The W.A.S.P.

Vol. 54, no. 4 | Winner of the Astronomical League's 2021 Mabel Sterns Award | April 2022

The Warren Astronomical Society Publication

Apollo 16

Apr 16—27, 1972

Apollo 16 was the tenth crewed mission in the United States Apollo space program, administered by NASA, and the next-to-last to land on the Moon, with a focus on science, and the use of the Lunar Roving Vehicle.

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:
Cranbrook: Institute of Science
1221 North Woodward Ave
Bloomfield Hills, Michigan

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

Membership and Annual Dues

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

Astronomical League (optional)$7.50
Send membership applications and dues to the treasurer:
c/o Warren Astronomical Society, Inc.
P.O. Box 1505
Warren, Michigan 48090-1505

Pay at the meetings

Also via PayPal (send funds to treasurer@warrenastro.org)

Among the many benefits of membership are
Loaner telescopes (with deposit). See 2nd VP.
Free copy of each WASP newsletter.
Free use of Stargate Observatory.
Special interest subgroups. See chairpersons.

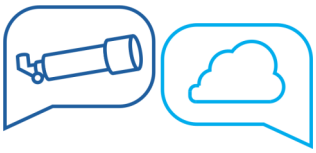
The Warren Astronomical Society Publication (WASP) is the official monthly publication of the Society.
Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted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

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

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

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 [illegible] astronomy, space news,

CANCELLED UNTIL FURTHER NOTICE

In This Issue:

President's Field of View

"In spring, the fancy of many a Scout leader and teacher turns to… astronomy! We've begun to get Outreach requests for the summer for Stargate Scouting events, a sure sign that nature is healing (cough). In the meantime, we have a couple of springtide events to bring to your attention:

Statewide Astronomy Night (SWAN) is coming up on April 8th! Please keep your fingers crossed for clear weather and join us at Stargate for the club's official contribution to the festivities.

Multiple regional Star Parties are on the calendar for June, and W.A.S. members are invited, so please check out the ads (so to speak) in this issue for details! I've been curious about the Michiana Party for years, so maybe this time I'll brave the, uh, "primitive" camping facilities to check it out.

(Jonathan is meanwhile thinking, "No, you won't!" because Jonathan knows how I am about camping.)

It's been a long and rather depressing winter here, and I think I am feeling withdrawal from actual observing. The good thing about a star party is you can make new friends and maybe catch up with some old ones even if the skies don't fulfill their promise.

Saddle up the palominos. We need to get back on the trail!"

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

DETROIT PUBLIC LIBRARY

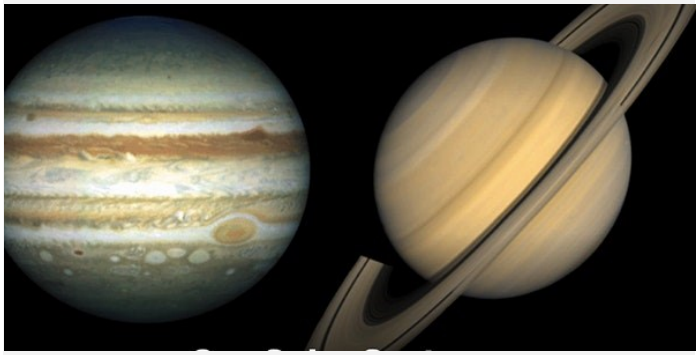
Business, Science & Technology

PRESENTS

Tour of the Solar System

Tuesday, April 26, 2022

6:00-7:30 p.m.



Tour the Solar System and Beyond!

About this event

Take a virtual tour of several locations throughout the solar system! Fly down Valles Marineris on Mars, see the rings of Saturn and the weird UFO-shaped shepherd moons within Saturn's rings! Watch the double sunrise on Mercury, and Pluto and Charon--forever facing each other in an amazing gravitational dance! Visit the Apollo landing sites on Earth's Moon, and the cliffs of Comet 67P! Then take a leisurely flight away from our Sun, and out into the stars of the Milky Way.

Bob Trembley is a volunteer NASA/JPL Solar System Ambassador, the First Vice President of the Warren Astronomical Society, and a Factotum for the Vatican Observatory Foundation.

DPL is partnering with WSU's planetarium on these talks related to astronomy.

Zoom link will be sent to registrants before program.

Image from solarsystem.nasa.gov

Call 313-481-1409 for more information during branch hours.

Register

Main Library
5201 Woodward Avenue
Detroit, MI 48202
313/481-1391

www.detroitpubliclibrary.org

Letters From Gary

Letter, to award winning W.A.S.P.

Once again the award winning W.A.S.P. blazes a trail of glory in the astro-sphere. What fired the imagination:

DIANE's tale of defeat and degradation in the south-west. The saga is told in most oblique manner, so one senses sorrow, even despair. Nota bene: When I suffer a debacle -- as reported in the same issue -- there is practically an "advert" in the NEW YORK TIMES, so my public knows I am Out There, doing astronomy so they do not have to.

WILLIAM THE CONQUEROR's article taught me a thing about M-42 (known in Grand Rapids area as the Great Persha Nebula). 1st observation por telescopo was by M. Pieresc in late 1610. Does any one know what he used? I do not doubt the Frenchman eagerly awaited autumn to look at the fuzzy star, commented upon for millennia. In that day astronomers might have thought it was a star which exploded.

Detail of Peiresc's notes recording his first observation of the Orion Nebula on 26 November 1610

DOUG, who does not throw stones at glass houses, had a link to a video of his zipping around his observatory in up-vertical view. Saw it on the library's computer. Comrade Bock is a veritable D. W. Griffiths. For me, "the talkies are just a fad". But how many of us have TWO observatories?

Jerry Persha catches up by the day!

DALE, the editor-chief scanner one, managed to assemble more pictures of Caroline Herschel than I have ever seen in one place! Does our Society deserve such a marvel? On the (new) chest-nut "women in science", there is much more to be said . . ., and undoubtedly not the end of it. "Lay on, MacDuff . . .".

G. M. ROSS,
whose star may be setting.

Forwarded:

Planning assaults on the heavens in the spring and summer to come. "Whiskey courage".

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

From: Joe McBride
To: Gary Ross
Cc: Bill Beers

Date: Thursday, March 03, 2022 18:13
Subject: **One year ago**

Staying safe during Covid discussing the up and coming 2021 observing season at CW!!!

Sent from my iDork

FOOT-NOTES:
SAVANT LEVY'S MARCH ESSAY

1) Wordsworth poem. Your thesis advisor at Queen's reminds me, again, of how provincial academicians can be, credentials aside. In an early draught of my dissertation, I quoted my advisor. The previous draught quoted two prominent scholars of judicial process who digressed in to psychology on seemingly thin ground. My man submitted comment in the margin which derided their pretension. I loved it, so quoted huim in the next submission. He struck the sentence out, I am sure from timidity. My subsequent failure was in not seeking opinion for a psychology professor to keep my advisor from some (imagined) line of fire.

2) Right you are mon ami: If a man "viewed" the lunar eclipse on line, he did not see it. At Orono, Maine, for the 1963 solar eclipse at the A. L. convention, I worked to get the cafeteria women solar filters. Basically they strung me along, the earnest teen-ager, because in the end one said she decided to watch it on television. In those days respectful of my elders, I said nothing, a restraint no longer honoured, Since the elders are thinning out, I expand scorn for those who are younger.

G.M. Ross

Etc.

Page 5 of March number re the spectacular picture of "false" aurora by sainted Larry F. Kalinowski.

Down memory lane: I think it was 1965 -- but too lazy to look it up -- that Sky and Telescope displayed a cover picture of an aurora borealis over Iowa. A certain Mr Cruik-

(Continued on page 5)

(Continued from page 4)
shank made the shot (eventually Dr of astronomy). On a winter's night in Oak Park, I too took a similar picture, sent to S&T.

The 2X2 slide came back with a note: Sorry, but nice try. The cover received many responses about an easy mistake to make. Local atmospheric conditions + bright discrete light sources. The mildly sainted Adrian Bradley should take note.

s/s/ The Dinosaur Rising From the Tar Pit

from the provinces to the award winning W.A.S.P. I do these things, so you will not have to!

Yet ANOTHER Letter

ONE-TWO BOLIDES OVER THE PRAIRIE PROVINCES (and N. Dak.)

C.B.C. "As It Happens" conducted an interview, week of 20th March, with a Winnipeg planetarium astronomer. There had been spectacular fire-balls over central North America two days running. The definition of a bolide is a mega-meteor over -4. He reported with sorrow he had missed both displays.

Why these spectacles, so close to one another? Yes, statistically the events *seriatim* were not easy to understand, but there was informal recognition of spring fire-balls. I had never heard of these vernal events, but am hardly a meteor astronomer -- any more.*

In the Veen Observatory library is the excellent *METEOR SHOWERS (1988)* by Gary W. Kronk. After coffee at Marronhaus (which I had to make), I climbed Calvary to read the Master. The index yielded *nada,* as did the chapters on March and April. Next: the *SKY AND TELESCOPE* Cumulative Index, 1941-1985, not easy to use, but fine-grained. Several key terms employed, but silent. Could these spring-time bolides have been described since the 1980's? Kronk's histories show how difficult, even ephemeral, meteor activity can be, with "formal" showers tough to describe.

I duly brought in my best men: Clayton "The Brain" and "Handsome Joe" McBride. We will find this planetarist, and get to the bottom of it.

G. M. Ross, whose name among the Pawnee = "His Feet Hasten The Telescope".

* For years I submitted humble hourly counts from Lowell Tnp. to the American Meteor Soc. clearing house at the State College, Geneseo, New York.

No going in to names, but I met the co-ordinator once on a hot night in Ohio, 1962. He was then working on his advanced degree. Years ago I stopped observing for them -- having heard not zilch. Since God has forbidden me to drop names, I never told this worthy in "upstate": In 1965 I received an invitation from the venerable Dr Olivier to join the Society. Given the lazy, dysfunctional boy I was then . . . never did, and LOST his letter, to boot. Further the Deponent sayeth not. Why am I so happy?

Observing Reports

1 March.

The Sun. Two groups of strikingly similar morphology: "cat's eyes". Two spots/ three spots.

Transparency good, seeing good.

5-cm. refractor @ 30X

4 March

The Sun. Two groups, one just on E. limb possibly of considerable extent. 14 spots; 7 spots, respectively.

Transparency poor (cirro-stratus), seeing good.

5-cm., F/ 11 refractor w/ mylar filter. 30X.

7 March

The Sun. Two extended groups, 3 and 8 spots in order of progression. Latter group with primate spot of well developed umbra-penumbra structure.

Transparency excellent but Sun low.

5-cm. refractor @ 30X + mylar filter.

10 March

The Sun. Three groups arrayed across disk. Central one has large spot now

(?) with bifurcated umbra. Perhaps two tiny satellite spots. Leaving group ~

3 spots. Extensive new appearance ~ 8 spots. # of groups equals previous record, this Observer for present Cycle.

Transparency good, seeing good.

5-cm. refractor @ 30X

13 March

The Sun. Two groups. Leaving group, one large spot, possibly contracting. Extended linear group dominates disc, at least fifteen spots.

Transparency excellent, seeing fair (wind)

5-cm. refractor @ 30X. Mylar sub-dia. filter.

13 - 14 March

The Moon. 1st Q. was on 10th. Observed when near meridian. Handsome Joe McBride and Observer independently noted extremely high altitude.

OBSERVER'S HANDBOOK: max. Declination on 12th @ +27 deg. 40'.

15 March

The Sun. 2 groups: 6 spots, 1 spot. Extensive formation reported days ago going away quickly.

Transparency poor, seeing fair.

5-cm. refractor, 55X with mylar sub-dia. filter.

15 - 16 March

Eta Leonis (Z.C. 1484) Mag. 3.5, very close multiple. Occ'n imersion/ emersion. Moon 94% waxing. Failed, commencement before sunset & limb brightness @ low mag.

Transparency good.

6-cm. refractor, 37X

20 March

The Sun. No sun-spots.

Transparency excellent. Seeing good.

5-cm. f /11 refractor @ 30X

.....

COMMENTARY: Conducted a few hours after Sun crossed Celestial Aequator to N. hemisphere.

20 - 21 March

Z. C. 2065. Lunar occultation, reappearance. 6.5 mag. double. Moon = 89% waning. Failed to observe star at all.

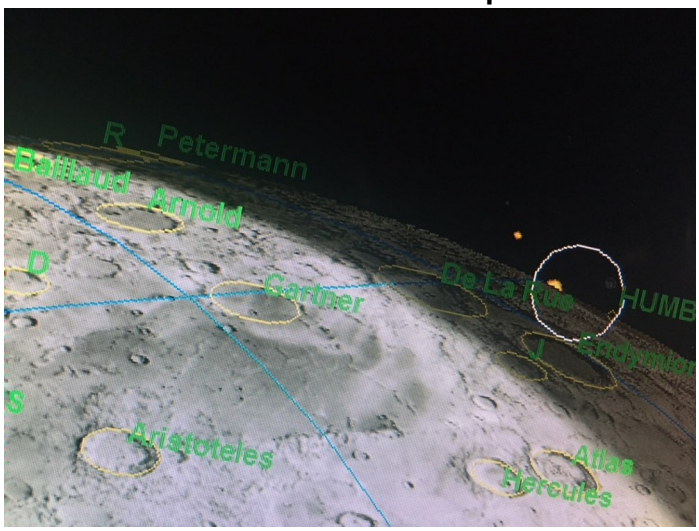
Transparency fair, seeing good.

6-cm refractor, f /11. @ Veen Obs.

.....

COMMENTARY: N. limb event. Moon low. Handsome Joe McBride: event earlier than predicted.

The Lunar Occultation in question



Star was at a very north declination on moon (barely) dark limb and reappeared at 1:44:56 am locat EDT. Here is a screen grab with my iPhone from GUIDE9. Gary essentially brought a knife to a gunfight. That 6cm is wonderful in its own rite but not the correct tool for the job under the conditions given.—Joe McBride

27 March

The Sun. Major activity again in one hemisphere. Two groups, one extensive with primate spot. Westerly group = ~ 11 spots, mostly "pores". Easterly = 6 spots, 1 with multiple umbrae. Linear complex

(Continued on page 7)

(Continued from page 6)

assumed 2 groups, but need polarity diagram.

Transparency excellent, seeing poor (wind).

5-cm. refractor. 45X, mylar filter

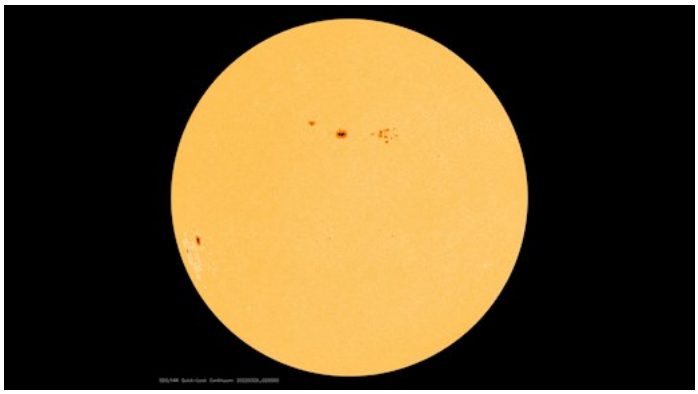
29 March

The Sun. Rev'd opinion: The extensive (linear) formation is one group, three components from W. to E.. 1) sub-group of 4 spots, 2) large spot of three umbrae, 3) array of numerous small-very sm. features.

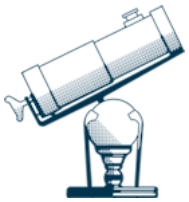
New group of 4 has appeared in S. hemis.

Transparency good, seeing fair.

5-cm. f /11 refractor & sub-dia. mylar filter.



The sun on 29 March, from Spaceweather.com.



Zodiacal Light Season is Here

The return of Zodiacal Light. Look for it from now through April 15. Around the Spring Equinox, we are angled such that at sunset we can see the reflection of the dust that orbits the Sun between Earth and Mars. Thanks to the high dust content that smacked into Juno during its trip to Jupiter, it is believed that this dust originated from Mars, and not necessarily comets. Maybe it is a combination of both? *Photo by Adrian Bradley*

ALCON 2022

July 28 – 30

EMBASSY SUITES HOTEL

1000 Woodward Pl. NE
Albuquerque, New Mexico 87102
https://alcon2022.astroleague.org/
(Website available by January 14, 2022)

Hosted by:

The Albuquerque Astronomical Society

www.TAAS.org

W.A.S. Astro-Images

As we say so long to winter, and sing hello to spring, I submit a winter sunset. Those with keen observational skills, or a vivid imagination, may have noticed a small crescent moon seeming to smile at the sunset. It is near the top border about 28.6% of the way into the photo from the left. For those like myself, who lust for a larger lunar landscape, I also zoomed in on the moon, and include that photo as well.

Photos by Ray Bosshard

The View From C.W. Sirius Observatory

Barnard 33 – The Horsehead Nebula

Last month, I was finally able to get a clear night up at the observatory with not too much snow removal on the dome. This is the Horsehead Nebula (also known as Barnard 33). It is a small dark nebula in the constellation Orion. The nebula is located just to the south of the bright star Alnitak, the easternmost star of Orion's Belt, and is part of the much larger Orion Molecular Cloud Complex. The Horsehead is located approx.1400 light-years from earth, and is thought to be 3-4 light-years tall. As you can see this dark nebula gets its name because of its resemblance to a horse's head. Some people see the shape differently. I see it as a sea horse shaped figure. Some see it as looking at the back of the horse where he is looking off to the side.

The nebula was first recorded in 1888 by Scottish astronomer Williamina Fleming on a photographic plate taken at the Harvard College Observatory. One of the first descriptions was made by E. E. Barnard, describing it as a: "Dark mass", where he then added it to his catalog as Barnard 33. The Horsehead is a dark cloud of dust and gas in the region in the Orion Molecular Cloud Complex where star formation is taking place. Color images reveal a deep-red color that originates from ionized hydrogen gas (Hα) predominantly behind the dark horse nebula, and caused by the nearby bright star Sigma Orionis. The darkness of the Horsehead is caused mostly by thick dust blocking the light of stars behind it. The lower part of the Horsehead's neck casts a shadow to the left. The visible dark nebula emerging from the gaseous complex is an active site of the formation of "low-mass" stars. Bright spots in the Horsehead Nebula's base are young stars just in the process of forming. Also, in the photo, you can see the pretty blue nebula in the lower left which is NGC2023. The Horsehead Nebula is best seen in the winter months in the constellation of Orion. But even trying to see this using a very large telescope is very difficult. If you happen to have access to a 22" or larger telescope, I recommend putting a hydrogen beta filter on a very low power eyepiece. Use averted vision when observing, as the head of the horse will be large. I captured this one using my 11" SCT and a one-shot color camera using no filters. It is 2 1/2 hours of integration time. Even though the Horsehead is a difficult visual target, it makes for a relatively easy photographic object. So, get your DSLR camera out on a tripod, or in your scope, point it just to the left of the 3 belt stars, and see if you can get a nice wide field image of it. Along with the beautiful Flame nebula located right next to it. It will make for a very cool photo.

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

From the Desk of the Northern Cross Observatory

This past month I had one night that was clear long enough to do some extensive data collection. The Leo triplet was the target I worked on the morning of March 4th, 2022, using the William Optics 105mm f/7 APO refractor and the ZWO asi2600MC PRO camera at a gain of 100 and a temp of 0C. 53 x 300 second light frames were used to generate this image. Stacking the data in Deep Sky Stacker and processed in PixInsight. The image was cropped as well.

According to Wikipedia the Leo Triplet is a small group of galaxies about 35 million light-years away in the constellation Leo. This galaxy group consists of the spiral galaxies M65, M66, and NGC 3628.

-Doug Bock

The Michiana Astronomical Society Presents:

The Twelfth Annual

Michiana Star Party

At the

DR. LAWLESS INTERNATIONAL DARK SKY PARK
Near Vandalia, MI

Box 262
South Bend, IN 46624

June 3-5, 2022

Observing opportunities
Special speakers
Dark sky
Vendors
Interaction with astronomy enthusiasts
Many types of telescopes
Camping, hiking trails, outdoor activities

PROGRAM

FRIDAY

Camp set-up after 3:00 p.m

- ★ Observing
- ★ Green laser constellation hunts
- ★ Informal talks
- ★ **8:00 p.m.- speaker: Robert Parrish,**
  Dr. Lawless Park Commissioner
  Light Pollution and Dark Skies

Eating and Sleeping

- ★ **Community fireplace and grill**
- ★ **Microwave oven available**
- ★ **Campsites available for tents, campers, and RV's**
- ★ **Public restrooms and running water available in Pavilion**
- ★ **Motels/hotels in nearby communities**

Park Opportunities

- ★ **Wildlife observations**
- ★ **Hiking trails**
- ★ **Biking trails**
- ★ **Open fields for games, Frisbee**

SEE:
www.Michiana-Astro.org for more information about Michiana Astronomical Society.
www.casscountymi.org/CountyParks/DrTKLawlessPark.aspx for more park information.

SATURDAY

- ★ **Vendors and swaps**
- ★ **Solar observing**
- ★ **Hiking, biking, free time**
- ★ **Outdoor activities for kids of all ages**
  11 :00 Speaker: Melinda O'Malley
  Astronomy 101
- ★ **12:00 Lunch break**
- ★ **1 :00 p.m. Speaker: Jim Hopkins**
  The Outer Planets
- ★ **2:30 p.m. Speaker Dr. Chris Howk**
  Galaxies on the Edge: Interstellar Matters in Edge-On Galaxies
- ★ **4:.00 p.m. Group photo**
- ★ **Dinner break**
- ★ **Observing**

SUNDAY

- ★ **Assist with clean-up**
- ★ **Pack up**
- ★ **Head Home**

Presentations

Monday, April 4, 2022

Virtual Presentations

In the News 2021

Retrospective and Updates

Main Talk:

By Ken Bertin

2021, while we were still embroiled with COVID (Omicron and all that), astronomical and space exploration still had newsworthy events. In this talk, Ken Bertin will present the year in review and highlight with some recent developments.

About the Speaker:

Ken Bertin is a hobbyist astronomer for over 65 years, Past President and VEEP of WAS, 10 Total Solar Eclipses, 4 Annular eclipses, 6 Transits of Mercury, 2 transits of Venus, and 15 Lunar eclipses. He does our presentations of historical figures in astronomy and is currently presenting online to schools and other organizations.

Short Talk:

The 1976 Mars-Epsilon-Geminorum Occultation and the Discovery of the "Third Moon of Mars"

By Dr. Jerry Dunifer

In April 1976 the planet Mars passed exactly between Earth and the star Epsilon Geminorum. An occultation of Mars with a star this bright occurs on average only once every 400 to 500 years. In this presentation I'll describe the photoelectric recording of this event which we made from the roof of the Physics & Astronomy Building on the Wayne State University campus. Precision time measurements were made using WWV (at 10 MHz) as our time standard. Our results are compared to those obtained by the Kuiper Airborne Observatory recording the occultation at an altitude of 41,000 feet

(Continued on page 14)

Thursday, April 21, 2022

Virtual Presentation

Enhancing Public Star Parties

with Electronic-Assisted Astronomy

By Dr. Brian Ottum

Dr. Brian Ottum will discuss Electronically Assisted Astronomy (EAA) – a form of observational astronomy that uses a camera instead of a telescope's eyepiece. He will show how he has used EAA to augment his public outreach sessions over the past year: at a boy scout camp, near a national park in Texas and at a luxury Florida resort. EAA allows for the near real-time imaging of deep space, displaying great color images on a screen for all to see.

Come ready to ask questions.

About the Speaker:

Brian has been an avid amateur astronomer for nearly 50 years, launched by seeing a lunar eclipse. He has done a lot of different things:

- Traveled to see 4 total solar eclipses
- Spent a summer at Bryce Canyon National Park as a volunteer "Night Sky" ranger
- Member of 6 different astronomy clubs
- Dedicated the Port Crescent State Park "dark sky preserve"
- Co-author on a comet nucleus research paper
- Installed a remote-control astrophotography rig in the NM desert
- "Astronomy at the Beach" booster

Brian was going to get a Ph.D. in astronomy, until he visited actual astronomers in AZ and found out that they spend their days doing math and sitting in front of computers. He eventually got a Ph.D. in market research and spent his days doing statistics and sitting in front of computers.

(Continued from page 13)
above sea level. An unexpected event in our data could be interpreted as a third moon of Mars!

About the Speaker:

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.

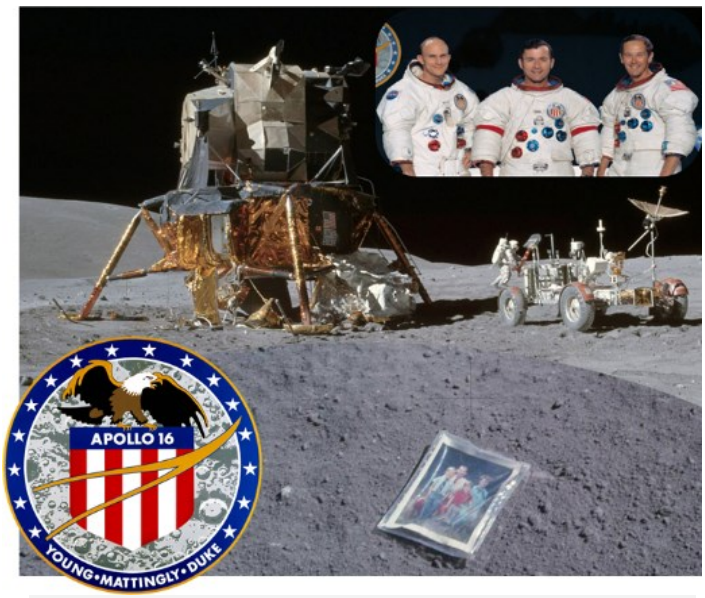
Since retirement, one of Jerry's hobbies has been visiting a number of the major and historic astronomy observatories around the World. He has visited dozens of different sites and has traveled as far as the geographic South Pole and the geographic North Pole. And many places in-between.

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 Bob Trembley at:

firstvp@warrenastro.org.

About the Cover



This month we celebrate the penultimate visit to the Moon by the Apollo astronauts.

On Apr 16, 1972 a Saturn V SA-511 lifted off, carrying the Apollo crew, John W. Young, commander; Thomas K. Mattingly II, command module pilot; and Charles M. Duke Jr., lunar module pilot to the moon.

Their target, the Descartes region, was selected as an outstanding location for sampling two volcanic constructional units of the highlands – the Cayley formation and the Kant Plateau.

The three primary objectives were (1) to inspect, survey, and sample materials and surface features at a selected landing site in the Descartes region; (2) emplace and activate surface experiments; and (3) conduct in-flight experiments and photographic tasks from lunar orbit. The landing crew drove over 16 miles in the Lunar Rover during three EVAs. During one EVA, before setting up a Solar Wind Collector, Duke placed a small family photo he had brought along onto the lunar surface and snapped a few photos of it with his Hasselblad film camera.

Apollo 16 mission logo

The Apollo 16 crew patch is dominated by an eagle perched atop a red, white and blue shield a superimposed on a lunar scene, surrounded by a blue circle of 16 stars with the crew's surnames completing the bottom are of the circle. Across the face of the shield is a gold symbol of flight outlined in blue, similar to that on the National Aeronautics and Space Administration (NASA) agency seal and insignia. The design was created by a NASA artist from ideas submitted by the three crew members.

Omicron!

Over the last few months you must have read dozens of articles, online or in print, about the Omicron variant of COVID-19. Fortunately, this is not one of them. This article is about Omicron² Eridani. It is a faint star in the constellation of Eridanus, the River.

Actually, there are two Omicron stars in that constellation. The first is brighter, and is a variable star. The second one is one of the closest stars to the Sun. Omicron², also known as 40 Eridani, happens to be not a disease but one of the most interesting star systems in the entire sky.

Omicron² is a triple star system that is only about 16 light years away. Its brightest component is a Sun-like star faintly visible to the unaided eye on a good night.It lies in northern Eridanus, the River, just a few degrees west of Rigel at the foot of Orion. The secondary is a white dwarf star. Unlike the companion of Sirius, this star is 9th magnitude and not near the brighter star so it is easy to see in a small telescope. The third star is not far from the secondary, but at 11th magnitude it is also not difficult to spot. This third star is a red dwarf.

Although red dwarf stars are the most plentiful, by far, in our region of the Milky Way galaxy, they are almost impossible to see because they are so small. The closest one to us is Proxima Centauri, or Alpha Centauri C, which at 4.24 light years is the closest star to the Sun. Also because they are so small and intrinsically faint, only a few of them are easy to find. 40 Eridani C is one of the easiest to find.

This interesting star has something else going for it. In 2018 astronomers discovered a planet orbiting the primary star. With a rapid orbit around Omicron², such a planet would receive much more radiation from the primary star than Earth gets from the Sun. But in 2021 new observations cast doubt on whether this planet exists at all.

Whether Omicron² Eridani really hosts a planet is subject to debate. But in the universe of Star Trek, it surely does. It is the home of Vulcan, Mr. Spock's home world. In the episode "Operation Annihilate", which appears near the end of the first season, Spock is blinded by the intense light used to immobilize the invading parasites on the planet Deneva. However his blindness is temporary because of the existence of an inner eyelid. Vulcan is said to orbit Omicron² Eridani's primary star, and since it is so much brighter than our Sun, even though Vulcan is at the same distance that Earth is from our Sun, they need the inner eyelid to protect their eyes.

I rather enjoy the idea that the fictitious Vulcan happens to orbit one of my favorite real stars. And unlike the Omicron variant, which one hopes will be eradicated soon, we admire Omicron² Eridani, the real star, and wish it to "Live long and prosper."

Tim Hunter took this beautifully focused picture showing Omicron (2) Eridani. The primary star, named Keid, is the bright one; just to the left is the secondary, a white dwarf; the tertiary, a red dwarf, is fainter still. Used with permission and thanks.

The Objects That Changed Astronomy

(And How to Observe Them)

-Brad Young, Astronomy Club of Tulsa

Part One: Homo Erectus to Galileo

In my next four articles, I'd like to look at the objects that changed astronomy, their impact, and how we can observe them today and understand how they have educated us about the universe we live in. Mankind's understanding of the universe has grown enormously in the last few centuries but has been improving since long before written history began. Let's begin with the ancient world, and the historical era up until the invention of the telescope. Consider too that many animals respond to the objects below and changes that occur, because they influence their lives and behavior in myriad ways.

Future articles will consider the astronomical growth from the invention of the telescope to the invention of photography, then on to the beginning of modern space-based observatories using the full spectrum of light and instruments of amazing power and scope.

The Sun

The sun also rises, and the sun goes down, and hastens to the place where it arose. Ecclesiastes 1:5

Although this daily cycle seems unremarkable to us today, we should remember that night used to mean terror for our ancient ancestors, especially before the domestication of fire. Having the sun rise was a wonderful thing; it brought heat and light and safety. At some point, people also noticed that it rose in different spots along the horizon, and often this affected the length of the day and night. These fundamental ideas are some of the earliest recorded scientific observations. These observations track the patterns which led to the defining acts of this epoch: the clocking of the seasons to raise crops and livestock. Indeed, the Sun and it's wandering are tied very intimately to mankind's development of civilization.

Famous Ancient Seasonal Observatory and Rock Concert Prop

There are many ways to observe the sun now, including noting is changing position in the sky by charting the shadow it casts throughout the day (sundial) or year (the analemma). Or just watch it rise on a chilly morning or set on a beautiful warm evening. Other ways to observe the sun using instruments (which really expanded our knowledge) will be discussed in later articles.

The Moon

Cold hearted orb that rules the night, removes the colours from our sight.
Red is grey and yellow white, but we decide which is right.
And which is an illusion?

"Late Lament" poem by Graeme Edge

The other major light in the sky, the Moon also shows cycles. Its cycles are both shorter and longer in duration than the sun's. The phases of the moon were probably noticed by the earliest humans, as there is evidence that some animals even notice some and may be influenced in their behavior by then. The tides of course are caused by the moon, and although this was not thoroughly explained until 1687 by Isaac newton, a correlation had been suggested before. And the Saros cycle, which determines when eclipses will occur, had been known to ancient civilizations all over the world.

Observing the Moon in historical context is even easier than the sun. We can observe its phases every night, observe the markings on it even with our eyes alone, and observe eclipses of it by the Earth or of the Sun whenever they are available. There are usually two to five eclipses of some kind visible every year somewhere on Earth; in 2022 there are two solar eclipses, neither of which are seen in North America, and two lunar eclipses, both of which are.

(Continued on page 17)

(Continued from page 16)

The Stars

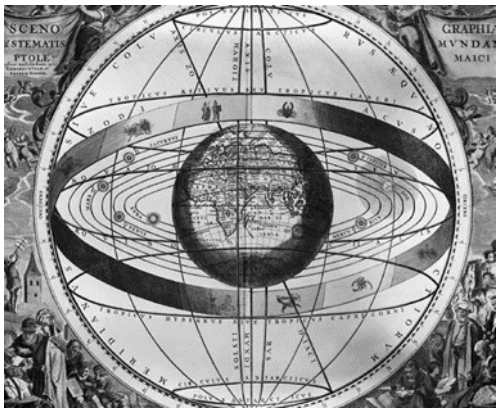
May the stars carry your sadness away, May the flowers fill your heart with beauty,
May hope forever wipe away your tears, And, above all, may silence make you strong.

—Chief Dan George, Tsleil-Waututh

The most ancient civilizations recorded star patterns and myths and legends associated with them. Pattern recognition is a highly important skill used by animals in different ways and recognizing patterns of stars is used by migratory beasts from birds to humans. The intersubjective thought exemplified by the mythology of the stars was a social bonding tool that led humans from marginally subsistent apes to the overlords of the animal kingdom. And these myths passed the technology to track the seasons and support domestication of crops and animals via oral tradition, long before writing was available. In other words, the cognitive revolution, in part manifested by ancient astronomy, led to the agricultural revolution.

But besides their importance, it's just fun to go out to a dark sky and watch the stars. Some of the patterns used by the ancients are a little hard to imagine, but others like Orion, Leo and Scorpio almost look like what they're supposed to be. And you can even make up your own patterns, your own stories as you sit around the campfire and enjoy the night sky. Or explore the stories and patterns developed by other cultures that you may not have heard about. It's a free show available to everyone every clear night.

The Planets



The fault, dear Brutus is not in our stars, but in ourselves, that we are underlings.

Cassius, "Julius Caesar"
(Act 1, Scene 2, verse 140–142) Shakespeare

Five of the stars were seen to move in the sky. Mercury, Venus, Mars, Jupiter, and Saturn were identified as planets in ancient times, and various wanderings led to other discoveries that helped explain how the universe is constructed. It was noticed that they, along with the sun and moon, traveled in a line of star patterns called the zodiac. Some sort of definition of this line by star patterns exists in nearly every culture. And their retrograde motion exasperated observers for centuries until Copernicus explained it by placing the Sun at the center of the solar system instead of the Earth.

The beginnings of modern astronomy were, in fact, astrology. The blurred lines are evident everywhere in history, from Newton to Lowell. Eventually, scientific method led to a schism that allowed astronomy to flourish in its modern form.

Again, even without a telescope, you can observe the planets whenever they are visible. Watch as Mercury pops up from the Sun three times a year in the evening and three times in the morning sky. Watch as Venus pops in and out in a slower cycle, usually appearing in the dawn or the dusk once a year as the brightest thing in the sky besides the Sun and Moon. Watch the stately wanderings of the outer planets

(Continued on page 18)

Saw a Fireball?

Report it to the American Meteor Society!

www.amsmeteors.org/members/fireball/report-a-fireball

amazonsmile
You Shop. Amazon Gives.

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.

(Continued from page 17)
and their retrograde loop as they approach and pass opposition. There are of course a lot more things to see about the planets as we will find in future chapters. But perhaps before you crank the power up on your mega scope to count the number of whorls in the Great Red Spot, it will interest you to just look at the planets as they move through the patterns of stars and imagine how surprising this must have been to early man and how he began to try to understand and explain why they moved while the thousands of other points in the sky stayed still.

Supernova

Someday you will find me caught beneath the landslide in a champagne supernova in the sky

"Champagne Supernova" Noel Gallagher

Although it wasn't exactly understood why, it was noticed that some of the Stars would grow much brighter than usual or appear from nowhere and become bright. These Nova or new stars would then fade usually to obscurity in a few days or weeks. It was generally understood that they had somehow gone through an extreme change, but it was not understood in detail until later in history.

Unfortunately, it would be a bad bet to tell you that you can see a naked eye supernova anytime soon. The last truly spectacular ones occurred just before the invention of the telescope, and we haven't really had one like those since. There are certainly candidates for ones that might go supernova soon, such as Eta Carinae, but there's really no way to tell until it happens. Similarly, I would be a fool to tell you that you will see a naked eye comet, but you never know.

Comets and Meteors

Comets were generally indicators of doom as you may know, but their appearance and motion to the sky made people wonder what they might be. Edmond Halley's brilliant determination that one comet had been seen several times through history was another explanation that came just after the deadline for pre telescopic times, but their importance in the history of astronomy had already been determined.

I'll be with you darling soon; I'll be with you when the stars start falling

"Sunshine of Your Love" Eric Clapton, Jack Bruce, Peter C. Brown, Peter R. Brown

Many attempts were made to explain their motion, sudden appearance, and fuzzy look with ominous tails trailing behind them, but it was mainly a subject of conjecture until Halley.

Meteors were certainly more numerous, but they were also confusing. It seemed as if stars were constantly falling out of the sky, but there never seemed to be fewer of them. On rare occasion, they would even make it to the surface and strike the Earth. But full explanations of both the objects seen in the sky and the objects found on the ground were lacking until more modern times. Meteorites found on Earth were thought to be stones that had been struck by lightning even in Ben Franklin's era. And the discovery of meteors being residue from comets also had to wait until modern times.

Meteors are also a bit unpredictable, but if you look at a dark site, you'll probably see a few any moonless night of the year. And there are several predictable showers that occur such as the Perseids and Geminids that give you a much higher chance of seeing meteors. There's nothing more relaxing than laying back in a lawn chair with a cool drink or a hot cup of cocoa and watching the stars fall.

There are many other astronomy related discoveries that were made before the invention of the telescope, but these may have been the most important ones to inspire wonder and exploration. Hopefully you can take the time to revisit these objects and phenomena and put yourself in their place. With only their eyes and their brains, our ancestors determined our place in the universe, how planets moved why they moved why the moon has phases and how the seasons work. These are the fundamental pillars of astronomy and in some ways of civilization itself.

Next time we will look at the age of discovery between the invention of the telescope and the invention of photography. Quite an amazing time to discuss.

Book Review

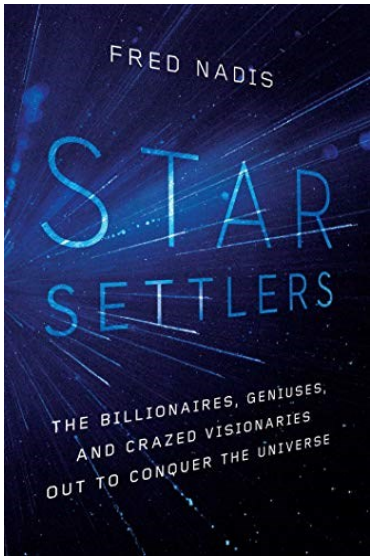
-Ed Bas

Star Settlers

The Billionaires, Geniuses, and Crazed Visionaries Out to Conquer the Universe: a nice, compact view of this broad subject.

A 250-page recent book (2020), reminds me of a long list of famous scientists and authors-- and a few mentioned that I didn't know before.

The author, Fred Nadis, is on the editorial board of the Journal of Science and Popular Culture. A science fiction fan and a writer for general magazines.



One name should be recognized in WAS: Guy Consolmagno, the director of the Vatican Observatory and speaking at the meetings. A Detroit native, and he hosted sf conventions also. A chapter devoted to the metaphysical lore of deep space, interviewed, "I am suspicious of those who turn exploration into a religion."

Another known name is: Ed Bass. I like his name! A Texan billionaire, a chapter devoted to Biosphere 2, a futuristic space environment built in Arizona in the late 1980's.

Did you know some astronomers and scientists wrote science fiction also? Of course, Carl Sagan ("Contact"), for one example and another one is Robert Forward, wrote "The Flight of the Dragonfly," etc. Aerospace engineer and a physicist, Forward died in 2002. I found the Dragonfly (published 1984), a 38-year-old copy, in good condition, in Upjohn Library in Kalamazoo College.

He did mention Musk, Bezos, and Brandon, but not a rehash though. Most of the readers knew well about these entrepreneurs in the recent media. The author nicely knitted von Braun, Goddard and Tsiolkovsky, to Presidents, business tycoons, old names like Asimov and Heinlein, to newer names like Robinson and Weir– a big bag of great ideas. He wrote chapters from Mars Mania, and Space Colonies, to The Space Rave. His endnotes are exhaustive and impressive.

The couple of chapters in the middle are not really necessary. Biospheres and sex in microgravity? Ok, I should and could surf but I had to read the entire book. My reading habit, good or bad.

"The search for knowledge, said a modern Chinese philosopher, is a form of play. Very well: we want to play with spaceships." It's not a new idea nor a new idiom, but Arthur C. Clarke wrote it in 1946. So prophetic.

Finally: robots or humans? It's a tough subject, and it's not a simple answer. And surveys in the general population mirror the public image. Half of them are seemingly anti-science and they don't care about the moon, Mars, the universe also. "Our true destiny might just be that of bit players in the cosmic scheme."

W.A.S.P. Photo and Article Submissions

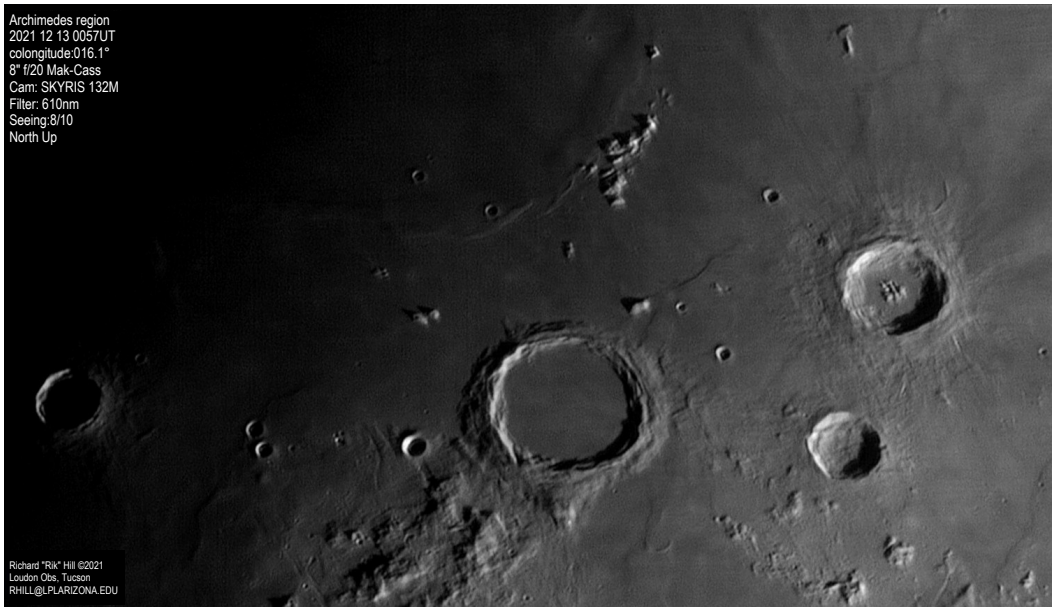
We'd like to see your photos and articles in the W.A.S.P. Your contribution is ESSENTIAL! —

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.

Archimedes Environs

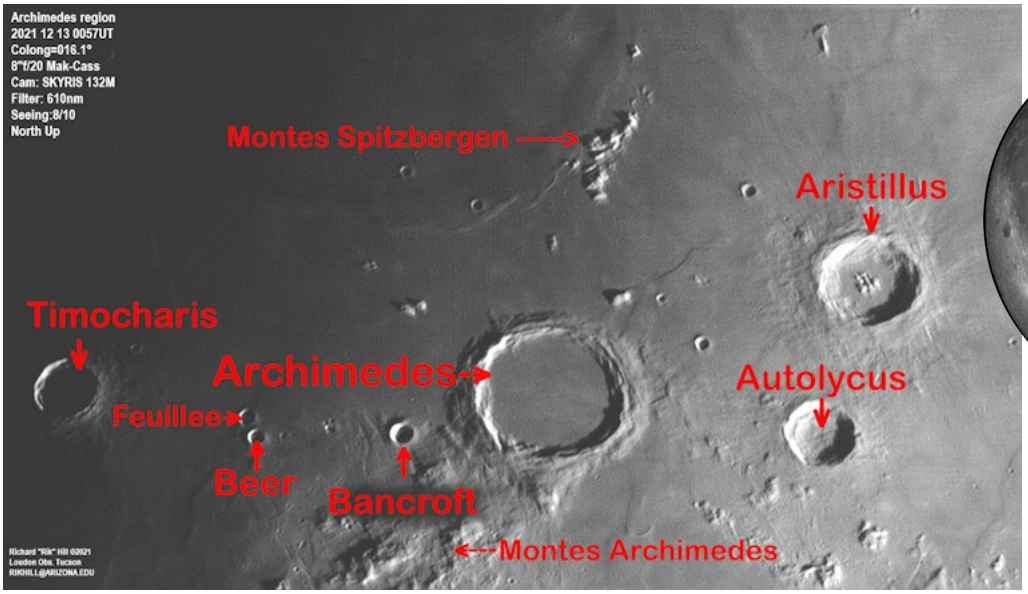


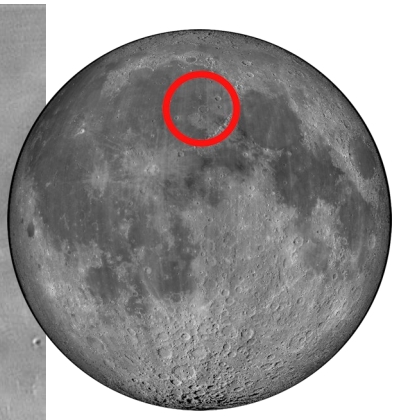
Just below center of this image is Archimedes (dia. 85km), one of those craters that newcomers to lunar observing learn quickly. It's in an area of few large craters so it stands out with it's relatively smooth flat floor. It's famous for several things. One are the tiny 1-2km craterlets on the floor that amateurs have used for years to gauge the quality of their night. Also there have been numerous reports of colorations on the floor that make it one of the better known sites for suspected transient lunar phenomenae. Because the moon has only a quarter the radius of the earth if you stood in the center of Archimedes you might just see the tops of the crater walls but it would be unlikely you would get the sense that you were in a crater!

On the right side of the image are two more good sized craters. The upper, larger one is Aristillus (56km) with curious central peaks and nicely terraced walls. Below is Autolycus (41km) with a small rima on its floor. Above Archimedes is the cluster of the Montes Spitzbergen. They look tall but are only around 1400m high. Nevertheless they sparkle in the morning sunlight, a glorious sight. The smaller crater just left (west) of Archimedes is Bancroft (14km) with the twin craters Beer (4km) south, and Fueillee (10km) north. I have to admit, they look more equal in size than that!

Below Bancroft are the Montes Archimedes. These get a bit taller than the Montes Spitzbergen, rising as much as 2km high. Finally, the large crater, mostly in shadow, on the left edge of this image is Timocharis (36km). It has a central peak but the Sun is not yet high enough there to show it here.

This composite was made of two images each made from 1800 frame AVIs stacked with AVIStack2 (IDL), assembled with Microsoft ICE and finished off with GIMP and IrfanView.





Location maps by Ralph DeCew

History S.I.G.

April 1982

If you have a programmable calculator handy, you might like “Pressing Keys: A Program to Find Your True Field of View” by Larry F. Kalinowski. This handy article is followed by an appeal to field work by Chuck Fausel in “Variable Star Observing.” Then there are the continuing thoughts in “Some Astronomical Reflections - Part III” by John J Wetzel.

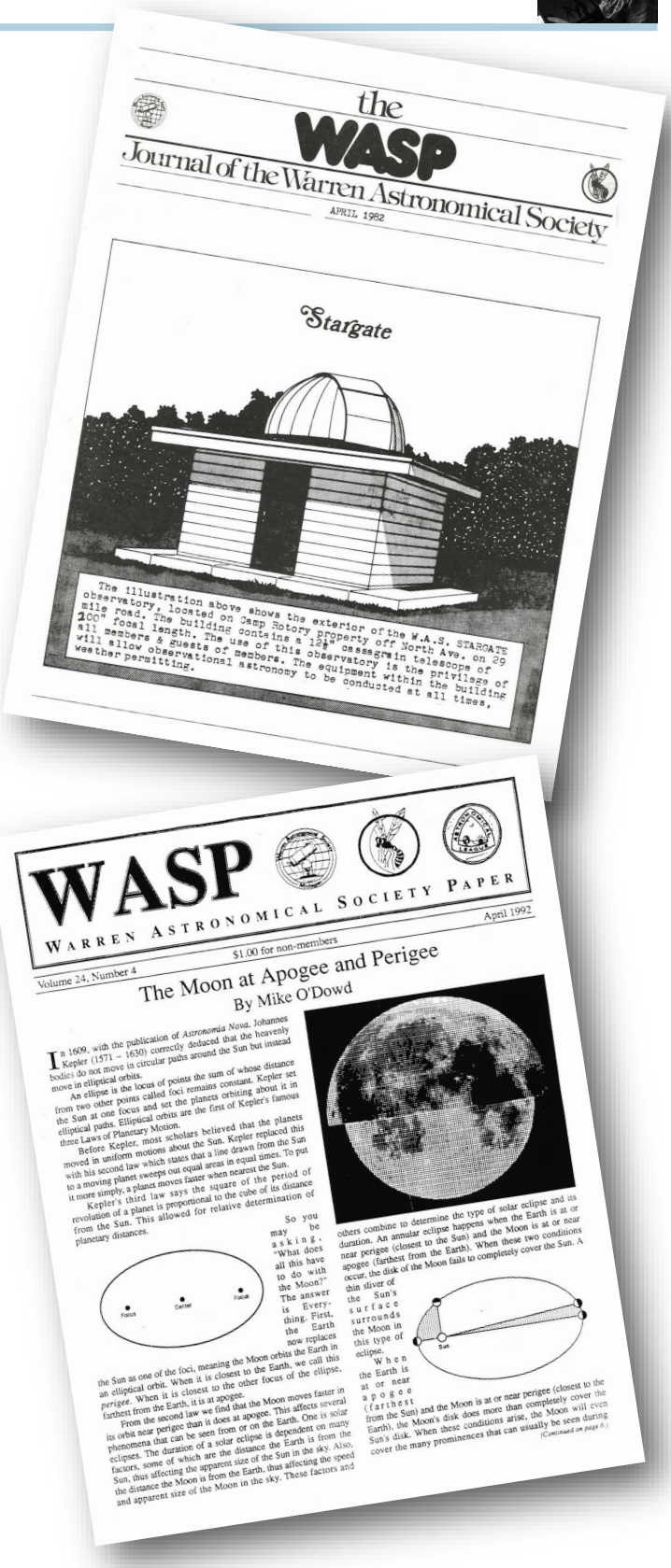
April 1992

With nary a mention of “Super Moon”, we get “The Moon at Apogee and Perigee” by Mike O’Dowd. In Larry F. Kalinowski’s “Computer Chatter”, Larry talks about a couple members offering to transmit by modem, articles that may be submitted- all you need to do is give them a floppy disk with your article in ASCII, they will then turn around and send it in. *This* editor does not miss the “good old days.”
If you follow Astronomy.fm’s Space Pirates program, you’ll find out Marty Kunz is still all about “Observing Jupiter's Moons.” A predecessor to NASA Sky Notes: NASA Spacelink talks about “Ulysses, A Unique Solar Polar Mission”. We finish with “At the Telescope-Double Stars.”

From the Scanning Room

In an interesting turn of events, my plan to go digging for more issues got upended by getting a notice that the owner of the house we’re renting is selling it and won’t be renewing the lease. So, we had to scramble to find new digs. But I did get a chance to scan and replicate a couple of items: *Comet News* and the *Computer Group Newsletter,* both by Larry Kalinowski. The scanned newsletters are currently filed under Archived Miscellaneous Files, until I come up with a better plan.
Perhaps I’ll do some more digging as I unpack in the “Fortress of Solitude III”. The timing of the move will have the interesting effect of my participation in the “Cranbrook” meeting in our current quarters, and then showing up in the “Macomb” meeting from the new home. Fingers crossed I get all the computery stuff cooperating.

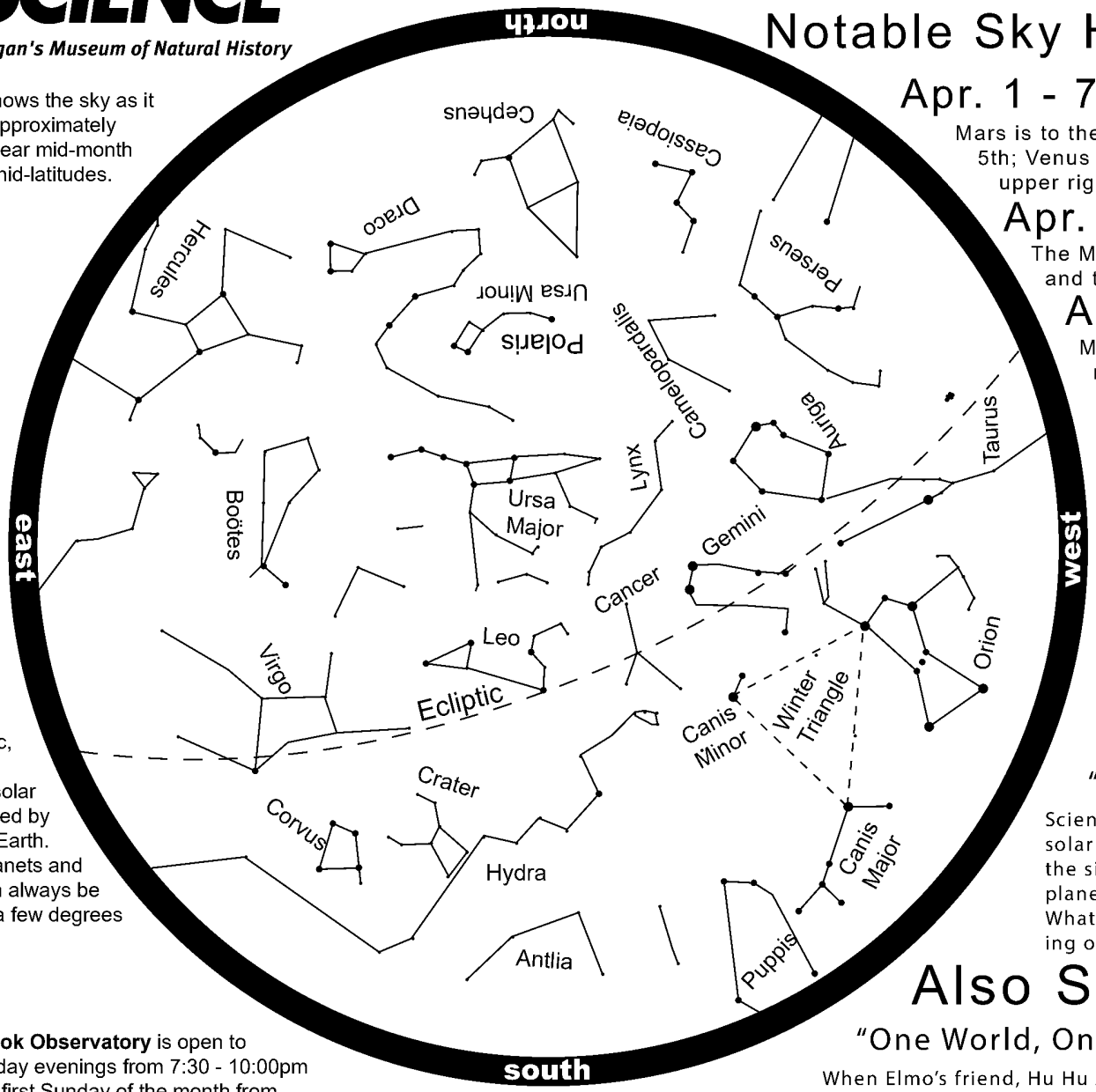
Dale Thieme,
Chief scanner



CRANBROOK INSTITUTE OF SCIENCE
Michigan's Museum of Natural History

APRIL 2022
Notable Sky Happenings

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



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

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

Apr. 1 - 7

Mars is to the right of Saturn on the 4th and below it on the 5th; Venus is to the left (ESE predawn). The Moon is at the upper right of Aldebaran on the 5th (W evening).

Apr. 8 - 14

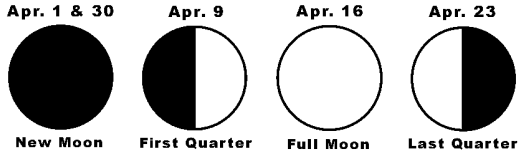
The Moon is to the left of Pollux on the 9th (SW eve.) and the upper right of Regulus on the 11th. (S eve.).

Apr. 15 - 21

Moon is above Spica on the 15th (SE eve.) and right of Antares on the 19th (SSW predawn).

Apr. 22 - 30

Moon is at the lower left of Saturn; Mars is to the left on the 25th (SE predawn). Venus is upper right of Jupiter; the Moon is below (27th ESE predawn). Mercury is at Maximim Elongation on the 29th (WNW eve. twilight). Venus is to the right of Jupiter (30th E predawn)



Now Showing

"Birth of Planet Earth"

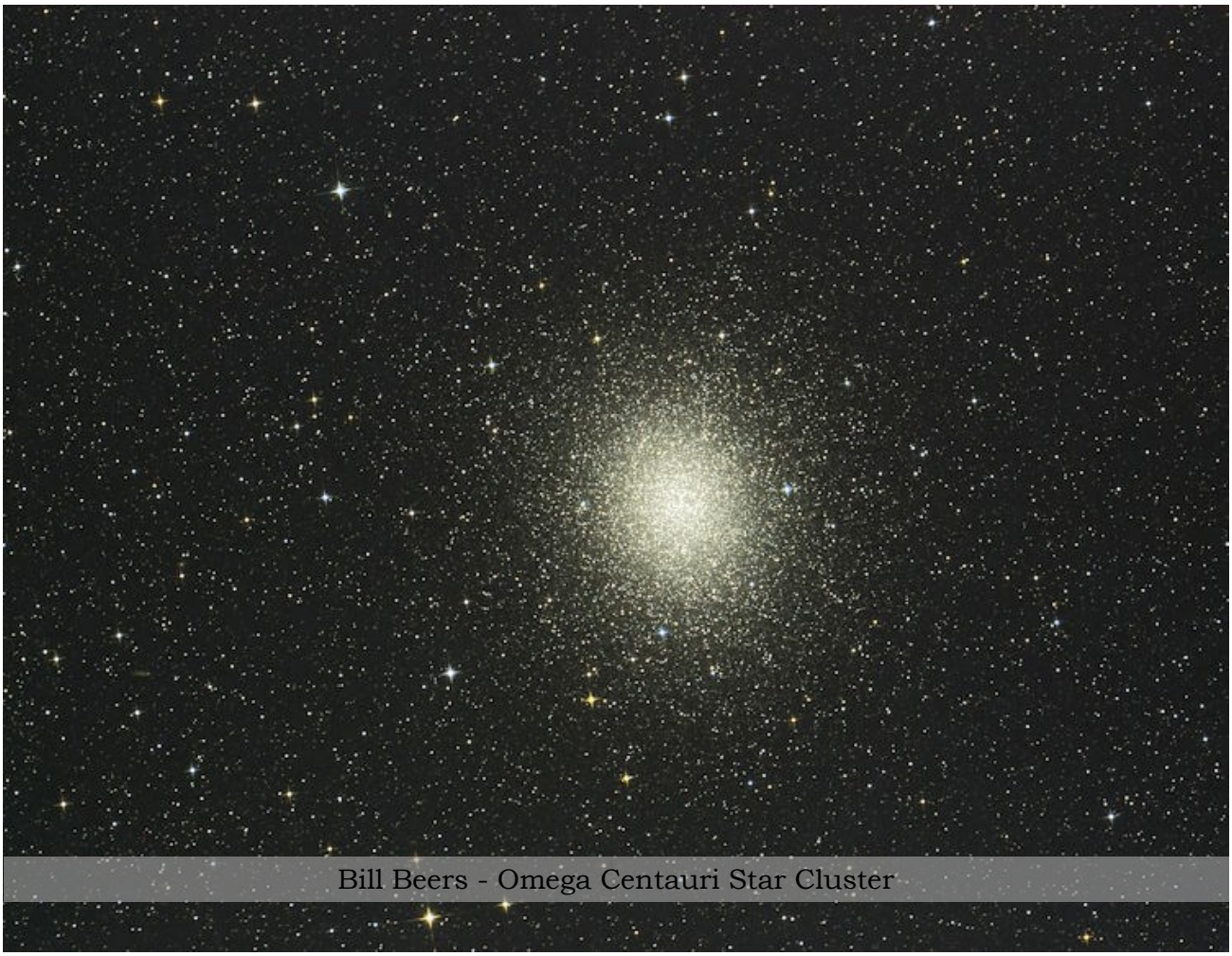
Scientists now believe that our galaxy is filled with solar systems, including up to a billion planets roughly the size of our own. How did Earth become a living planet in the wake of our solar system's violent birth? What does its history tell us about our chances of finding other worlds that are truly Earth-like?

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



Bill Beers - Omega Centauri Star Cluster

April 2022

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 April Fools' Day NEW MOON	2
3 First Day of Ramadan	4 Cranbrook	5	6	7 Moon at Apogee: 404438km	8	9
10	11	12	13	14	15 Good Friday	16 FULL MOON
17 Easter Sunday	18 Tax Day	19 Moon at Perigee: 365143km	20	21 Macomb	22	23 Stargate Open House
24	25	26	27	28	29 Mercury at Greatest Elong: 20.6°E	30 Partial Solar Eclipse; mag=0.640 NEW MOON

Stargate Observatory

Monthly Free Astronomy Open House and Star Party

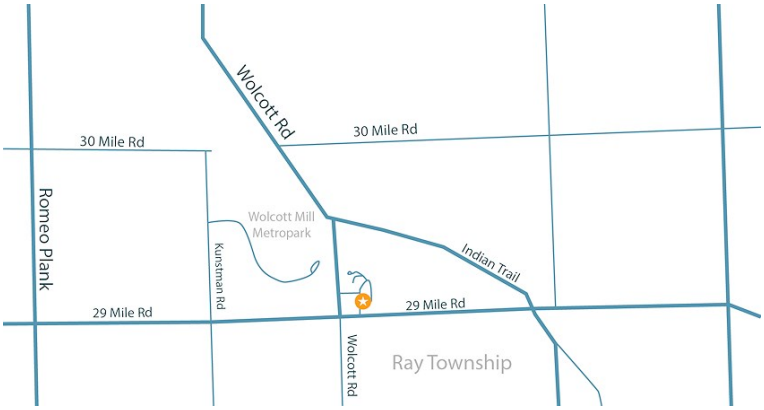
7:30 PM, 4th Saturday of the month!
Wolcott Mill Metropark - Camp Rotary entrance

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

- Sky tours.
- See different telescope types in operation.
- Get help with your telescope.
- We can schedule special presentations and outings for scouts, student or community groups.

Contact: outreach@warrenastro.org

Find us on MeetUp.com



20505 29 Mile Rd (1.8 miles east of Romeo Plank Rd) Ray, MI 48096

Observatory Rules:

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

Stargate Report

Jeff MacLeod opened the observatory at 7 pm. It was cloudy and windy. There were no visitors and the observatory was closed at 9 pm. Jeff reported the observatory appeared in good shape.

Next open house is on April 23 starting at 7:30 pm

Riyad I. Matti
2022 WAS 2nd VP,
Observatory Chairperson

Treasurer's Report

Treasurer's Report for March 28, 2022

Main account, Bank of America

Main Account	$22,919.47
Deposits:	$144.70
Withdrawals:	$171.90

GLAAC account

Bank of America	$90.00
Deposits:	$0
Withdrawals:	$3123.95

PayPal Account

As of March 28, 2021	$1,322.35
Money in (memberships, donations) :	$145.25
Money out (for postage)	$ 17.90

Total Paid Memberships 103

Special Mention for March:

Steven Aggas (Former member and president) renewed this year joining David Levy in our Arizona contingent.

News from the Treasury:

Most of the GLAAC funds were transferred to GLAAC. The remaining $90.00 will be paid to GLAAC when the account is officially closed.

Keep those AL memberships coming in. Before we renew at the end of June, I will send out a full roster of AL payments that I received, giving the membership a chance to verify their status. Remember that you must be a paid member to take advantage of our $7.50/yr Astronomical League membership price.

Astronomical Events for April 2022

Add one hour for Daylight Savings Time

Source:
http://astropixels.com/almanac/almanac21/almanac2022est.html

Day	EST (h:m)	Event
01	01:24	NEW MOON
02	18:00	Mercury at Superior Conjunction
04	08:05	Moon at Ascending Node
04	20:16	Pleiades 3.6°N of Moon
04	21:00	Mars 0.3°S of Saturn
07	14:11	Moon at Apogee: 404438 km
09	01:47	FIRST QUARTER MOON
09	10:14	Pollux 2.2°N of Moon
13	17:00	Mercury at Perihelion
16	13:55	FULL MOON
18	09:01	Moon at Descending Node
19	10:16	Moon at Perigee: 365143 km
19	12:36	Antares 3.1°S of Moon
22	13:00	Lyrid Meteor Shower
23	06:56	LAST QUARTER MOON
24	15:56	Saturn 4.5°N of Moon
25	17:06	Mars 3.9°N of Moon
26	20:51	Venus 3.8°N of Moon
27	03:23	Jupiter 3.6°N of Moon
29	03:00	Mercury at Greatest Elong: 20.6°E
29	14:31	Mercury 1.3°S of Pleiades
30	15:00	Venus 0.2°S of Jupiter
30	15:28	NEW MOON
30	15:41	Partial Solar Eclipse; mag=0.640

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

Adrian Bradley,
Treasurer

Meeting Minutes

WARREN ASTRONOMICAL SOCIETY MINUTES OF (VIRTUAL) BOARD MEETING MARCH 7, 2022 @ 6:30PM

Meeting called to order @ 6:30PM by President Diane Hall. Officers in attendance: Diane Hall – Bob Trembley – Riyad Matti – Mark Kedzior – Adrian Bradley - Kevin McLaughlin – Dale Thieme (Quorum present).

OFFICER REPORTS:

Diane Hall reported that Cranbrook has made inquiries as to our return to in person meetings, but this will need to be addressed at a special board meeting to discuss and review a return to in person meetings.

1st VP Bob Trembley has scheduled another speaker for June and is actively looking for follow-up presentations from previous speakers.

2nd VP Riyad Matti reports that the February 26th Open House was virtual with Doug Bock providing live images for attendees. The next Open House will be March 26th, with Jeff MacLeod operating the observatory. Riyad is also investigating the purchase of a spectroscope for the K2 refractor to enhance scientific observing and study.

Secretary Mark Kedzior reported the February meeting minutes are posted in the March WASP.

Treasurer Adrian Bradley reports that the account totals of both the WAS and GLAAC is posted in the March WASP. He also reported that preparations are underway to transfer the GLAAC account to the GLAAC since receiving the 501(3)(c) status.

Outreach Chair Kevin McLaughlin reports that Mark Kedzior will be at the Warren Civic Center Library on March 10th, with viewing through telescopes and activities from the NASA @My Library Grant.

Publications Chair Dale Thieme reports the March WASP is posted online.

OLD BUSINESS:

WAS Website update – the committee has not been able to meet, but a meeting will be setup to discuss this item. The Jon Root Bequeathment to the WAS – Adrian Bradley will be contact the Root Family for further details on this item.

NEW BUSINESS:

Discussion on the transfer of GLAAC account to GLAAC: Motion by Adrian Bradley – supported by Dale Thieme to transfer the GLAAC account to the GLAAC in their account they are establishing in light of receiving 501(3)(c) status. Motion passed 7 -0. Motion by Diane Hall to consider the return to in person meetings at Cranbrook – supported by Adrian Bradley – after discussion, motion by Diane Hall to table return to in person meetings until board meets to discuss in detail and come up with determination by the Macomb March 17th meeting – supported by Adrian Bradley – motion passed 7-0.

Dale Thieme asked for a co-host to assist in muting during our virtual meetings. Adrian Bradley volunteered to assist.

Motion to adjourn by Bob Trembley – supported by Adrian Bradley – motion passed 7-0. Meeting adjourned at 7:13 PM.

Respectfully submitted,
Mark Kedzior
Secretary, WAS

WARREN ASTRONOMICAL SOCIETY CRANBROOK (VIRTUAL) MEETING MARCH 7, 2022 7:30PM

Meeting called to order at 7:30PM by President Diane Hall (WebEx attendance – 25 & YouTube – 12 @ 8:30PM).

OFFICER REPORTS:

President Diane Hall reported the board will meet off site to discuss returning to in person meetings, along with necessary logistical support (venues, snacks, AV support, discussion groups) and to make a decision on this matter.

1st VP Bob Trembley is asking membership for the need of presentations for upcoming meetings.

2nd VP Riyad Matti reported on the February 26th Virtual Open House with Doug Bock from his Northern Cross Observatory. The next Open House will be March 26th, with former President Jeff MacLeod at the helm of the Kalinowski-Khula refractor.

Secretary Mark Kedzior reports the February meeting minutes are in the March WASP.

Treasurer Adrian Bradley gave the balances of the WAS and GLAAC accounts

Outreach Chair Kevin McLaughlin reported a March 10th outreach event at Warren Civic Center Library for the NASA @ My Library grant they received, and S.W.A.N. Night will be Friday, April 8th at Stargate.

Publications Chair Dale Thieme reports the March WASP in on line.

SPECIAL INTEREST GROUPS:

Solar – Bob Trembley posted latest images from the sun.

Double Star Group – No observing report, but are in process of upgrading equipment to enhance double star observing/study (micrometer eyepiece and a spectroscope).

History – Dale Thieme did historical briefs from moments in time from the WASP at 10 years, 20 years, 30 years and 40 years ago intervals.

Radio – No report.

Astrophotography – Doug Bock reports doing solar

(Continued on page 27)

(Continued from page 26)

imaging. Adrian Bradley reports on his attempts at landscape astrophotography including the Milky Way.

OBSERVING REPORTS:

David Levy reports the sun is very active and has been comet searching in earnest. He finished his report with a reading from Charlotte Bronte. Adrian Bradley shared images of Orion Belt and Sword, light pillars, zodiacal light over Lake Huron. Doug Bock shared his February 26th Open House images: IC 410, the Leo Triplet, M35 & NGC 2158, M97 & M108, Markarian's Chain, NGC 2246 Rosette Nebula, Cone Nebula – all images were posted in the March WASP. Ken Bertin enjoyed observing the Winter Circle (Hexagon).

SHORT PRESENTATION:

Diane Hall introduced (with bio) 1st VP Bob Trembley with his presentation of "Europa Clipper". Bob described in detail the mission of this endeavor to Europa, with detailed reconnaissance to see if it is suitable for life, with an array of scientific equipment on board. The launch is scheduled for October 2024, with gravity assists from Mars in February 2025, Earth in December 2026, then arrive to Jupiter in April 2030. There will be 44 flybys of Europa to retrieve scientific info, then ending the mission by impacting the moon Ganymede. Questions and discussion followed his detailed presentation.

MAIN PRESENTATION:

1st VP Bob Trembley introduced Doug Bock (with bio) and his presentation "Beginning Astro-Imaging" (And Maybe Some Advanced Examples). Doug shared and described astrophotography setups, from a simple setup (Tripod, DSLR w/ ball mount, lens choices) and other recommended accessories, to the more advanced with using a computer. He also gave examples of single frame images, stacking images, star trails, meteor images, aurora images, time lapse video, and the software needed to process the images one takes.

Questions and discussion followed his very informative presentation.

To see both presentations in their entirety, go to:

https://www.youtube.com/warrenastro

Meeting ended at 9:50 PM.

Mark Kedzior
Secretary, WAS

WARREN ASTRONOMICAL SOCIETY MACOMB (VIRTUAL) MEETING MARCH 17, 2022 7:30PM

Meeting called to order at 7:30 PM by 1st VP Bob Trembley (WebEx attendance – 23 & YouTube –? @ 8:15 PM).

OFFICER REPORTS:

1st VP Bob Trembley reports a need for speakers at future meetings.

2nd VP Riyad Matti reports the next Open House is March 26th, with former WAS President Jeff MacLeod manning the Stargate Observatory.

Secretary Mark Kedzior reported on upcoming launch of the Library Telescope Program in Warren.

Treasurer Adrian Bradley gave treasury report of both the WAS and GLAAC accounts. We also have currently 104 paid memberships to date.

No report from both the Outreach and Publications Chairs.

OUTREACH:

Ken Bertin continues to do his "Facebook Astronomy" each week. Adrian Bradley will be presenting to the University Lowbrows on March 18th, the Detroit Public Library on March 22nd, and a Wyandotte radio show later in the month.

SPECIAL INTEREST GROUPS:

Double Stars – No report. Astrophotography – Bill Beers shared his image of the Horsehead Nebula (Barnard 33) 1400 LY away and 3-4 LY tall. Adrian Bradley shared images of astronomical twilight taken over Lake Huron at Port Sanilac.

OBSERVING REPORTS:

David Levy reports the sun is very active – reports on his observing the triple star system Omicron Eridani – consisting of a 4th mag, a 9th mag white dwarf, and an 11th mag red dwarf 16 LY away. He finished with a reading from a Ukrainian Poet about the Dnieper River.

MAIN PRESENTATION:

1st VP Bob Trembley introduced (with bio) Dr. Andrew Gangidine, Curator of Earth/Space Sciences at Cranbrook Institute of Science, with "Ancient Fossils and the Search for Life on Mars". Dr.Gangidine received his PhD in 2020 from the University of Cincinnati in astrobiology, which he defined as "the study of the origin, evolution, distribution and future of life in the universe". He explained his field studies in the search for microscopic organisms in the Grand Prismatic Hot Springs in Yellowstone, and his methodology in searching for these microscopic fossils. He also explained that the Mars Perseverance Rover is searching for signs of past life in Jezero Crater, looking for these microscopic fossils as part of its mission.

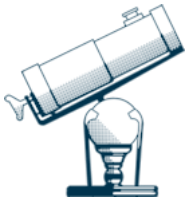
Questions and discussion followed his excellent presentation.

To see his presentation in its entirety, go to:

https://www.youtube.com/warrenastro

Meeting ended at 9:30 PM.

Mark Kedzior
Secretary, WAS



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
McMath-Hulbert Astronomy Society	Lake Angelus	Board and paid members-First Sunday of the month Public open house—first Saturday at 11 am
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/
McMath-Hulbert Astronomy Club http://www.mcmathhulbert.org/solar/newsletter/
Ford Amateur Astronomy Club: http://www.fordastronomyclub.com/starstuff/index.html
University Lowbrow Astronomers: http://www.umich.edu/~lowbrows/reflections/

WAS Member Websites

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

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

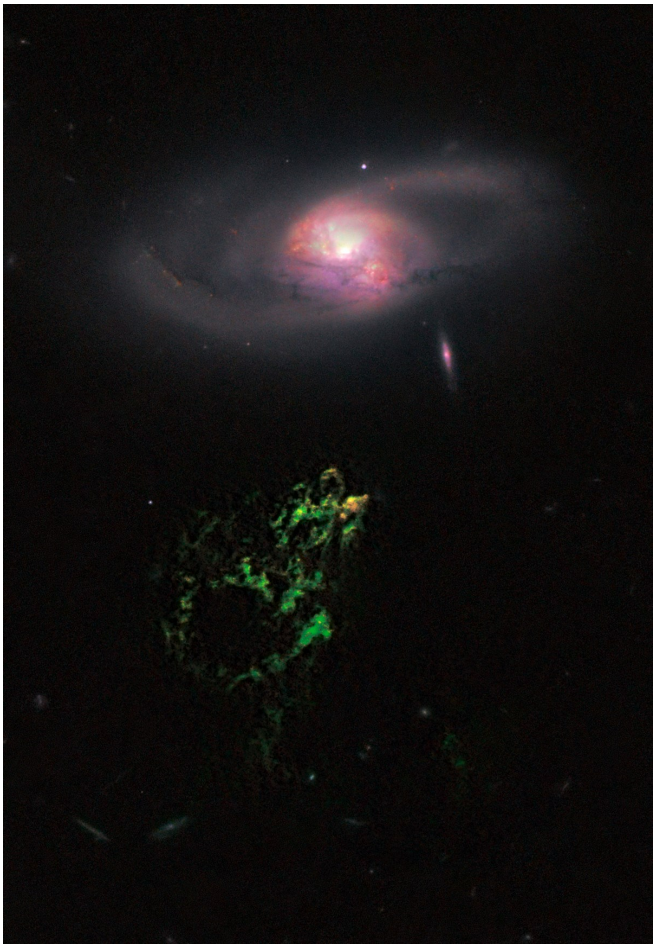
This article is distributed by NASA Night Sky Network
The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Springtime Catspotting: Lynx and Leo Minor

David Prosper

Many constellations are bright, big, and fairly easy to spot. Others can be surprisingly small and faint, but with practice even these challenging star patterns become easier to discern. A couple of fun fainter constellations can be found in between the brighter stars of Ursa Major, Leo, and Gemini: **Lynx** and **Leo Minor**, two wild cats hunting among the menagerie of animal-themed northern star patterns!

Lynx, named for the species of wild cat, is seen as a faint zigzag pattern found between Ursa Major, Gemini, and Auriga. Grab a telescope and try to spot the remote starry orb of globular cluster NGC 2419. As it is so distant compared to other globular clusters - 300,000 light years from both our solar system and the center of the Milky Way - it was thought that this cluster may be the remnants of a dwarf galaxy consumed by our own. Additional studies have muddied the waters concerning its possible origins, revealing two distinct populations of stars residing in NGC 2419, which is unusual for normally-homogenous globular clusters and marks it as a fascinating object for further research.



Hanny's Voorwerp and the neighboring galaxy IC 2497, as imaged by Hubble. Credits: NASA, ESA, W. Keel (University of Alabama), and the Galaxy Zoo Team Source: hubblesite.org/contents/news-releases/2011/news-2011-01.html

Leo Minor is a faint and diminutive set of stars. Its "triangle" is most noticeable, tucked in between Leo and Ursa Major. Leo Minor is the cub of Leo the Lion, similar to Ursa Minor being the cub to the Great Bear of Ursa Major. While home to some interesting galaxies that can be observed from large amateur scopes under dark skies, perhaps the most intriguing object found within Leo Minor's borders is Hanny's Voorwerp. This unusual deep-space object is thought to be a possible "light echo" of a quasar in neighboring galaxy IC 2497 that has recently "switched off." It was found by Hanny van Arkel, a Dutch schoolteacher, via her participation in the Galaxy Zoo citizen science project. Since then a few more intriguing objects similar to Hanny's discovery have been found, called "Voorwerpjes."

Lynx and Leo Minor are relatively "new" constellations, as they were both created by the legendarily sharp-eyed European astronomer Johannes Hevelius in the late 1600s. A few other constellations originated by Hevelius are still in official use: Canes Venatici, Lacerta, Scutum, Sextans, and Vulpecula. What if your eyes aren't quite as sharp as Johannes Hevelius – or if your weather and light pollution make searching for fainter stars more difficult than enjoyable? See if you can spot the next Voorwerp by participating in one of the many citizen science programs offered by NASA at science.nasa.gov/citizenscience! And of course, you can find the latest updates and observations of even more dim and distant objects at nasa.gov.

Map of the sky around Lynx and Leo Minor. Notice the prevalence of animal-themed constellations in this area, making it a sort of celestial menagerie. If you are having difficulty locating the fainter stars of Leo Minor and Lynx, don't fret; they are indeed a challenge. Hevelius even named the constellation as reference to the quality of eyesight one needs in order to discern these faint stars, since supposedly one would need eyes as sharp as a Lynx to see it! Darker skies will indeed make your search easier; light pollution, even a relatively bright Moon, will overwhelm the faint stars for both of these celestial wildcats. While you will be able to see NGC 2419 with a backyard telescope, Hanny's Voorwerp is far too faint, but its location is still marked. A few fainter constellation labels and diagrams in this region have been omitted for clarity.
Image created with assistance from Stellarium