



Celebrating Sixty Years of the Warren Astronomical Society



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

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

Membership and Annual Dues

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

Astronomical League (optional)\$7.50

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

Pay at the meetings

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

Among the many benefits of membership are

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

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

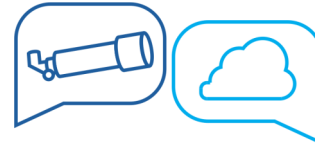
Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted in person, via US Mail, or by email (publications@warrenastro.org)

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

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

Snack Volunteer Schedule

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



Discussion Group Meeting

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



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President's Field of View

I was folding some laundry one evening late in January when I felt the whim to raise the blinds and peek out upon the snow-dusted street. Twilight had just shaded into darkness, and I could see Sirius and Rigel glittering over the skeletal tree branches and rooftops. The sight of them, even framed in a mundane window screened by double-paned glass, gave me a strange, deep sense of comfort. I recalled the astronomer E.E. Barnard's reminiscence of his childhood, when he looked upon groups of stars whose names he did not yet know, missed them as they passed from view and welcomed them as returning friends when they came around again in the night sky.

I did learn the stars as a child, and thought of them in some way as friends, or at least as characters, sorted neatly by color like the cartoon figures that existed then to sell me toys and lunchboxes. Red Aldebaran, blue Rigel, yellow Capella and off-white Procyon... Castor and Pollux in their multiplicities and bold, bright Sirius. They had personalities to me. They'd been born and one day would die and in the meantime they lived, each captured in the delayed snapshot of light traveling across the galaxy to my eyes.

Something about the bright stars of winter drew me in and captivated me; I learned the strange music of Orion's belt stars (Alnilam, Alnitak, Mintaka) and the names of the Pleiades. I learned them on the driveway of my grandparents' house. I rediscovered them, as one does old friends, walking across the campus of my university. I probed them at last with a telescope on the shores of the Great Lakes. And even now, something of that connection echoes across the decades and many thousands of miles; I glimpse a corner of that mighty Hexagon through my window and feel a moment of peace in a disordered world.

They are not friends, nor gods, nor the light of transfigured heroes, and yet... remain something more than faraway suns to me. Even now.

-Diane Hall
President

A graphic for 'Space Pirate Radio' featuring a white silhouette of a pirate ship with 'SPACE' and 'PIRATES' written on its sails, set against a background of Earth from space. Below the image is a dark blue box with yellow and white text.

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

A graphic showing a white name tag with a blue border and the text 'Warren Astronomical Society' at the top, 'Your Name Here' in the center, and 'Club Member Name Tags' in yellow on a dark blue background. Below the name tag is a dark blue box with white text.

Email publications@warrenastro.org for
your personalized name tag

Saw a Fireball?

Report it to the American Meteor Society!



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



Letters

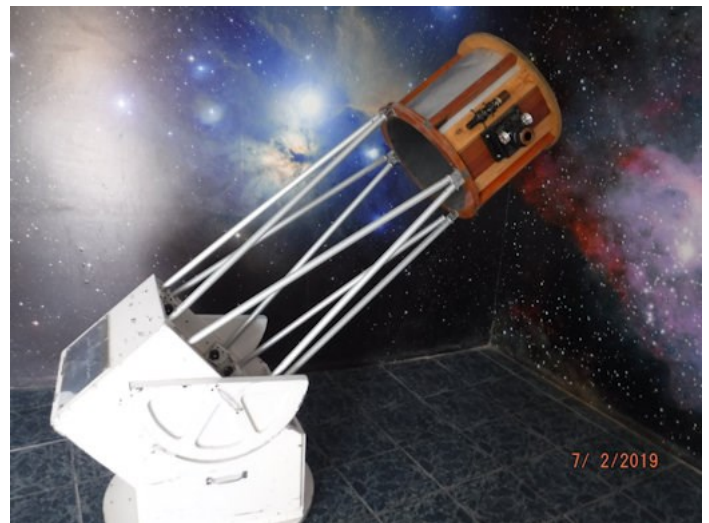
Forwarded by Gary Ross

Michael T. Rusesky is the cousin who got me involved in astronomy, late 1950's. Precocious lad, he tackled a **six-inch** Newtonian, and even a few years later, a Maksutov (failed).

Retired mining engineer in Alaska, Mike now man-of-the-world living in (former) British Honduras. Next stop, who knows . . .?

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

Subject: A Dobsonian
Date: 2021-01-27 16:51
From: Mike Rusesky
To: G.M. Ross



A sight among the places visited during the 2019 Chilean solar eclipse trip I was a part of.

Your e-mail recently made me think of this.

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.



Reports

McMath-Hulbert Observatory

We've been working inside the administration building so far this year focusing on cleanup and organization of various rooms. We're also planning work on the spectroheliograph in Tower 2 in the form of projecting test images onto the input slit to verify collimation and condition of the optics in the 30' underground well that's part of the optical path. We have a slide projector that we'll be using to project test patterns onto the input slit. The plan is to print out different patterns of lines etc. on Mylar film, mount them into slide mounts so we have a known input to the system. Then we'll look at the projection on the output slit. This way we can work out there in the winter since the sun is well below the tree tops and is not visible until springtime again.

We have a star party planned for January at the Hawk Woods Nature Center in Auburn Hills on Feb. 6. Marty Kunz will be using multiple eyepieces for viewing so that we can change out and sanitize eyepieces as different families look through his 8" Celestron.

Unfortunately we're still forced to limit access to MHO to the small group of active volunteers who have been caring for the observatory in recent months. Will 2021 be a better year for astronomy??

The sun has been quiet for the past month and a half, but there are now some visible sunspots and 2021 should be an interesting year of increasing activity at the onset of Cycle 25.

G. M. Ross Reports: The Sun

21st of January ~ meridian.

Transparency excellent, but seeing fair. (Wind.)

One group, 4 spots of which one was a tiny "pore".

5 cm. refractor, f /11. 60X: Martinmil custom eyepiece of uncertain origin.

No mount drive. No auto-focus eyepiece. No apochromat objective.

Sub-diameter mylar filter.

23 January.

Transparency excellent. Seeing good.

@ 60X, sole group of three spots, one a tiny "pore".

Same formation as last obs'n. Careful examination of E limb yielded no new activity.

50 mm. f /11 refractor w/ sub-diameter mylar filter.

27 January

Transparency excellent. No sun-spot groups. The previously observed group was in decline.

60X, 5 cm. f /11 refractor.

29 January, just W. of culmination

No sun-spots. Transparency good, seeing poor.

5-cm refractor @ 60X. Sub-diameter mylar filter.

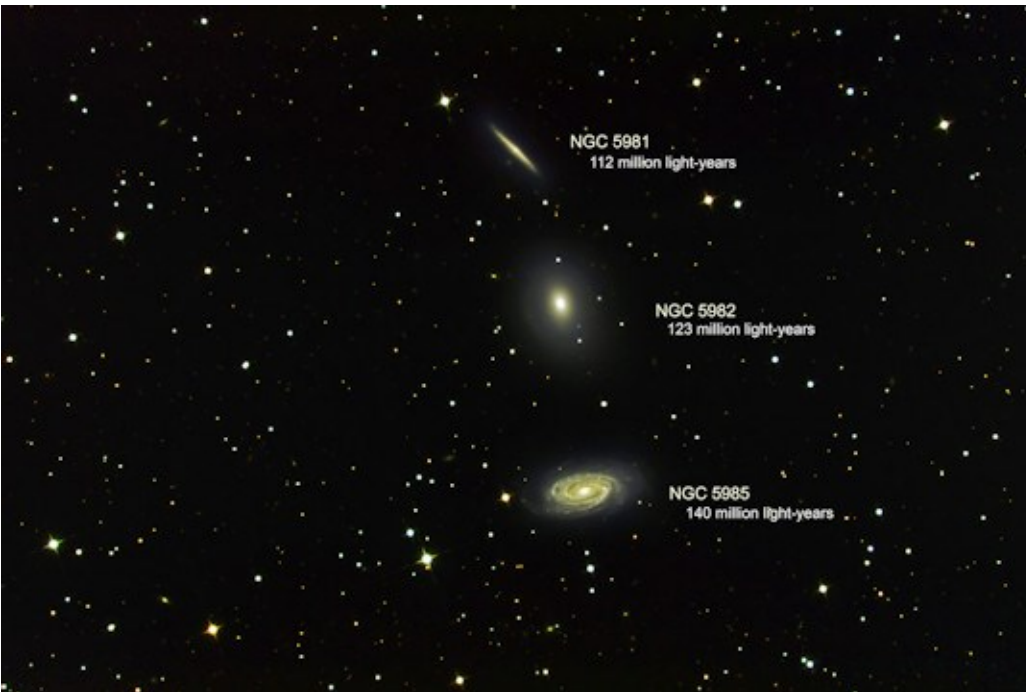


Here's Marty showing off our newly organized Ham Radio Station K8MHO!

The View From C.W. Sirius Observatory

The Draco Trio

Last summer while filing through a list of potential imaging targets, I found this one to be very interesting. It is a group of 3 different style of galaxies in the same field of view. NGC 5985, NGC 5982, NGC 5981 make up what is known as the Draco Trio. All of them located in the northern constellation Draco. Even though they may appear to be in close proximity to each other, that is not the case. I have included the actual distances on the image to show how far away they actually are. These distances are light-years from Earth. The Trio was discovered by William Herschel in 1788.



First, is NGC 5985. It is a beautiful face-on spiral galaxy and is probably the easiest in the group to see, even though it is the farthest of the three, having a magnitude of 11, it is approx. 140 million light-years from earth. This spiral is classified as a

Seyfert type 1 galaxy, with an active black hole at its center.

Second, we have NGC 5982. This is a nice elliptical galaxy about 100,000 light-years across. Located approx. 123 million light-years from Earth, NGC 5982 has a “kinematically decoupled” nucleus, with its major axis being nearly perpendicular to the rotation of the galaxy. In other words, it is believed to have small central disks counter-rotating, or decoupled from the rest of the galaxy.

And third is NGC 5981. This one is also a spiral galaxy, but is edge-on from our perspective. Being the faintest of the three, this edge-on is a dwarf galaxy located closest to us at approx. 112 million light-years away. I could not find much more information on NGC 5981, probably because it is so small.

So to visually observe this group, since they are pretty faint, I would recommend using a larger size telescope, 10 inch or greater. The summer months are the best time to observe the Trio since they will be the highest in the north sky. And having dark skies will definitely help locating this unique trio. This image is made up of 5 hours of integration time, shot through my 11” SCT scope and using

a one shot color CMOS camera. So if you want to observe, or image a very unique group of galaxies, I highly recommend the Draco Trio. Happy hunting!



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





On January 23, 2021 we had a virtual open house. Lots of good discussions from 6:30 until about 11:40pm. We looked at:

- The moon in waxing gibbous phase.
- IC 434 is a bright emission nebula in the constellation Orion. It was discovered on February 1, 1786 by William Herschel. The Horsehead Nebula is a dark nebula silhouetted against it.
- Messier 41 (also known as M41 or NGC 2287) is an open cluster in the constellation Canis Major. It was discovered by Giovanni Batista Hodierna before 1654 and was perhaps known to Aristotle about 325 BC.
- Comet C/2020 M3 (ATLAS) is currently in the constellation of Auriga.
- The Orion Nebula (also known as Messier 42, M42, or NGC 1976) is a diffuse nebula situated in the Milky Way, being south of Orion's Belt in the constellation of Orion. It is one of the brightest nebulae, and is visible to the naked eye in the night sky.
- NGC 2244 (also known as Caldwell 50 or the Satellite Cluster) is an open cluster in the Rosette Nebula, which is located in the constellation Monoceros. This cluster has several O-type stars, super hot stars that generate large amounts of radiation and stellar wind. The age of this cluster has been estimated to be less than 5 million years.

Hickson 44 (HCG 44) is a group of galaxies in the constellation Leo. As Arp 316, a part of this group is also designated as group of galaxies in the Atlas of Peculiar Galaxies.

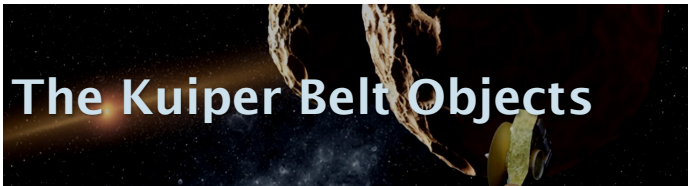


-Doug Bock

Presentations

Monday, February 1, 2021 Virtual Presentations

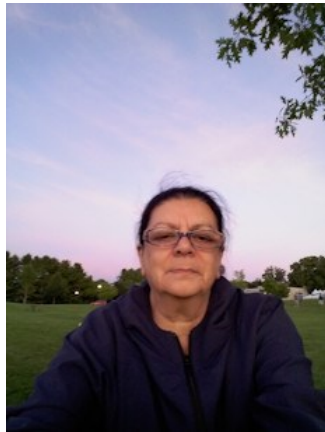
Main Talk:



By Dr. Kapila Clara Castoldi

Dr Castoldi will cover several related topics: a brief overview of asteroids and comets, leftovers from the formation of the Solar System; discovery, in the early 1990's, of objects similar in size to Pluto at the outskirts of the Solar Systems, as predicted by Gerard Kuiper; demotion of Pluto to the role of 'dwarf planet' and definition of a 'new' Solar System and the New Horizons mission and ongoing search for Kuiper Belt Objects.

Dr. Kapila Clara Castoldi earned a doctorate in High Energy Physics from University of Milan, Italy. After ten years as Research scientist at the Italian Institute for Nuclear Physics (INFN), she joined Northwestern University for experiments at Fermilab. Kapila eventually left research for full time teaching and joined Oakland University, where she is currently Adjunct Professor of Physics.



Short Talk:

The World's Largest Refractor?

The answer may surprise you

By Bob Berta

Before science moved into monster reflectors in observatories, refractors were king. We are well versed with the stories of large refractors that were in a race to outdo each other...longer focal lengths, bigger apertures, until that famous giant at Yerkes. But was it the largest refractor? Would you believe that there was a refractor so large that the Yerkes might have served as a finder scope for it!

(Continued on page 9)

Thursday, February 18, 2021 Virtual Presentation

Anti-matter Cosmic Rays and Dark Matter

By Dr. Ilias Cholis

Antimatter cosmic ray measurements can advance our understanding of high-energy astrophysical phenomena in our own Galaxy. Over the last years, satellite experiments as the Alpha Magnetic Spectrometer on board the International Space Station measure antimatter cosmic ray fluxes, including positrons (the antiparticles of electrons), anti-protons (the antiparticles of protons) and recently antimatter nuclei. These measurements provide a novel probe to search for new physics including annihilations of dark matter in the Milky Way, which he will present.

Ilias Cholis is an Assistant Professor of Physics at Oakland University. He did his graduate studies with Neal Weiner at the New York University, followed by postdoctoral positions at SISSA Trieste, at Fermilab and at John Hopkins University. Dr. Cholis is a theoretical astrophysicist. His work includes both analytic and numerical approaches to tackle theoretical questions, as well as developing new data analysis techniques, making connections between different observations probing the same astrophysical processes or sources in a multi-messenger approach. His work focuses on searches for evidence of dark matter annihilation in high energy astrophysical measurements and on the study of high energy astrophysical phenomena occurring near compact objects.

Dr. Cholis's research includes work on cosmic-ray sources and cosmic-ray propagation through the Milky Way and the Heliosphere, on diffuse gamma-ray studies and the development of techniques to analyze Fermi-Large Area Telescope and AMS-02 observations. His work also includes gravitational wave astrophysics, and in particular the investigation of black holes as a dark matter candidate.



(Continued from page 8)

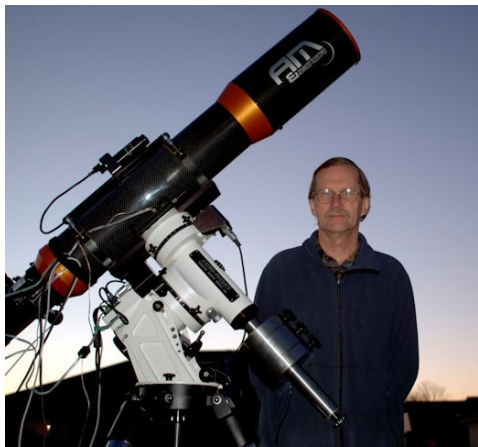
A member of WAS since 2004 has served as Secretary, 2nd VP, President, and Outreach Chair. Her is also a member of the Oakland Astronomy Club where he served as VP for several years, a member of the 7 Ponds Astronomy Club, and San Francisco Amateur Astronomers in California.

Bob is both a Michigan Representative for the Astronomical Society of the Pacific's Night Sky Network, as well as a Solar System Ambassador for the Jet Propulsion Laboratory (JPL).

He retired in 2004 from San Francisco, California where he worked as an Electrical Engineer, Construction Supervisor in downtown San Francisco, and a Safety Engineer in the Law Department over a career spanning 36 years. He also owned a professional photography business.

He is an accomplished gigging musician on various keyboard instruments, an avid cyclist, and kayaker. Bob designed the astronomy observatory at the DbarA Scout Camp in Dryden/Metamora and is currently the manager of that observatory. As part of his Scout duties, he is a Merit Badge Counselor for Astronomy, Cycling, and Fly Fishing.

His and his wife, Nancy, have raised 5 children. His youngest son, Brian who is a Junior at UofM, is an avid member of WAS and as a Boy Scout, completed his Eagle Scout project benefiting the WAS Star Gate observatory.



Invitation from the Southern Cross Astronomical Society

Hello, my name is Sergio Figuera and I am one of the organizers of the 2021 Winter Star Party Virtual Edition. I just wanted to take a minute to invite you and your club members to watch our virtual star party broadcast on Feb 8-11, from 7pm to 11pm EST. Below is a link to a promo video on YouTube. We invite your club member to be part of this free online event. The video includes instructions on how to register for the door prizes as well as tune-in information for the star party.

YouTube promo:
<https://www.youtube.com/watch?v=mOg0H9uXuYs>

To sign up for door prizes, please visit...
<https://www.scas.org/winter-star-party/virtualregistration.cfm>

If you have any questions, please do not hesitate to contact me. Keep looking up. Thank you.

Sergio Figuera (info@sergiofiguera.com)
SCAS/WSP

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 Dale Partin at:

firstvp@warrenastro.org.



Orion in Winter

As twilight deepens these evenings, Orion is just clearing the eastern horizon. Robert Frost wrote eloquently in his famous poem “The Star Splitter”

*“You know Orion always comes up sideways,
Throwing a leg up over our fence of moun-
tains.”*

Whenever I see Orion rising, which is almost every night from fall to midwinter, I am reminded of how poets like Robert Frost saw the mighty hunter as it entered the sky to take command of winter. Even if you have difficulty finding some constellations, the three stars in a row that form Orion’s belt are a giveaway. And if you have a telescope, as Frost did, the view is even better. Just below the belt lies a fainter set of three stars. Surrounding the middle one is a gigantic cloud of hydrogen gas which is the Great Nebula in Orion. It is one of the richest star forming regions in our whole galaxy.

During that first winter I enjoyed watching lots of the fainter stars within the nebula change their brightness over time scales of days, hours, or in one case, minutes. According to Janet Mattei, the late director of the American Association of Variable Star Observers, these variable stars can “flicker” as they go through their carefree cycles of stellar youth.

Near the top of Orion, marking his left shoulder, is a much older, grandfather star. Named Betelgeuse, this star is at the other end of the stellar life cycle. An old, very large and massive sun, Betelgeuse varies lazily from being almost as bright as Rigel, the star marking Orion’s lower right knee, to not much brighter than Bellatrix, the star marking Orion’s right shoulder.

Last winter Betelgeuse faded more than usual, and throughout 2020 it was setting off alarms that it was about to explode as a supernova. Probably not now, though it will likely happen within the next hundred thousand years or so. In the spring Betelgeuse began to brighten again, but when I saw it rising above the eastern horizon in late August, it had faded once more.

Around that same time, the Hubble Space Telescope, observing in ultraviolet light, provided data that suggested that the unusual dimming was caused by an ejection of some very high temperature gas from within the star into space.

When Betelgeuse is finally done being the star we love, its core will collapse almost instantaneously, within a few seconds. Betelgeuse will increase exponentially in brightness. It will shine as brightly as the first quarter Moon and will be easily visible in daylight for three months or more. It will be brighter than Tycho’s great exploding star of 1572, and brighter even than the brilliant supernova of 1006. As large as it is, Betelgeuse is probably not massive enough that its core will shrink to a black hole. Instead, it will probably form a new neutron star, small, dark, very dense, and cold.

Stars are people too. They age just as we do. They enjoy the carefree times of youth, go through a long middle age like our Sun, and then get strange again as they grow old. Please go out and enjoy Orion rising over the eastern horizon these evenings. It is time to settle back and enjoy this magnificent king of the winter sky. As you look, imagine how young stars like those in the nebula, and old ones like Betelgeuse, tell their beautiful story of the life cycle of distant suns.



Orion and vicinity as shown from Castor House, one of the smaller buildings at Jarnac Observatory. A bright Geminids meteor is in the picture.



“Alien Worlds” (Netflix Series)

Review of Episodes 1 - 3



Alien Worlds does an excellent job of looking at life on Earth and asking “What might life look like on some of the thousands of exoplanets we’ve discovered?” The lifeforms on these hypothetical worlds have evolved well past the microbe stage, and these planets all have rich ecosystems comparable with Earth’s.

Episode one covers life on a high-gravity world with a thick atmosphere - it was doing a *great job*, right up until the end when they talked about the planet’s higher gravity pulling in more asteroids...

At this point I said “Wait... *WHAT?! NO!*”

It’s more about how *many* asteroids there are in your system, their velocity, their trajectory, if there are any gas giants or other companions that may have messed up their orbits. A planet’s gravity certainly does play a part, but not nearly as much as the episode made it out to be.

Asteroid impacts were used to illustrate how “specialized creatures” fared worse than “generalist creatures” after an impact; the episode’s generalists reminded me (disturbingly) of Shoggoths from H.P. Lovecraft’s Cthulhu Mythos, or “The Blob.”

Episode two covered life on a tidally-locked world, with a hellish star-facing side, a frozen nighttime side, and a twilight region wrapping around the planet with running water. This episode reminded me how weird ants are...

The beginning of episode two shocked me! I thought we were seeing a CGI scene, or an alien planet set from an episode of Star Trek... until the human researcher wearing a gas mask walked into view - all I could do was say “WOW” over and over!

Episode two covered extremophiles pretty well - half-way through the episode I told Connie “*OK! You HAVE to assign this episode to your astronomy students!*” *Teachers take note!*

Episode three covered life on an oxygen-rich world orbiting a binary star; the alien ecosystem, predator-prey interactions, and life-cycles were compared and contrasted with creatures from Earth. I commented to Connie that with the exoplanet’s higher oxygen levels, forest-fires must be “exciting!”

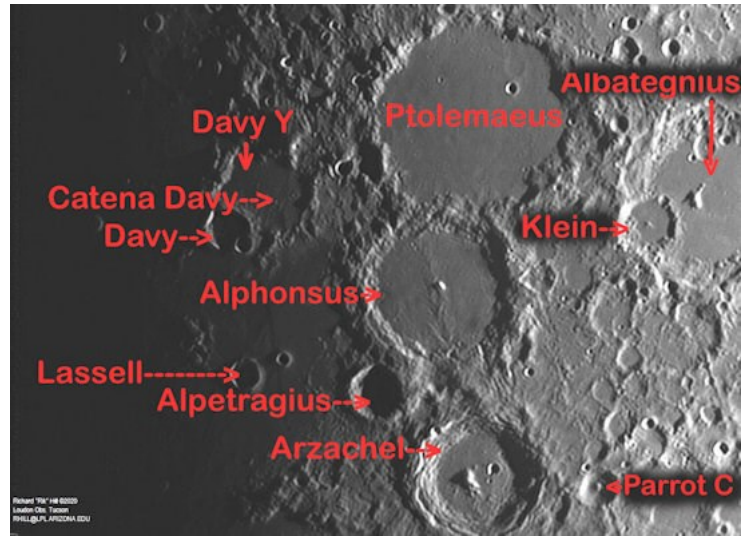
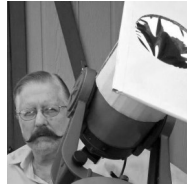
Each episode has shown me things about Earth creatures that I was unaware of, and made me think about some weird things Earth creatures do that I was aware of!

Bob Trembley



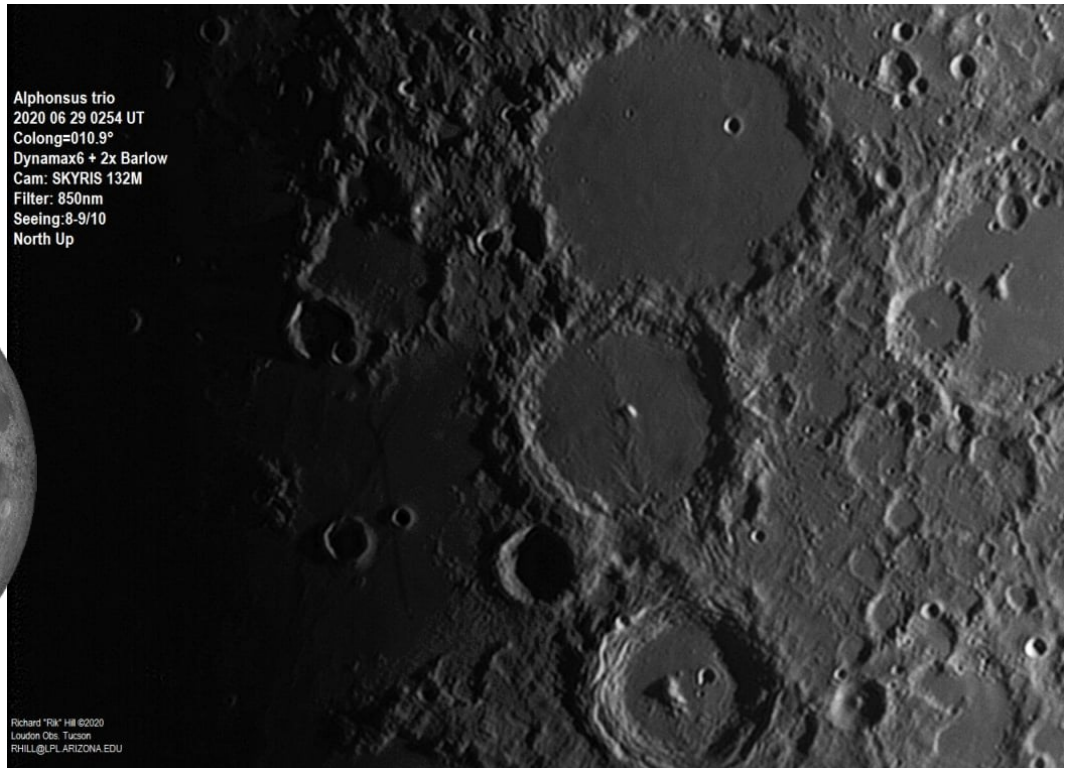
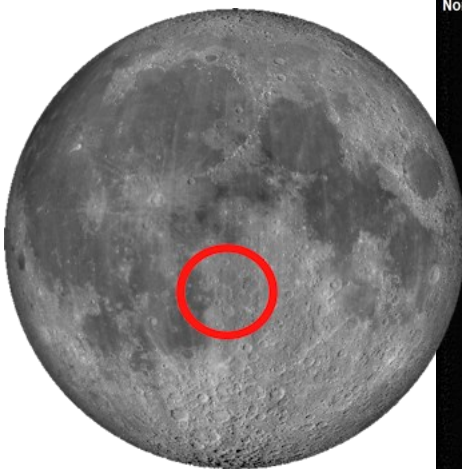
Alphonsus trio

Around first quarter the center of the terminator is dominated by the big trio of craters seen here: Ptolemaeus (158km diameter) at top, a prime example of what used to be called a "walled plain", and south of it Alphonsus (121km) with its little central peak and rima on the right side. At bottom is Arzachel (100 km) with a larger, off-center central peak. Note the rima on the east (right) side near the edge of the shadow of the eastern wall. Between Alphonsus and Arzachel is a shadow filled Alpetragius (41km) its unusual central mound hidden from view by shadow for a few more hours. West (left) of Alpetragius is the smaller crater Lassell (24km). Then moving north we see a 36km crater Davy with a 15km crater Davy A, on its wall to the southeast. Next to Davy to the east, between Davy and Ptolemaeus, is a large rectangular flat floored crater Davy Y listed as 70km diameter (if a rectangle can have a diameter). On the east floor, in shadow here, is a row of craters called Catena Davy thought to be caused by the impact of a body (a comet?) that broke up on its way to the Moon like Comet Shoemaker-Levy 9 did on its way to Jupiter, but the slower rotation rate of the Moon caused the impact to be in a much tighter line of craterlets. Over on the right side of the image is about half of the large crater Albategnius (139km) with the smaller crater Klein (46km) on it's west wall. South of Klein you will see a large scratch in the lunar surface and then another, longer more or less



parallel to it running from the east wall of Alphonsus down through a 31km crater, Parrot C, just east of Alpetragius. Then there's another much shorter parallel gouge on the south wall of Alphonsus. These are trenches dug out when skyscraper sized rocks were flung across the lunar landscape from the Imbrium impact, ripped out in seconds! What a sight that must have been!!

Location maps by Ralph DeCew



Alphonsus trio
2020 06 29 0254 UT
Colong=010.9°
Dynamax6 + 2x Barlow
Cam: SKYRIS 132M
Filter: 850nm
Seeing: 8-9/10
North Up

Richard "Rik" Hill ©2020
Loudon Obs. Tucson
RHILL@PL.ARIZONA.EDU

February 1987

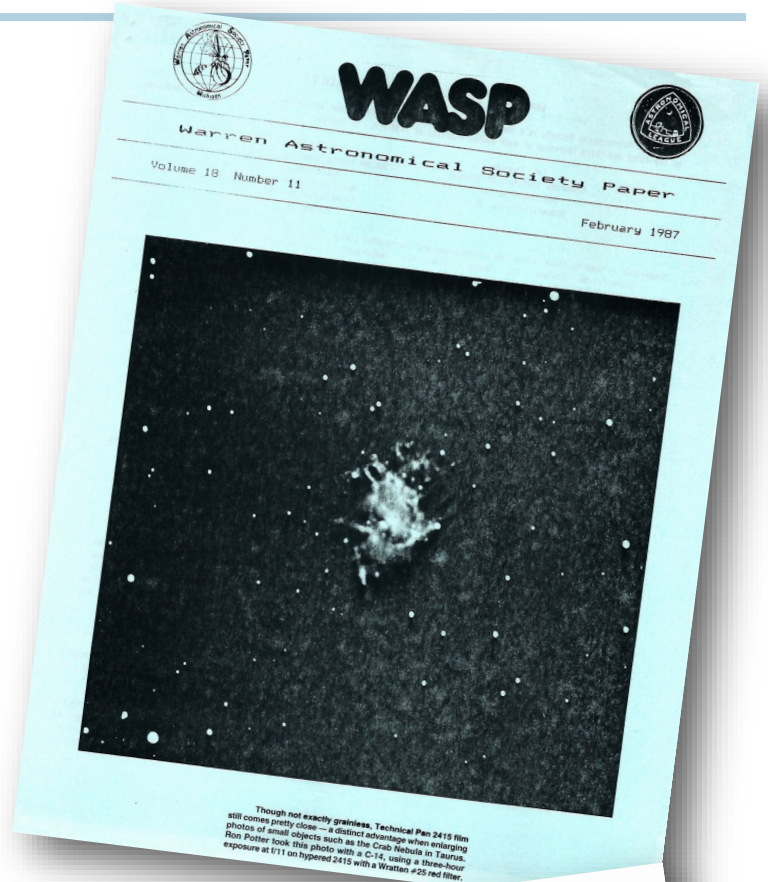
This issue featured a not-so grainy film photo of the Crab Nebula. It leads off with an Annual Banquet report by Alice Strom, who was kind enough to record the awardees from that night on December 11 (not the third Thursday??): E. John Searles, Ken Strom; Distinguished Service, Russ Pat-ten; Astronomer of the Year, Clyde Burdette; Arm-chair Astronomer, Jon Root. Clyde follows up with the article, "Eclipsing Binaries". Larry Kalinowski fills us in "Some Film Basics" as part 2 of his *Getting Started in Astrophotography* series. Later in the issue, some astronomical charts, including one submitted by the Assistant Director of Northern Cross Observatory, Robin L. Bock on Occultation Predictions for February 1987.



February 1997

Like last month's report, we have a situation here. I have printed versions (note I didn't say copies) of all the online versions except February's. A shame since the printed versions often had content that didn't make it to the online form. So, here's what the online one has to offer: A sketchy report on the Awards Banquet ("Many deserving members received awards" doesn't quite cut it for the History SIG guy). Even Larry Kalinowski, who I relied on for many award reports failed to mention any while commenting on the proceedings and menu in "Computer Chatter". Jeff Bondono covers NGC 2261 in "Masterpieces Messier Missed". My last chance at retrieving award names died in the meeting minutes with "Remaining Appreciation certificates were presented." Perhaps my luck will change if the printed version ever surfaces.

Dale Thieme,
Chief scanner



The Warren Astronomical Society Paper Volume 29, Number 2, February, 1997

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Annual Awards Banquet

by Brian Benning
Well, I finally made it to the annual awards banquet and am glad I did. I didn't go my first year in the club because I was a new member and I didn't know very many people in the club. The next year I just couldn't make it. In December of '96 I made it a point to attend. I found it to be as fun as everyone said it would be.
There were about 60 people in attendance. I knew most of the ones there. There was plenty of time for socialization before the meal. After a toast by our president we ate. I must say that the food was very tasty. The dessert was very good too.
After dinner John Herrgott handed out the awards. Many deserving members received awards. Some received multiple awards.
Next on the agenda was the slide show. The presentation was excellent and it was put together quite well. It was a good representation as to what went on with the club in '96.
Finally it was time for the raffle. The raffle was very enjoyable but would have been more fun if I would have won something. I spent \$10 on tickets but lost. I'm glad the money went towards the club. John Herrgott explained that there was quite a nice assortment of prizes offered this year. There were a lot of lucky winners.
After the raffle there was more time for socialization and then the evening winded down. Everyone said their good-byes and I'm sure they look forward to next year's banquet. I know that I do.

Computer Chatter

by Larry Kalinowski
According to the latest photos of Hale-Bopp, there seems to be five or more jets spouting gas from the core. The jets are almost evenly spaced, giving the head-on comet the look of a wagonwheel without the wooden and steel band that form the outer rim. CCD photography brings out the spoke-like effect. The spokes may not be recognizable with the naked eye. Nevertheless, the tail should be quite wide when viewed from the side, as it will be when it finally makes its rush across the sky during the late winter and spring.
Four new programs have been added to the WAS shareware library. VGASTARS is a simplified planetarium program, limited to sixth magnitude. Your youngsters might find it easier to operate. Features include panning left, right, up, down, zooming in and out. Run it from the A. drive. LUMIDEMO is a Lumicon created program to help telescope users pick a range of eyepieces based on magnification, field of view or exit pupil. Filters are discussed. ORBITSID graphically shows the tracks of four prominent comets in 3-D (stereo) mode. You'll need a pair of red and blue eyeglasses to view this program. You can change the depth of field and orbit tilt if you want a better view. GALAXY COLLISIONS simulates the effect of one galaxy passing near or through another galaxy. You can change the number of stars and the mass of the first galaxy. The second galaxy is represented by one star which also has a variable mass. Store your galaxy designs and play each scenario over and over again. OUR COSMOHOOD has been upgraded and is shown as a new version.
I counted 55 people at the WAS's 1996 awards banquet. If you were there, I'm sure you're still carrying a smile on your face from the fine cuisine and festivities. I did miss one thing though... those wonderful

This chart shows the sky as it appears at approximately 8pm EST near mid-month at northern mid-latitudes.

FEBRUARY 2021

Notable Sky Happenings

Feb. 1 - 7

The Moon is at the upper left of Antares, the "heart" of Scorpius the scorpion, in the south-southeast predawn sky on the 6th.

Feb. 8 - 14

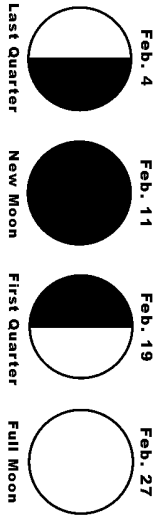
The bright star rising in the east after sunset this month is Regulus, the "heart of Leo the lion. This springtime constellation is a welcome sight!

Feb. 15 - 21

The bright orange star above the Moon in the south-west the evening of the 18th is Mars. The Moon is at the upper right of Aldebaran in the south on the 19th and at the upper left on the 20th.

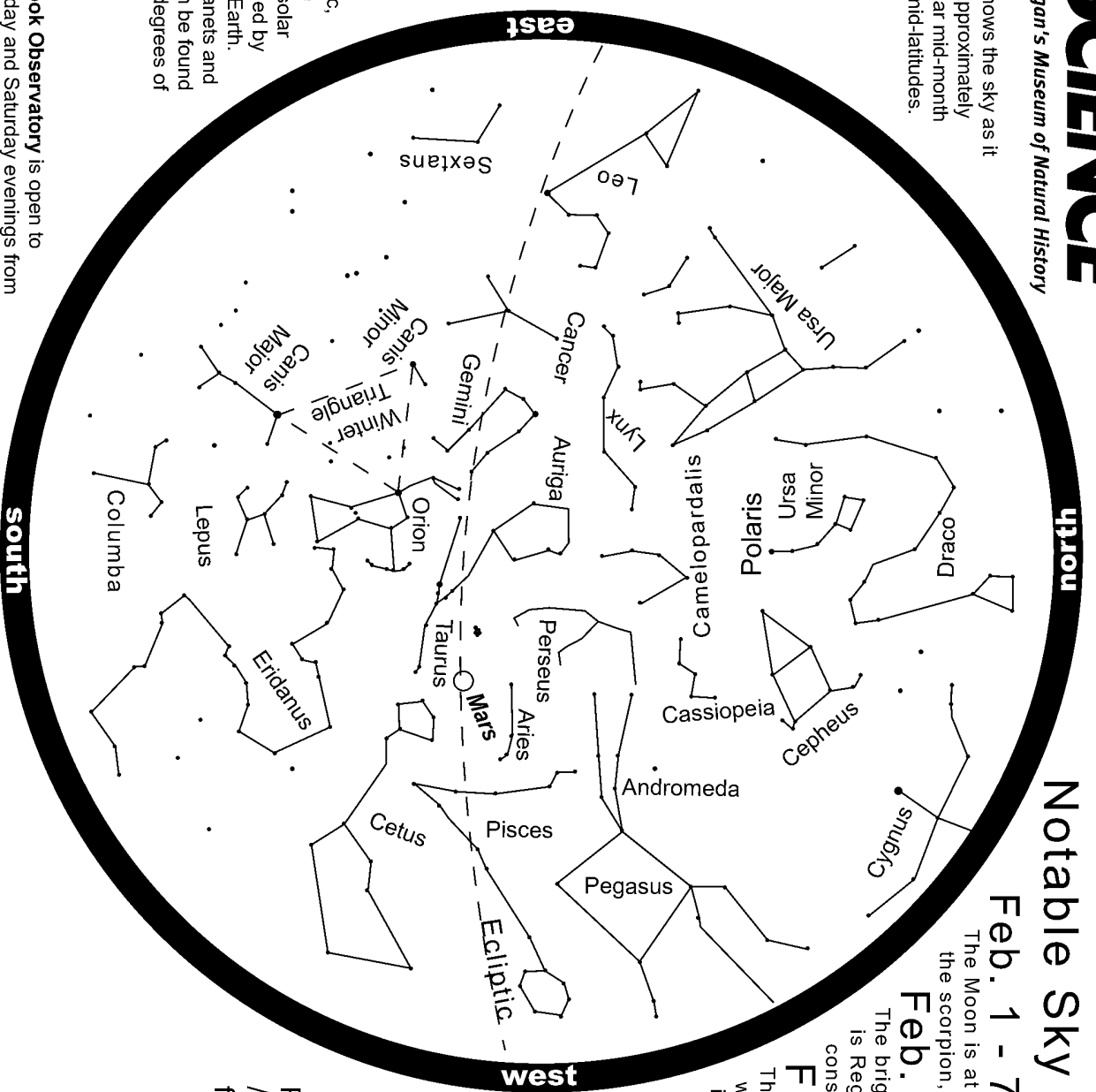
Feb. 22 - 29

The Moon is at the lower right of Pollux in the SE the evening of the 23rd. The "twin" star Castor is above. The Moon is at the lower left of Regulus in the east the evening of the 26th.



Now Showing

Please visit science.cranbrook.edu/explorer/acheson-planetarium for program updates.



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 be found within a few degrees of this plane.

The Cranbrook Observatory is open to the public Friday and Saturday 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 6" telescope! For observatory information visit <http://science.cranbrook.edu/explorer/observatory>

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





Bill Beers - NGC7023 Iris Nebula

February 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Cranbrook Virtual Meeting	2 Groundhog Day	3	4	5	6
7	8	9	10	11 Maha Shivaratri New Moon	12 Lincoln's Birthday (USA)	13
14 Valentines Day	15 Presidents Day	16	17 Ash Wednesday	18 Perseverance Mars landing Macomb Virtual Meeting	19	20
21	22	23	24	25	26	27 Full Moon Virtual Stargate
28						



Stargate Observatory

Special Notice

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

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

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

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

Observatory Rules:

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

Advisory: Concerns are circulating in the amateur astronomy community about COVID-19 being passed from one person to another via contact of different persons' eyes with a telescope eyepiece. While we are not medical experts, we thought we should pass on this concern. Sharing telescopes may be considered by some to be high-risk due to the possibility of eyes touching eyepieces.

Stargate Report

Stargate observatory and the Dob shed along with all equipment are in good condition as of January 4, 2020.

The observatory will remain closed until further notice due to the COVID-19 pandemic.

Virtual observing report from Northern Cross Observatory (NCO) on January 23, 2021;

Doug Bock started the WebEx virtual observing session at about 6:30 pm, roughly 11 people attended.

First Doug demonstrated how the automation software works then we observed the Moon, M42, the horsehead nebula IC 434, the Rosette Nebula, M41, comet Atlas, Galaxy cluster HCG44,

Further virtual observing may be continued based on clear sky and availability of the NCO during a scheduled but closed open house until the Stargate observatory is opened after COVID-19.

Riyad I. Matti
2021 WAS 2nd VP
Observatory Chairperson

Treasurer's Report

Treasurer's Report for 2/1/2021 Bank Account

Balances as of 1/27/2021:

- W.A.S. : \$21338.56
- G.L.A.A.C. : \$3075.18

PayPal

- Total : \$840.21
- \$428.20 Income (Memberships, Calendars)
- \$374.78 Expenses

Memberships

- 3 Membership Renewals via PayPal, and a couple of others via check sent to P.O. Box.
- 152 Total Memberships, Will work on updating to find out how many are current.

Noteworthy

Dr. Brian Ottum sent a \$300 donation to W.A.S. On behalf of G.L.A.A.C. The GLAAC account will eventually be transferred to GLAAC's own bank account as they are currently in process of applying for their own 501c3 status. The donation should be reflected as part of GLAAC's current bank account balance, and is intended to be used to pay for the filing/application fee.

Adrian Bradley,
Treasurer

Astronomical Events for February 2021

Add one hour for Daylight Savings Time

Source:

<http://www.astropixels.com/ephemeris/astrocal/astrocal2021est.html>

Day	EST (h:m)	Event
03	14:33	Moon at Perigee: 370127 km
04	12:37	LAST QUARTER MOON
06	03:33	Antares 5.5°S of Moon
06	19:29	Moon at Descending Node
08	09:00	Mercury at Inferior Conjunction
11	14:06	NEW MOON
15	09:00	Mercury 3.8° of Jupiter
18	05:22	Moon at Apogee: 404467 km
18	17:47	Mars 3.7°N of Moon
19	13:47	FIRST QUARTER MOON
20	00:00	Venus at Aphelion
20	08:15	Aldebaran 5.0°S of Moon
20	20:44	Moon at Ascending Node
23	03:00	Mercury 4.0° of Saturn
23	20:10	Pollux 3.7°N of Moon
24	19:16	Beehive 2.4°S of Moon
26	09:04	Regulus 4.6°S of Moon
27	03:17	FULL MOON

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.

smile.amazon.com

Outreach Report

Member Spotlight

Bob Trembley gave a presentation to **Connie Trembley's** online astronomy class about NASA's Mars Perseverance Rover on Jan. 20th. Bob will be giving the same presentation for the Detroit Public Library on Feb. 16th at 6:00 PM.

Ken Bertin will be giving his "Size and Distance" talk to students at Toronto Centennial College on Monday and Tuesday Feb 1 & 2.

If you are giving presentations or doing other astronomy outreach, *please let me know!* [Use this link to send me a quick email report.](#)

Great Lakes Association of Astronomy Clubs Board Meeting Jan. 14, 2021 - ONLINE, 7pm - <https://umich.zoom.us/j/584733345>

Call to order: 7:08 pm

Online:

- Adrian Bradley - GLAAC President, Lowbrows
- John Wallbank - GLAAC Vice President, Lowbrows
- Jeff Kopmanis - GLAAC Secretary, Lowbrows
- Brian Ottum - GLAAC Communications, Lowbrows
- Mike Ryan - GLAAC AATB Large Telescope Manager, Ford
- Bob Trembley - GLAAC Webmeister, Vatican Observatory Foundation

Discussion:

Elections for 2021 officers.

Existing officers are OK with staying on, Shared Treasurer between P and VP

President: Adrian Bradley

VP and Treasurer: John Wallbank

Secretary: Jeff Kopmanis

Webmeister: Bob Trembley

Communications: Brian Ottum

AATB Large Telescope Manager: Mike Ryan

JW makes motion to accept candidates on basis of affirmation, 2nd time

Communications and Webmaster need more assistance - recruit from 9 clubs

ACTION: bring another person to the Board to help with Comm/Web

Contact people who stepped forward to help with AATB (eg: Tim Campbell)

Planning Committee: Tim Campbell, Liam, Doug Bock, MiSci Center, Diane Hall

Bank Account Status

AB busy, wait for Feb creation

~\$2000 will be transferred

AB as WAS Treasurer, will get reimbursements from WAS in the interim

501c3 Status

Any org with < \$5000 annual income is automatically a 501c3

JW will file the IRS form 990-EZ

AATB 2021 - Sept 24/25

Covid-19 vaccination status in June will dictate live event

10M people in Michigan

JW: Right now, "We don't know nuthin'!"

JK: primary event might be online, but with special on-site viewing for pre-registrants

Brian will contact Bridget Hayward regarding Island Lake State Park arrangements.

No fewer than 30 minutes between events on a license

Speakers can present remotely, even in an in-person event in a tent

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Eclipse in 2024 - GLAAC should be central in advertising this event
NightSkyNetwork pins have to be ordered before March
Jan 31 - Brian Ottum Orion Tour online -- if scope works!

Adjourn:

Motion to adjourn by **BO**, seconded by **AB**. Approved by unanimous vote.
Meeting Adjourned at 8:12 pm.

Action Items:

Bring a person to the Board meeting in Feb to help with Comm/Web recruitment/assistance.

Clubs: be thinking about AATB online and in-person events

JK: send Planning Committee email

Next GLAAC Meeting: February 11, 2021 7:00 PM

-Bob Trembley



Action photo from the Pete Kwentus collection. If you recognize anyone, please let us know at publications@warrenastro.org

Join the Astronomical League!



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

Also:

- Participate in the Observing Program
- Avail yourself of the League Store
- Astronomy Books at a discount
- Attend Astronomical League Conventions

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

alcor@warrenastro.org

3-D Thursdays!

"Three-Dimensional" Series for Rural K-12 Educators

- Professional Development
- Networking
- NGSS Connections

First Thursday of Each Month Upcoming: Feb. 4th at 7:00 pm Central Time

With hosts Rachael Arens and Michael Guarraia, Albert Einstein Distinguished Educator Fellows at NASA

Join us for a freestyle conversation and workshop with the NASA AEROKATS and ROVER Education Network (ARENJ to learn how to use NASA technologies and practices in authentic, experiential learning environments. Members can partner with the NASA AREN Project to access kite-based "AERO KATS" and remote-controlled aquatic and land-based "ROVERS" that collect remotely sensed Earth observations! Through this program, educators gain the opportunity to work with NASA scientists and learn real-life protocols and field operations conducted by NASA! This webinar is suitable for all grades K-12.

Special Guests



Andy Henry

AEROKATS and ROVER Education Network (AREN)

Andy Henry is a consultant for the Wayne Regional Educational Service Agency (Wayne RESA), in Wayne County, MI. Since 1998 he has been developing multimedia, GIS and remote sensing tools, and providing professional development and training for teachers, students, and administrators locally and nationally. He has served as an adjunct lecturer at Eastern Michigan University on the instructional use of GIS. Andy currently serves as Principal Investigator for the NASA AEROKATS and ROVER Education Network (AREN) project, which engages audiences in experiential learning using novel NASA remote sensing technologies, science and field operations concepts.



Geoff Bland

AEROKATS and ROVER Education Network (AREN)

Geoff Bland is an aerospace engineer working in the Earth Science Division of NASA's Goddard Space Flight Center. Located at the Wallops Flight Facility in Virginia, Geoff has been focused on development and deployment of novel observation tools such as unmanned aircraft systems (UAS), aquatic measurement systems, and tethered aerosystems such as kites and balloons. Engaging the community in NASA's work is a key focus, including participation in education outreach activities such as the AEROKATS and ROVER Education Network (AREN).



Partner



Register at: <https://forms.gle/1p7DE5Vohfnb9yr57>

Meeting Minutes

MINUTES OF BOARD MEETING JANUARY 4, 2021 6:30PM

Meeting called to order at 6:30PM by President Diane Hall via WebEx.

Officers in attendance: Diane Hall, Dale Partin, Riyad Matti, Mark Kedzior, Adrian Bradley, Bob Trembley, Dale Thieme - quorum present - (WAS members Jonathan Kade, Ken Bertin, Mark Jakubisin also in attendance).

Officer Reports:

1st VP - Dale Partin reported that he has been able to schedule "high quality" speakers. Virtual presentations via WebEx makes it possible to schedule regardless of where presenters live. He is in need of short presentations for our 1st Monday virtual "Cranbrook" meetings.

2nd VP - Riyad Matti reported that he visited Stargate Observatory - he did an inspection of the observatory and the Dob Shed - did not see any issues that need immediate attention - will finish caulking repairs in spring to discourage wasps from entering and establishing a presence in the observatory. Due to COVID 19 restrictions the observatory remains closed to the public and outreach events until further notice.

Secretary - Mark Kedzior reported that he picked up mail at the Warren PO Box - received membership/check in mail and will arrange getting this to Adrian Bradley. He is still in possession of "Mystery Prize" University Optics 1.25" 25MM eyepiece and is awaiting further instructions on delivering this to raffle winner.

Treasurer - Adrian Bradley reviewed the income/expenditures in treasury. He also will be meeting with outgoing 2020 WAS Treasurer Mark Jakubisin for an orderly transfer of treasury forms/documents/signatures, etc.

Outreach - Bob Trembley reported he did virtual presentation on the Sun to Connie Trembley's class in New Haven Schools on 1/4/2021. Bob is also looking for individuals who have presentations that can be presented to schools and other venues -he has a contact at the Macomb Intermediate School District (Mark Muzzin) who has a list of all science educators in Macomb County. Bob asks that you email him if you have an online presentation that can be provided for the list he is compiling.

Publications - Dale Thieme (via Florida) reports the January WASP was up on January 1st.

OLD BUSINESS -

2021 Mailer - Diane asked the board for their final input for the 2021 mailer (2020 Year in Review items) and provide items to Dale Thieme NLT than the Macomb meeting on 1/21/2021. Once final input is compiled, mailer should be ready to be distributed at end of month/beginning of February.

WAS Website Overhaul - Diane reported that in the 60th anniversary year of the WAS this would be a great time to overhaul our website (last done in 2007 by Jonathan Kade). Bob Trembley has volunteered to work on this along with Jonathan Kade - he will start from the ground up and provide mock ups of newly designed website to share with the board until final approval before rolling out.

Calendar Orders and Distribution - Diane reported that the first order of 2021 calendars were shipped - awaiting another shipment of calendars from printer in Canada for second shipment for late orders.

Banquet Door Prize Distribution - Discussed status of door prize delivery:

Dale Hollenbaugh received his Wall Art of the Sun & Solar System

Ken Bertin received his Caldwell Objects Poster
RASC 2021 Handbook is being shipped to Victor Manske

Pocket Sky Atlas is being shipped to Tab Ahmed
Sue Ciaravino opted for the "Mystery Prize" of wine instead of University Optics 1.25" 25MM Orthoscopic eyepiece, which will now go to Mike Young.

NEW BUSINESS -

Officer Transitions - auditing and verifying emails so officers and board receive communications.

Form 990 - Outgoing 2020 WAS Treasurer Mark Jakubisin will be meeting with incoming Treasurer Adrian Bradley to file Form 990 with IRS and to do a ledger review before treasury and treasury related items are turned over to Adrian for the 2021 year.

Discussion of Membership Dues - In June 2020 a decision was made for members who paid dues in 2020 will be carried through the 2021 membership year due to the pandemic issue. After dis-

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cussion, it was agreed to make a final decision on collection of membership dues for 2021 at the February Board meeting.

Meeting was adjourned at 7:20PM by President Diane Hall.

Respectfully submitted,
Mark Kedzior
Secretary

CRANBROOK (VIRTUAL) MEETING JANUARY 4, 2021 7:30PM

Meeting was called to order and a welcome to all to the first meeting of 2021 by President Diane Hall. Diane reviewed the rules and etiquette of this virtual meeting and presentation so as to be enjoyed by all in attendance. Diane reported that this is the 60th anniversary year of the WAS. She also reported that the WAS mailer for the 2021 year will be sent out by the end of January/beginning of February after final editing. The WAS 2021 calendars (1st shipment) were sent out, and we are awaiting the 2nd batch from the printer in Canada for the second mailing to follow upon receipt. (Attendance count via WebEx was 21 - on YouTube was [16](#)).

OFFICER REPORTS -

1st VP - Dale Partin reports that presenting for the Macomb meeting on January 21, 2021 will be Dr. Roger Wiens, Lead Scientist of Instrumentation for both the Mars Rovers Curiosity and Perseverance, with "Exploring Mars with the Curiosity and Perseverance Rovers". On Monday, February 1, 2021 at the Cranbrook meeting, Dr. Castoldi, Oakland University, will be presenting on the "Kuiper Belt Objects". Finally, he also mentioned that there is a need for short presentations for our 1st Monday Cranbrook meetings - if you are able to present a short presentation, please contact him to schedule.

2nd VP - Riyadh Matti reported that he visited Stargate Observatory - he did an inspection of the observatory and the Dob Shed - did not see any issues that need immediate attention - will finish caulking repairs in spring to discourage wasps from entering and establishing a presence in the observatory. Due to COVID 19 restrictions the observatory remains closed to the public and outreach events until further notice.

Secretary - Mark Kedzior reported that the minutes of the December meetings recorded by outgoing 2020 WAS Secretary Glenn Wilkens are duly recorded in the January 2021 edition of the WASP.

Treasurer - Adrian Bradley reported that the Treasury Report by outgoing 2020 WAS Treasurer Mark Jakubisin is in the January 2021 edition of the WASP. He also reported that we have received payments via PayPal for memberships and calen-

dar purchases. Adrian and Mark will be reviewing the treasury ledger and related items before being transferred over to Adrian for the 2021 year.

Outreach - Bob Trembley reported he did virtual presentation on the Sun to Connie Trembley's class in New Haven Schools on 1/4/2021. Bob is also looking for individuals who have presentations that can be presented to schools and other venues -he has a contact at the Macomb Intermediate School District (Mark Muzzin) who has a list of all science educators in Macomb County. Bob asks that you email him if you have an online presentation that can be provided for the list he is compiling. He would like to post your Outreach events in our Google Docs. Finally, he feels that with the pandemic we will probably be in virtual/online mode for Outreach at least to/through summer of this year.

Publications - Dale Thieme (via Florida) reported that the January 2021 edition of the WASP is up. He reported on the status of the 2021 WAS Mailer, which is scheduled to go out at the end of January/beginning of February pending final inputs and review from the board.

SPECIAL INTEREST GROUPS -

Solar - Nothing remarkable to report - A few individuals have been monitoring solar websites for the latest activity on the Sun and reported what is currently taking place to the membership.

History - Dale Thieme had nothing to report as of this meeting.

Astrophotography - No report - Diane mentioned to interested individuals of learning astrophotography to contact Bill Beers, whose email address is in his monthly WASP column "The View from C.W. Sirius Observatory".

GLAAC - Adrian Bradley reports that the GLAAC still meets virtually. Elections for the 2021 year will be taking place with many of the same officers running to return to their respective offices. Discussions currently taking place regarding AATB 2021 and the format in which it will be presented (virtual/hybrid) - decision will be based on the current state guidelines of the ongoing pandemic.

Astronomical League - Jonathan Kade reported to see him if interested in Astronomical League memberships and available WAS merchandise. He also took time to explain the WebEx logins and link to meeting invitation.

IN THE NEWS - January 4,2021

- presented by Diane Hall:

Hayabusa II - Satellite sent to Asteroid 162173 Ryugu - retrieved material from the surface and returned to Earth.

Sumitomo University Forestry (Japan) is developing wooden satellites that will burn up upon reentry into Earth's atmosphere to reduce amount of

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space junk that does not disintegrate upon reentry.

SpaceX – Designing technology to catch falling rocket upon final stages of landing.

Cosmology – Recent study finding universe is hundreds of millions of years younger than first thought.

Oumuamua – Recent findings on the visitor to our solar system.

IN THE SKY – January 4, 2021

Quadrantid meteor shower – Peak on January 3rd – located in area in sky where constellation doesn't exist unlike other meteor showers.

January 9th – In morning skies Venus is located between Messier objects M8 and M20.

January 13th – Triple planetary conjunction of Jupiter, Saturn and Mercury 30 minutes after sunset – need clear, unobstructed view to southwest horizon to see.

OBSERVING REPORTS –

Adrian Bradley shared his visit to the Upper Peninsula of Michigan with his photography efforts of stars over the Mackinac Bridge and Tahquamenon Falls, and shared info with the camera settings and exposure times to achieve his desired results.

Ken Bertin shared his thoughts and iPhone photos of the recent Jupiter-Saturn conjunction.

David Levy (via Arizona) gave his New Years' wishes to all. He witnesses major fireballs from the Quadrantid meteor shower from his observing site in Arizona. He shared a couple of poems - one in particular by Walt Whitman – “Look Down Fair Moon”. He gave kudos to Adrian Bradley for sharing his astrophotography with those in attendance.

SHORT PRESENTATION –

1st VP Dale Partin introduced tonight's presenter, Ken Bertin, with a brief bio and titles of his two presentations: “2020 Astro-News in Review” and the main presentation “Giovanni Cassini: His Life and Times”.

REVIEW OF ASTRONOMY NEWS 2020

Ken reported on these top astronomy events of 2020:

Comet Neowise

Mars Close Approach 2020

Is Betelgeuse Going Supernova?

Lunar and Solar Eclipses of 2020

SpaceX First Astronaut Launch to ISS & Return on August 2nd

OSIRIS Rex Satellite to Asteroid Bennu -Returned with 2oz. of samples

China Lunar Probe – Landed & Returned with 4 lbs. of Moon samples

Collapse & Destruction of Arecibo Radio Telescope

on December 1st

Jupiter – Saturn Conjunction on 12/21/2020 – closest in 800 years

Perseverance Mars Rover – expected to land 18 February 2021

Two Merging Spiral Galaxies Detected
Supernova Detected

Questions/discussion on what was/were the best stories of 2020? The top three seemed to be with the Arecibo collapse, the Jupiter-Saturn Conjunction, and Comet Neowise, with the latter two adversely affecting opportunities to showcase these events in our Outreach efforts.

Short presentation concluded at 8:40PM – main presentation to begin at 8:50PM

MAIN PRESENTATION –

The Life of Giovanni Domenico Cassini”

– Ken Bertin

Once again, 1st VP Dale Partin introduced Ken Bertin and another of his special presentations on astronomers of historical significance.

Ken's presentation covered:

Born June 8, 1625

Family History/Parents/Children

Education

Beginnings at Pazano Observatory in 1644

Meridian Scope at Church of San Petronio in 1669

Telescope observations with optics by Campani to observe bands of Jupiter and moons, the rings of Saturn & Cassini Division

Worked at Paris Observatory beginning in 1668, then directed the Academy of Science in France – became French citizen in 1678

Cassini went completely blind in 1711

Died September 14, 1712 at the Paris Observatory

Discussions and questions followed with members of audience on presentation

Meeting ended at 9:36PM

MACOMB (VIRTUAL) MEETING

Thursday, January 21, 2021

(WebEx & YouTube Attendance – 49)

The regular Thursday Macomb meeting was called to order at 7:30PM by President Diane Hall. Diane announced that there was a production error in our 2021 WAS Calendars (US & Canadian holidays were omitted by default) and apologized for the inconvenience to those who purchased a calendar. She also announced that our annual WAS mailer with membership applications will be going out at the end of the month.

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OFFICER REPORTS (of note):

1st VP – Dale Partin announced our Monday, February 1st Cranbrook meeting presenters will be:

Short Presentation - Bob Berta, presenting “The World’s Largest Refractor”

Main Presentation – Dr. Kapila Clara Castoldi, Adjunct Associate Professor of Astronomy/Physics, Oakland University, presenting “Kuiper Belt Objects”

At the Macomb meeting on Thursday, February 18th, Dr. Ilias Cholis, Assistant Professor, Department of Physics, Oakland University, will be presenting “Anti-Matter: Cosmic Ray Physics”.

2nd VP – Riyadh Matti reported on Stargate Observatory check – everything is satisfactory, but observatory is still closed due to COVID restrictions.

Outreach – Bob Trembley reported on online outreach activities. Ken Bertin has been doing Facebook Astronomy with interested individuals.

SPECIAL INTEREST SUB GROUP REPORTS (of note):

Solar - Some spots on the Sun were observed.

Double Stars – Riyadh Matti reported on heightened interest of the dimming of Betelgeuse.

David Levy (from Arizona) – Quote of the Week – a poem by Thomas Hardy regarding lunar eclipses (this year, a total lunar eclipse on May 26, 2021 and a partial lunar eclipse on November 19, 2021).

OBSERVING REPORTS:

Gary M. Ross - reporting from the Veen Observatory in Grand Rapids - observed four sunspots with 57mm refractor with sub diameter solar filter.

Jonathan Kade/Diane Hall – observed Mars and Uranus on 1/20 – they were in close proximity to each other in sky.

Riyadh Matti – Virtual Observing with Doug Bock on Saturday, 1/23 at Northern Cross Observatory.

Paul _____(?) – Shared image of Flaming Star Nebula and Horsehead Nebula.

Doug Bock – Shared a three-hour exposure of IC 3184 – Spiral Galaxy in Cepheus on December 31, 2020.

Adrian Bradley – Shared image of Orion Belt/Sword taken from his backyard.

IN THE NEWS/IN THE SKY

presented by Jeff MacLeod:

Jeff presented a numerous assortment of average facts/happenings by the numbers that took place in the past seventeen days in the solar system/universe.

On 1/20, SpaceX performed the 8th reuse of its booster for another space launch, and noted that the space shuttle Discovery was reused 39 times. He also shared a website – arXiv.org (Cornell Uni-

versity) – and briefly described three articles found on this site:

Planetary – “Future Large Obliquity of Jupiter”

Stellar – “3D Simulations of Oxygen Shell Burning With/Without Magnetic Fields”

Galactic – “Observed Rate of Binary Black Hole Mergers That Can Be Entirely Explained by Globular Clusters”

IN THE SKY – Jeff suggested three items of interest for beginner, intermediate and advanced astronomers to observe at this time:

Beginner – one night only (1/21) – observe lunar feature Straight Wall (Scarp of Rupes Recta) – 40 miles long

Intermediate – Observe Uranus – in close proximity to Mars in sky

Advanced – Observe Psyche – most metallic asteroid known – in constellation of Taurus

INTERMISSION

Main Presentation

1st VP Dale Partin introduced tonight’s presenter, Dr. Roger Wiens, with his talk on “Exploring Mars with the Curiosity and Perseverance Rovers”.

Dr. Wiens gave a brief review of previous landings on Mars, then went into detail on explaining the instrument payloads on both the Curiosity and Perseverance rovers. The Curiosity rover, which landed in 2012, is still exploring Gale Crater (90 miles wide) and through its exploring and analyzing of the data it has collected, found that 3.5 billion years ago: 1) a lake filled Gale Crater in the past with a neutral pH; 2) conditions were habitable for life; and 3) building blocks of life were present on Mars.

Microbial biosignatures, 1 billion to 3.7 billion years old, were found, similar to stromatolites, earth’s oldest fossil, found in the Strelley Pool Formation in Australia. He explained what each scientific instrument collected/analyzed on the Curiosity mission and what the instrumentation on the Perseverance mission would be tasked to do. The Perseverance launched from Earth on July 30, 2020, and is scheduled to land on Mars on **February 18, 2021**.

The next future mission to Mars would entail collecting samples and returning them to Earth for further study.

At the end of the presentation, Dr. Wiens fielded questions from our participants regarding the rover missions.

Meeting was adjourned at 9:40PM.

Respectfully submitted,
Mark Kedzior
Secretary
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
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
Sunset Astronomical Society:	http://www.sunsetastronomicalsociety.com/
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!

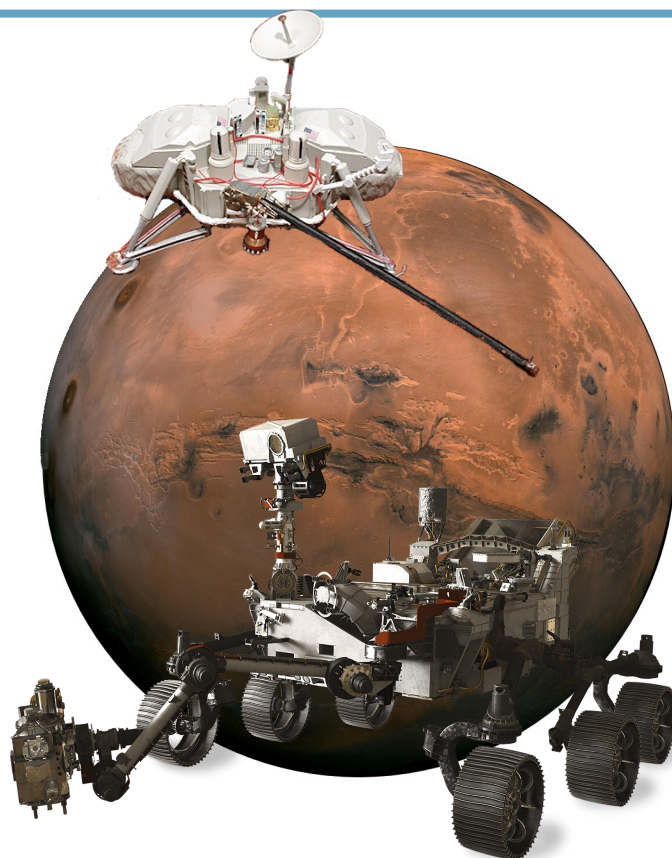
Landing On Mars: A Tricky Feat!

David Prosper

The Perseverance rover and Ingenuity helicopter will land in Mars's Jezero crater on February 18, 2021, NASA's latest mission to explore the red planet. Landing on Mars is an incredibly difficult feat that has challenged engineers for decades: while missions like Curiosity have succeeded, its surface is littered with the wreckage of many failures as well. Why is landing on Mars so difficult?

Mars presents a unique problem to potential landers as it possesses a relatively large mass and a thin, but not insubstantial, atmosphere. The atmosphere is thick enough that spacecraft are stuffed inside a streamlined aeroshell sporting a protective heat shield to prevent burning up upon entry - but that same atmosphere is not thick enough to rely on parachutes alone for a safe landing, since they can't catch sufficient air to slow down quickly enough. This is even worse for larger explorers like Perseverance, weighing in at 2,260 lbs (1,025 kg). Fortunately, engineers have crafted some ingenious landing methods over the decades to allow their spacecraft to survive what is called *Entry, Descent, and Landing (EDL)*.

The Viking landers touched down on Mars in 1976 using heat shields, parachutes, and retrorockets. Despite using large parachutes, the large Viking landers fired retrorockets at the end to land at a safe speed. This complex combination has been followed by almost every mission since, but subsequent missions have innovated in the landing segment. The 1997 Mars Pathfinder mission added airbags in conjunction with parachutes and retrorockets to safely bounce its way to a landing on the Martian surface. Then three sturdy "petals" ensured the lander was pushed into an upright position after landing on an ancient floodplain. The Opportunity and Spirit missions used a very similar method to place their rovers on the Martian surface in 2004. Phoenix (2008) and Insight (2018) actually utilized Viking-style landings. The large and heavy Curiosity rover required extra power at the end to safely land the car-sized rover, and so the daring "Sky Crane" deployment system was successfully used in 2012. After an initial descent using a mas-



sive heat shield and parachute, powerful retrorockets finished slowing down the spacecraft to about 2 miles per hour. The Sky Crane then safely lowered the rover down to the Martian surface using a strong cable. Its job done, the Sky Crane then flew off and crash-landed a safe distance away. Having proved the efficacy of the Sky Crane system, NASA will use this same method to attempt a safe landing for Perseverance this month!

You can watch coverage of the Mars Perseverance landing starting at 11:00 AM PST (2:00 PM EST) on February 18 at nasa.gov/nasalive. Touchdown is expected around 12:55 PM PST (3:55 PM EST). NASA has great resources about the Perseverance Rover and accompanying Ingenuity helicopter on mars.nasa.gov/mars2020. And of course, find out how we plan to land on many different worlds at nasa.gov.

Next Page:

Illustrations of the Entry, Descent, and Landing (EDL) sequences for Viking in 1976, and Perseverance in 2021. Despite the wide gap between these missions in terms of technology, they both performed their landing maneuvers automatically, since our planets are too far apart to allow Earth-based engineers to control them in real time! (NASA/JPL/Caltech)

