moon is below Saturn at 11:00pm (SE). The Moon is at the left of Saturn on the 19th (SSW predawn). Summer begins at 11:54am on the 21st.

June 22 - 30

Mercury is at maximum elongation east (left) of the Sun in WNW evening twilight on the 23rd.



Now Showing

"CAPCOM GO! The Apollo Story" "CAPCOM GO! The Apollo Story" is an immersive, historical documentary that showcases the achievements of the Apollo program and what it took to put the first humans on the Moon 50 years ago this month. It introduces a new generation to the immense challenges they overcame and will inspire them to become the explorers, designers, engineers, thinkers and dreamers of the future.

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>



Stargate Observatory

Monthly Free Astronomy Open House and Star Party

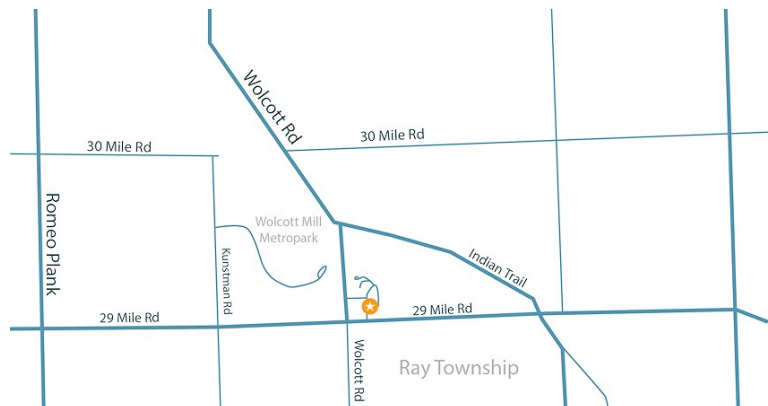
4th Saturday of the month!

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](https://www.meetup.com) 



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

Observatory Rules:

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

Stargate Report

Stargate Observatory Events

The Stargate Observatory hosted two events for May 2019, International Astronomy Day on 11 May and the monthly Open House.

Riyad Matti opened the observatory for International Astronomy Day, however due to cloudy skies, we did not have any visitors.

Despite the initial cloudy forecast for the Open House, the skies cleared and we had about 12 club members with scopes and 40 visitors.

Dome Replacement at StarGate Observatory

The WAS board has received quotes from AshDomes, ObservaDome, Technical Innovations and Observatory Solutions, to replace the existing dome.

Next Month Events

Next Open House is scheduled for Saturday, June 22, 2019.

Please arrive just after sunset (or sooner if you plan to set up a scope or do solar observing).

A friendly reminder to be courteous if you arrive after dark, dim your headlights upon entry to the park, and no white light flashlights please.

If you are setting up a large scope or have a lot of equipment to set up then you are permitted to park on the observing field, with your vehicle lights pointed away from the observatory and other telescopes.

Remember to dress warm and in layers!

Sunset : 9:14pm
Astronomical Twilight Ending : 10:30pm
Moonrise : 12:29am

Thank You
David Baranski
2nd VP (Observatory Chairperson 2019)
Phone : 248.934.9836
personal Email : d.r.baranski@sbcglobal.net

Saw a Fireball?

Report it to the American Meteor Society!



[www.amsmeteors.org/
members/fireball/
report-a-fireball](http://www.amsmeteors.org/members/fireball/report-a-fireball)

Astronomical Events for June 2019

Add one hour for Daylight Savings Time
Source:

<http://www.astropixels.com/ephemeris/astrocal/astrocal2019est.html>

Day	EST (h:m)	Event
01	13:15	Venus 3.2°N of Moon
03	05:02	NEW MOON
04	10:42	Mercury 3.7°N of Moon
05	10:05	Mars 1.6°N of Moon
05	17:46	Moon at Ascending Node
06	04:41	Pollux 6.2°N of Moon
07	02:19	Beehive 0.2°S of Moon
07	18:21	Moon at Perigee: 368508 km
08	14:36	Regulus 3.2°S of Moon
08	20:51	Venus 5.0°S of Pleiades
10	00:59	FIRST QUARTER MOON
10	10:00	Jupiter at Opposition
16	13:50	Jupiter 2.0°S of Moon
16	18:09	Venus 4.6°N of Aldebaran
17	03:31	FULL MOON
18	13:00	Mercury 0.2° of Mars
18	20:49	Moon at Descending Node
18	22:58	Saturn 0.4°N of Moon: Occn.
19	08:04	Mercury 5.2°S of Pollux
21	03:00	Mars 5.4°S of Pollux
21	10:54	Summer Solstice
23	02:50	Moon at Apogee: 404549 km
23	18:00	Mercury at Greatest Elong: 25.2°E
25	04:46	LAST QUARTER MOON
30	10:06	Aldebaran 2.3°S of Moon

Outreach Report

Astronomy at the Beach – Speaker/Presentations Needed

We are looking for anyone that would like to speak at Astronomy at the Beach this year. If you are interested please fill out our [2019 Presentation Application](#).

Astronomy at the Beach – Volunteers Needed

Do you know someone or a group that would might be interested in helping out at Astronomy at the Beach? We have created a [volunteer sign-up](#)

Moon Landing PBS Movie Screening at the Detroit Public Library Main Branch

Sat. June 15, 2019, 3:00 PM

Contact: Jennifer Dye jdye@detroitpubliclibrary.org. (734) 846-6266.

Upcoming Outreach Events:

Mark Kedzior will be presenting at the Grosse Pointe Woods Library will be Wednesday, June 12th at 6:30 PM.

Bob Trembley will be giving his lecture “The Apollo Program and its Legacy” at the Warren Public Library, Civic Center Branch on Thur. June 27 at 6:00 PM.

Outreach Requests:

Star Party hosted by Rebecca Blum – Cancelled due to rain
Sat. June 1, 9:30 PM – 11:30 PM

Cranbrook Institute of Science – at the football-lacrosse field on the south side of the Boy’s Middle School; the parking lot is on the south side of the school and the field is on the east side of the parking lot. Rebecca wanted a couple additional ‘scopes.

Volunteers: Diane Hall and Jonathan Kade, Sandra Mac-ika

Contact: Jon Blum jon@jonrosie.com
[[Google Calendar](#)]

Astronomy Presentation for Vacation Bible School

St Paul Lutheran Church, St Clair Shores

Their space-themed event is “Miraculous Missions.” Anything astronomy / space is good.

Thur. June 20, 2019 7:00 PM

Expecting 75-100 preschool-6th graders

Contact: Donna Megge 586-612-7777, auntnonnie555@yahoo.com

[[Google Calendar](#)]

Note: this is unfortunately at the same time as our Macomb meeting.

Warren Public Library Civic Center Branch – wants a presentation on astronomy this summer. 6:00 or 6:30 PM.

Leave by 7:45 PM.

Contact: Paul Konkolesky pkonkolesky@cityofwarren.org
(586) 751-0770 ext. 5007

Warren Public Library System – wants a presentation on astronomy this summer

Contact: William Konkolesky beyondcosmic@gmail.com
(248) 515-9568

NOTE: The City of Warren requires a NOTARIZED waiver form to be filed with them before you will be allowed to lecture.

Detroit Public Library – Campbell Branch

Tuesday July 16 3:00-4:00 PM [[Google Calendar](#)]

Tuesday July 23, 3:00-4:00 PM [[Google Calendar](#)]

Would like an Intro to Astronomy for Kids (4-16yrs)

Contact: Abigail Rubin aru-bin@detroitpubliclibrary.org 313-481-1552

Address: 8733 W Vernor Highway, Detroit, Michigan, 48209

Warren Public Library – Busch Branch

Wednesday evenings, June 15 – July 31, 6:30 PM

Contact: Andrea Mucha amucha@cityofwarren.org (586) 353-0580

Volunteers: Bob Berta: June 19, Jonathan Kade: June 26.

Still Open: July 3, 10, 17, 24, 31

Auburn Hills Public Library – wants presenters or panelists for some astronomical adult programs during Astronomy Week. They also would like the same in June or July

Would also like an Astrophotography lecture/panel: any Tuesday evening mid-June to July OR Saturday, July 6 afternoon OR Monday July 15 afternoon

Contact: Victoria Phelps reference@auburn-hills.lib.mi.us

MacDonald Public Library, New Baltimore – wants an individual or small group to lead an astronomy program geared toward teens and adults.

Volunteers: Jonathan Kade, Dave Bailey, Bob Berta, Angelo DiDonato

Available times:

- Monday, 7/1 – room available between 2 p.m. and 7 p.m.
- Saturday, 7/6 – room available between 10 a.m. and 4 p.m.
- Wednesday, 7/10 – room available between 2 p.m. and 6 p.m.
- Monday, 7/15 – room available between 2 p.m. and 8 p.m.
- Saturday, 7/20 – room available between 10 a.m. and 4 p.m.

(Continued on page 21)

(Continued from page 20)

- p.m.; tentatively reserved for an Apollo program (commemorative)
- Wednesday, 8/7 - room available between 2 p.m. and 6 p.m.
 - Saturday, 8/17 - room available between 10 a.m. and 4 p.m.; end of summer "Teen Invasion" party
- Contact: Maria Gardella gardellm@libcoop.net. (586) 725-0273

Hobby Day at Crosswinds Marsh

Saturday, August 10th, 9:00 am-1:00 pm

Sumpter Township

Brenna Van Schoick Bvanschoick@waynecounty.com
(734) 654-1223

Volunteers: Diane Hall; one or two more would be nice!

[[Google Calendar](#)]

Camp-out at Chesterfield Pollard Park

Friday Aug. 23 6:30 PM - Sat. Morning

The evening will include storytelling, sports games, s'mores stations, a flashlight night hike, and more.

Contact: Michele Vannerson mvanner-son@chesterfieldtwp.org (586) 949-0400, ext. 6450

[[Google Calendar](#)]

Member Spotlight

Mark Kedzior did a telescope class/presentation to 9 patrons at the GP Woods Library on May 1st.

Mark Kedzior and **Dr. Dale Partin** will be preparing another Orion 4.5" Star Blast reflector, on June 1st - when completed, it will be placed in the Ray Township Library to launch their program - date yet to be determined.

Ken Bertin & Bob Berta gave a two-hour class at Macomb Community College for SOAR on Friday May 3rd - this is a class they teach twice a year. Bob reports they had about 40 students.

Diane Hall stood-in for Gary Ross at the Royal Oak Elk's Club, Thur. May 16th. She reports "I spoke to two dozen UA retirees at their union meeting in Royal Oak about the joys of getting into astronomy during retirement and how astronomy clubs can help. The UA provided a very tasty lunch in return."

Bob Trembley brought his Virtual Reality gear back to Connie's school, *twice*, and showed every 8th grade student a VR fly-over of Saturn's rings, or a fly-through of the Milky Way galaxy in [OVERVIEW VR](#); one young man exclaimed "Oh my GOD! There are SO MANY stars!"

Chesterfield Township Library Telescope Program Update

- **Mark Kedzior** spent Thursday, May 30th and Friday, May 31st at the library, completing the modifications on

two Orion 4.5" Star Blast reflectors, along with constructing padded carrying cases for each telescope. These Library Telescopes are ready to be checked out by patrons after the program launch scheduled at the library on Tuesday, June 18 at 6:00 PM.

Bob Berta was at Stargate Observatory and hosted cub scout pack 90 and boy scout troop 90 on May 31

Providing a List of our Outreach Presenters & Presentations to Libraries

Ken Bertin asked that I sent info on his latest lecture to libraries; I can do this for ALL our outreach team and their presentations! Get me a presentation name, description and audience age of your presentation, and I'll keep a Google Doc we can share with libraries, or anyone...

Adding Your Name to the list of WAS Outreach Volunteers

W.A.S. outreach volunteers receive periodic mailings about event requests; if you would like your name added to our list of volunteers, please contact Bob Trembley at outreach@warrenastro.org

NASA's OSIRIS-REx Mission Needs *Your* help!

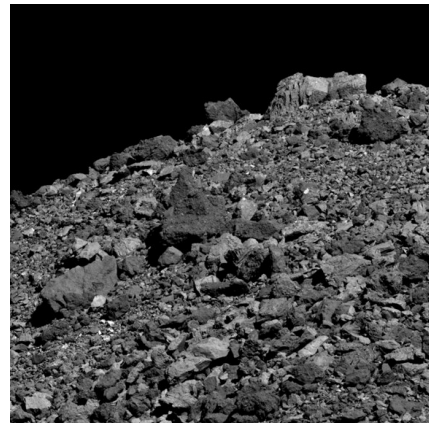
Direct from Dolores Hill:

Are you looking for an interesting and important project with limited duration?

From now until July 10th you can help the OSIRIS-REx mission map rocks, boulders, and craters on asteroid Bennu via CosmoQuest's Bennu Mappers project! Your help is greatly appreciated and it gives you a chance to explore truly amazing images! The data acquired will inform decisions on the best sites for the TAGSAM sample collection. See here for more details and to begin:

<https://www.asteroidmission.org/?latest-news=nasa-invites-public-help-asteroid-mission-choose-sample-site>

<https://bennu.cosmoquest.org/>



Bennu's Rocky Slope. Credit: NASA/Goddard/University of Arizona

Bob Trembley
Outreach Chair

Meeting Minutes

BOARD MEETING – May 6th

Members present: David Baranski, Diane Hall, Mark Jakubisin, Dale Partin, Jonathan Kade, Bob Trembley, Marty Kunz, and Jerry Voorheis.

The meeting was called to order by Jonathan Kade at: 6:38 PM

Officer's reports

Jonathan Kade gave the President's report

Jonathan Kade gave the 1st Vice President's report.

David Baranski gave the 2nd Vice President's report. He talked about Statewide Astronomy Night.

Mark Jakubisin gave the Treasurer's report.

Jerry Voorheis reported that the minutes are in the WASP.

Bob Trembley gave the Outreach report. He reported many speaker opportunities from libraries.

Publications – Dale Partin reported that the WASP is out.

Old Business

Diane Hall is developing the WAS survey. There was a discussion of buying a telescope.

So far there are 3 quotes for replacing the Stargate dome ranging from \$8,000 to \$50,000. Amounts mentioned were \$12,800, \$17,000 and \$27,000. Mark Jakubisin will contact Chrysler about help. David Baranski will call Hufley, the manufacturer of our dome. Jonathan Kade will contact Lawrence Technological University.

There was a discussion of what to do with the WAS library books.

New Business

Mark Kedzior requested WAS brochures.

There was a discussion about donating a telescope to the Ray Township Library. Dale Partin will talk to the library.

International Astronomy Day is this coming Saturday.

A motion was made by Bob Trembley with 2nd by Dale Partin to donate \$300.00 to GLAAC. The motion passed

The meeting adjourned at: 7:30 PM

CRANBROOK MEETING – May 6th

Meeting called to order at 7:33 PM by Jonathan Kade, 1st Vice President.

Ken Bertin presented In the News and In the Sky.

Roll call.

39 persons were present.

Jonathan Kade gave the President's report. He reported that president Jeff MacLeod completed his semester at Wayne State University.

Jonathan Kade gave the 1st Vice President's report. He reported that there was an opening in the presentation schedule for the June Macomb meeting.

Mark Jakubisin gave the Treasurer's report.

Jerry Voorheis reported that the minutes are in the WASP.

Bob Trembley gave the Outreach report. He reported on many outreach opportunities.

Dr. Dale Partin reported that the WASP is up.

David Baranski gave the 2nd Vice President's report: Stargate will be open for International Astronomy Day on May 11th. The next regular Open House will be May 25th. The WAS is getting quotes for replacing the Stargate dome.

Marty Kunz reported a sunspot flaring.

There will be a meeting Saturday at the McMath Hulbert Observatory.

The next discussion group will be hosted by Laura Wade on Wednesday, May 22nd.

Bob Trembley spoke about GLAAC. The WAS will donate \$300.00 to GLAAC.

Jonathan Kade reported that the WAS library will be closing at Cranbrook.

Jonathan Kade reported that Astro League memberships were open, and that merchandise was available for sale.

Observing reports: Diane Hall reported on observations at a dark sky park. Mark Jakubisin reported about outstanding observing near Sedona, Arizona

The Short Presentation was given by Professor Jerry Dunifer "Barnard's Star".

Snack/Break Time.

The Long Presentation was given by Dr. Louis Irwin - "Looking for Life in all the Right Places, A virtual tour of the putative ecosystems in our Solar System".

Meeting was adjourned at 10:06 PM.

MACOMB MEETING – May 16th

Meeting called to order at 7:31 PM by Jeff MacLeod, President.

Roll call.

34 persons were present.

Jeff MacLeod gave the President's Report He spoke about rock climbing.

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

Jeff MacLeod gave the 2nd Vice President's report. The 2

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open houses were uneventful due to bad weather. There will be a full moon for the next open house. Jeff MacLeod gave the Secretary's report. The minutes are in the WASP. Jeff MacLeod gave the Treasurer's report The Treasurer's report is in the WASP Jeff MacLeod gave the Outreach report. Bob Trembley needs help. Jeff MacLeod gave the publications report The WASP is up. Ken Bertin presented In the News and In the Sky.

Observing Reports: There were Solar flares effecting the earth during the previous week. Jerry Voorheis reported that the 10-meter Ham band was open for cross country communication. Diane Hall and Jonathan Kade reported on observations at the McMath Hulbert Observatory. Snack/Break Time. **The Main Presentation** was by Dave Bailey - "Higher Priority than Mars - A Case for Visiting Near-Earth Objects" Meeting was adjourned at 9:33 PM.

Jerry Voorheis
Secretary

Treasurer's Report

Treasurer's Report for 5/30/2019

MEMBERSHIP

We have 94 current members

INCOME AND EXPENDITURES (SUMMARY)

We took in \$2176 and spent/transferred \$248 We have \$22032 in the bank \$22 in checks and \$704 in cash, totaling \$22,757 as of 5/30/2019.

INCOME

\$1,580	Memberships/renewals
\$30	Astronomical League
\$283	Snacks
\$165	Calendars
\$21	Paul Strong Scholarship

EXPENSES

\$142	Snacks / Supplies
\$90	Meetup Fees 2019
\$16	Library Storage Boxes

GLAAC Report 5/30/2019

Beginning Balance: \$5,101.34

INCOME

No Activity

EXPENSES

No activity

Ending Balance: \$5,101.34

Mark Jakubisin
Treasurer



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



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.

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:
Oakland Astronomy Club:
Ford Amateur Astronomy Club:
Sunset Astronomical Society:
University Lowbrow Astronomers:

<http://www.warrenastro.org/was/newsletter/>
<http://oaklandastronomy.net/newsletters/oacnews.html>
<http://www.fordastronomyclub.com/starstuff/index.html>
<http://www.sunsetastronomicalsociety.com/>
<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

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!

Jupiter Shines in June

By David Prosper

Jupiter stakes its claim as the king of the planets in June, shining bright all night. **Saturn** trails behind Jupiter, and the **Moon** passes by both planets mid-month. **Mercury** puts on its best evening appearance in 2019 late in the month, outshining nearby **Mars** at sunset.

Jupiter is visible almost the entire evening this month. Earth will be between Jupiter and the Sun on June 10, meaning Jupiter is at **opposition**. On that date, Jupiter rises in the east as the Sun sets in the west, remaining visible the entire night. Jupiter will be one of the brightest objects in the night sky, shining at magnitude -2.6. Its four largest moons and cloud bands are easily spotted with even a small telescope.

What if your sky is cloudy or you don't have a telescope? See far more of Jupiter than we can observe from Earth with NASA's **Juno** mission! Juno has been orbiting Jupiter since 2016, swooping mere thousands of miles above its cloud tops in its extremely elliptical polar orbits, which take the probe over 5 million miles away at its furthest point! These extreme orbits minimize Juno's exposure to Jupiter's powerful radiation as it studies the gas giant's internal structure, especially its intense magnetic fields. Juno's hardy JunoCam instrument takes incredible photos of Jupiter's raging storms during its flybys. All of the images are available to the public, and citizen scientists are doing amazing things with them. You can too! Find out more at bit.ly/JunoCam

Saturn rises about two hours after Jupiter and is visible before midnight. The ringed planet rises earlier each evening

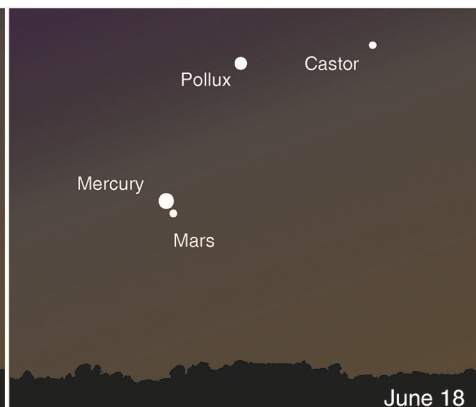
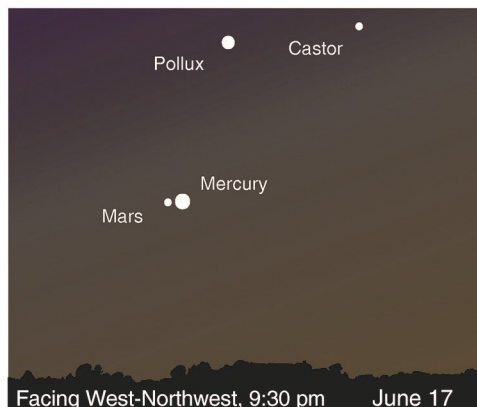
as its own opposition approaches in July. The **Moon** appears near both gas giants mid-month. The Moon's tour begins on June 16 as it approaches Jupiter, and its visit ends on June 19 after swinging past Saturn.

Mercury is back in evening skies and will be highest after sunset on June 23, just two days after the summer solstice! Spot it low in the western horizon, close to the much dimmer and redder **Mars**. This is your best chance this year to spot Mercury in the evening, and nearly your last chance to see Mars, too! The two smallest planets of our solar system pass close to each other the evenings of June 17-18, coming within just ¼ degree, or half the width of a full Moon, making for a potentially great landscape photo at twilight.

Discover more about NASA's current and future missions at nasa.gov



Caption: A giant storm in Jupiter's north polar region, captured by JunoCam on February 4, 2019. Image processing performed by citizen scientists Gerald Eichstädt and Seán Doran. Source: bit.ly/JupiterSpiral



Caption: Mars and Mercury after sunset the evenings of June 17-18, 2019. Image created with assistance from Stellarium.