The W.A.S.P.

Vol. 52, no. 11

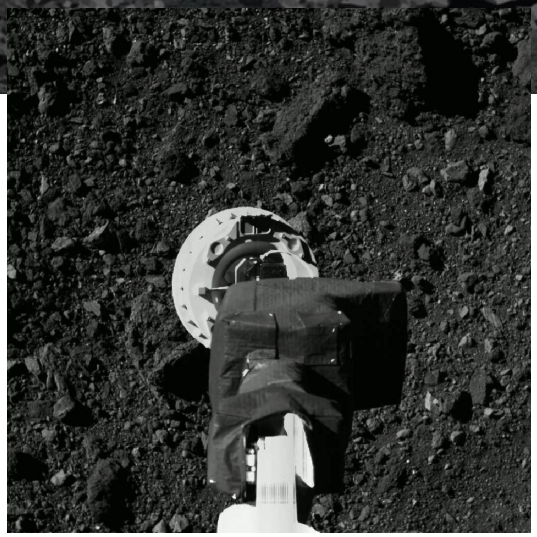
November 2020

The Warren Astronomical Society Paper

OSIRIS-REx

Successful TAG maneuver on Bennu

Artistic rendition



October 20, 2020

The OSIRIS-REx mission performed a TAG (Touch and Go) maneuver to capture regolith samples to bring back to Earth for study. The success of the first attempt (of three possible) ensured that the probe could now return to Earth with the samples. Congratulations to the OSIRIS-REx team.

For the video of the TAG, see NASA's recording of it:

https://www.youtube.com/watch?v=xj0O-fLSV7c&feature=emb_logo

Images courtesy of NASA

The WASP

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

Dale Thieme, Editor

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

First Monday meeting:
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.

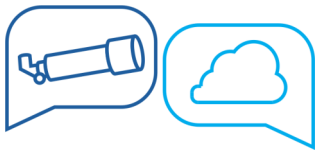
The Warren Astronomical Society Paper (WASP) is the official monthly publication of the Society.
Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted 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, a[illegible]hatnot!

In This Issue:

President's Field of View

We have reached the dreaded Election Special Edition of the Field of View, the requisite call to arms as our Nominating Committee gamely twists arms to fill every slot in our Board of Officers.

As someone who spent their working days on campaigns this year, as both organizer and manager during the weirdest election cycle in modern US history, I'm not going to belabor the challenges of running the W.A.S. during a pandemic. Instead, I'm going to point out to you all that the Virtual W.A.S. represents new opportunities for people to serve the club in ways not present before.

Can't sign up to bring snacks because there's no communal snack time? Share space-y recipes, share art, share music; show us your techniques in real time. Teach us! Can't invite us all to your living room because there's no Discussion Group? Invite us to new, heretofore unexplored platforms for virtual bonding; just because we've settled on WebEx for meetings doesn't mean that's all we can do. Enlighten us! Have something to share but worried about a live-stream in front of us all? Experiment on Facebook, pre-record, start small and expand. Want to go multimedia for a presentation in a way that can only exist in a virtual space? Hit up the officers to see what they think! Present In The News/ In The Sky in a way that blasts through our preconceptions of what that can be.

Want to be an officer but you live three time zones away? Now you can! Want to host a viewing night from a remote observatory that isn't even in Michigan? We're up for that.

The future is going to be weird, but right now it's bounded by our imagination as much as anything else, and the W.A.S. is nothing if not an imaginative group.

We can do this. We are the Warren Astronomical Society. You can do this. YOU are the Warren Astronomical Society, and the future is now.

Diane Hall,
President

Book Review

To Mars with Love
Patricia Ann Straat, author

To Mars with Love

Patricia Ann Straat, author

On July 20, 1976, Viking Lander 1 touched down on Mars. I vaguely remember the occasion since I've reached the age where I vaguely remember anything. Among those recollections is the excitement of the actual landing, the initial images from Mars, names given to rocks in the area (remember 'Big Joe'?) and experiments to find evidence of life. On board were several experiments, including three biological experiments: the gas exchange experiment, the pyrolytic release experiment, and the Labeled Release experiment.

Dr. Straat (Ph.D. in biochemistry) shares her participation in the Labeled Release Experiment. Even though we know how the Viking mission ends, we can only imagine the pressures of developing, testing and deploying the device under the deadline of the "launch window" such as needing to dismantle the unit, fly it across the country and assemble it again only to find it "dead on arrival." That would have to shake your confidence. Add to that, once the device is running again, needing to "fix" it while on route to Mars, and you have one scary ride.

This story of the Labeled Release Experiment and the disputed results (NASA's arbitrary Yes/No without allowing a maybe – hardly scientific) made this book an entertaining and illuminating read. I've found that there is only one source for the book, order it from here:

https://www.tomarswithlove.com/

-Dale Thieme

Letters

Love Letter to the W.A.S.P.

Verily it can be said: Amateur astronomy in the Great Lakes region rotates around the Grand Rapids - Warren axis. Our works are mighty, programmes are stunning. I would like to say this cultural *puissance* is from my dual membership, which would cause unpleasantness. It might even be untrue.

The W.A.S.P. is a prominent artifact of this success. I have declared it the best astro-newsletter in the near solar (50 l.y.) neighbourhood, but a recent attempt to expand that sphere of influence met with fierce resistance. One can not go in in to detail without treading on a forbidden topic at Society meetings, or one that should be. (No mention of names, either.)

Every one is doing a splendid job, from B. Diane Hall, "America's Sweetheart", to Chris J. "Iron Man" Miller. I stay around to lend intellectual dignity . . . and decreasing physical participation. I even despise the City of Warren less.

G. M. ROSS

Shot Fired Across Another's Bow

'A Bit Odd'

TO: David L. Debruyn, Curator Emeritus, Chaffee Planetarium

FROM: G. M. Ross, 1st or 2nd Greatest Observer in Michigan

At last night's Mars oriented meeting --great job by "Honest John" Foerch -- you had the misbegotten idea to refer to Percival Lowell by the above-captioned. My first response was fury, but I could not smash the screen belonging to Clayton V. Carey at "Carey's Roost".

Professor Lowell was "a bit odd". Fired by the view of Saturn with his child's telescope, he went on to run the greatest (private) science research organisation in the world at the turn of the last century. He spent his inheritance, and shook down God knows how many of the venerable Lowells, plus the cream of Boston society. P. L. was notable genial, articulate, urbane.

As a product of the Gilded Age, Lowell might have become a yacht basin boozer with a string of mistresses, an attractive man who married late. He was no shuffler, mumbler, nor ignoramus, the sort to attract the scorn of Lewis, Veblen and Mencken, to say nothing of my father. Yes, as a member of the American plutocracy, he was as you say, *per supra*.

G. M. Ross

Paul Strong Scholarship

This scholarship was established in honor of Paul Strong, Professor of Physics and Astronomy, for his many years of service to both Macomb Community College and to the Warren Astronomical Society. It requires a GPA of at least 3.5 and that the applicant have a science-related major. WAS contributes $500 to Macomb Community College for it each year.

There were 41 applicants for this award this year, which is given annually.

On this occasion, the Board awarded the scholarship to Victoria Van Valkenburgh.

About Victoria:

Following her honorable discharge from the Marine Corps in December, Victoria has decided for a career in engineering.

She cares about the future of the planet, so she plans to continue her education for Environmental Engineering at University of Michigan. She is saving her G.I. bill to finish her bachelors and start a masters degree. She might minor in mechanical engineering as well.

While enlisted, she participated in various community service opportunities. There is an organization called the Single Marine Program where they organize many events, including sports, holidays, parties and community services.

October Mars Report #1

3-4 OCTOBER, VEEN OBS.

Rain had cleared sky. Extremely good transparency by casual inspection of plants/ Moon. Seeing in 5" Newtonian unexpectedly good.

Syrtis Major to left of central meridian, and very prominent at its northern extreme. Iapigia is less pronounced feature.. Deucalionis Regio well seen, arrayed as 2 long latitudinal prongs. More indistinctly seen: Pyrhale Reghio/ Mare Erythraeum complex. Could not make out Hellas as a discrete feature, only a mere *lacuna* on the globe.

Best view of Mars since 2003. ~ 165X.

4-5 OCTOBER, VEEN OBSERVATORY

Windy, turbid. At Society meeting report that a smoke plume had reached Michigan. Seeing fair. Syrtis Major on Central Meridian., a huge "V" far in to N. hemisphere, very dark promontory. Same intensity of shade extends to left along the "coast". The combined northern margin or Mare Cimmerium & Syrtis Major is very well defined against Lybia + Aeolis.

Bits of cloud, so rest of night likely hopeless.

7-8 OCTOBER, VEEN OBSERVATORY

Both transparency and seeing perfect! 5" Newtonian employed.

At start of observing, C. Meridian ~ 280 deg. long. S. Major/ S. Minor very dark against Lybia. Less so for Mare Tyrrhenum. Syrtis Major (again) far down on disc, so Meroe Insula goes all the way to N. limb. No hint of Thoth.

Previous report error because M. Cimmerium starkly divided from M. Tyrrhenum by Hesperia (isthmus). Cimmerium very well defined against Aeolis/ Zapheria.

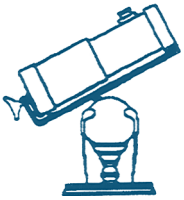
Noachis. Mare Serpentis observed against the planet's limb, dark but no detail @ ~ 165X. Could not make out Deucalionis Regio, probably too foreshortened. No hint of Mare Australae. Thee Hellas (basin) not identified as such -- or at all.

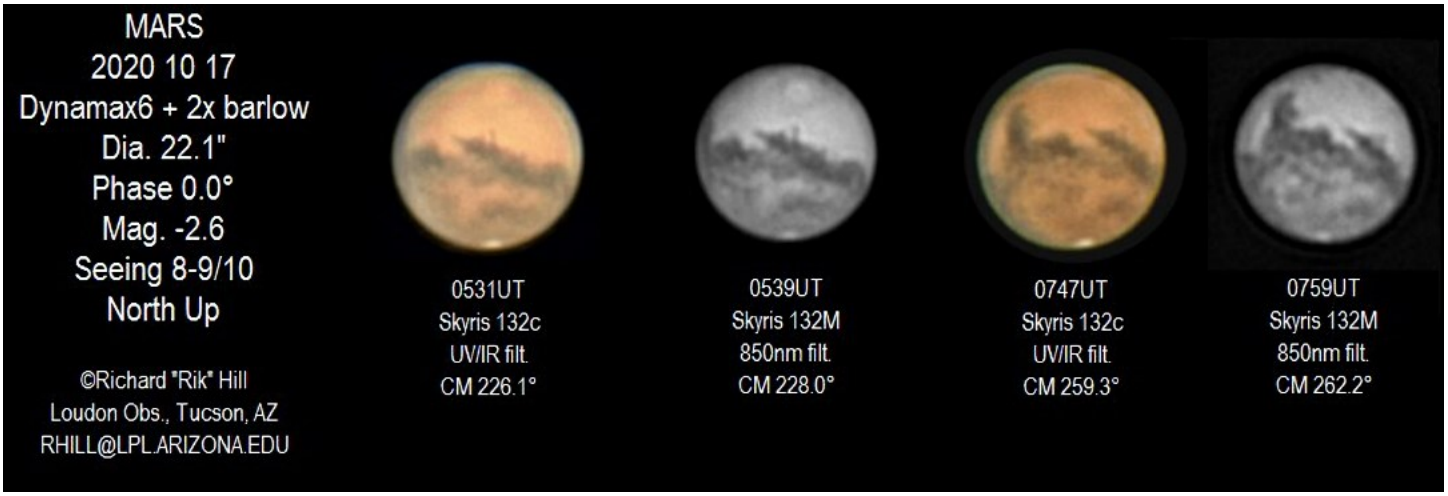
8-9 OCTOBER, VEEN OBSERVATORY

Obs'ns start ~ 05.00 U.T. Another very clear steady A.M. 5" Newtonian, with "25" red filter. S. Major/ Minor very dark in add'n to Iapigia. CXleft of Deucalionis Regio clearly seen. Tangle of fine detail obs'd to right of "Hellas"/ Hellespontis going to Mare Serpentis. Is this Chalce?

No hint, small light areas on N. margin of Sabeus Sinus. Right tip of Mare Cimmerium like a "nose" protruding from west limb. Ausonia could not be made out.

Sky and Telescope map in Oct. issue, inadequate!





PlaneWave Instruments
Intent to Construct and Operate
Universe Station **(working title)**
Observatory
September 2020

PlaneWave Instruments, the global leader in design and production of high-tech research telescopes and equipment, recently relocated its manufacturing, research and development, and most of its staff to a 57-acre campus in Adrian, Michigan. In September 2019, they manufactured their first telescope made entirely in Michigan facilities.

The Adrian campus is a beautiful wooded site and includes a number of historically significant buildings: the Adrian Center for the Arts, the Sam Beauford Woodworking Institute, 7 buildings dedicated to the design and manufacturing of PlaneWave products, and a 1-acre parcel currently earmarked for an on-site observatory. Directly across North Main Street, the Lenawee Intermediate School District Tech Center and Jackson College share a campus and facilities.

The observatory site currently identified sits on the north-east corner of the PlaneWave campus, in a highly visible location on the main route into the City of Adrian. Additionally, the site is contiguous to one of the oldest rails to trails projects in Michigan, the Kiwanis Trail, and is located on a planned expansion of the trail as identified in the 2018 Kiwanis Trail Master Plan.

There are multiple intended purposes for the observatory including:

- Fostering scientific inquiry
- Enhancing STEAM opportunities for area students
- Community engagement
- Development of a talent pipeline of high-tech science educated workers
- Spark curiosity
- Inform citizens about the universe
- Promoting astronomy and the sciences in general
- Creating a world class facility to bring visitors to Lenawee County
- Supporting the local economy

Observatory Primary Instrument – PW1000

The PW1000 is PlaneWave's largest current product: a 1-meter observatory-class telescope. Among its outstanding features are these:

- Superior optics utilizing a PlaneWave developed mirror lightening process in a thermally stable quartz base
- Integrated direct-drive tracking system
- Outstanding performance with largest format CCD cameras on market
- Pinpoint stars over a 100mm image circle
- Dual Nasmyth focus ports, allowing for simultaneous mounting of two instruments or one instrument and an eyepiece
- Alt-Az mount

(Continued on page 7)

(Continued from page 6)

Remote Pairing – PW1000

PlaneWave has just concluded negotiations with several partners on the installation of a new PW1000 in a highly desirable high-altitude location in Chile. Our intention is to pair the PW1000 in the Adrian Observatory with the Chile instrument, providing an opportunity for students, amateurs, and professionals to have a hands-on experience in Adrian, while also providing access to one of the premier observatory sites on the planet to our local partners in the region.

Also Planned –Solar Telescope

Partners

In addition to industry partners, the project intends to build partnerships with regional colleges and universities, local school districts, regional astronomy clubs, the business community, travel and tourism organizations, and other interested parties.

About PlaneWave

PlaneWave Instruments was founded in 2006 by Rick Hedrick and Joe Haberman after Rick sold his interest in Celestron, one of the world's largest telescope manufacturers. Rick's goal in establishing PlaneWave was to design and produce the perfect telescope and to take the uncertainties out of the research telescope market by providing standardized models that perform at world-class levels for consistent published costs.

PlaneWave has innovated in the high-tech telescope industry in seven significant areas: stable optics, large corrected fields of view, accurate tracking systems, easy collimation, fast slewing, comprehensive in-house testing, and complete control of the manufacturing process and products. Because of this approach to innovation, testing, and manufacturing excellence, PlaneWave now leads the world in the design and manufacture of high-tech research telescopes with the largest market share of any global manufacturer.

Institute for Student Astronomical Research

For several years, PlaneWave has been a major supporter of a unique student research program based in Arizona called InStAR - or the Institute for Student Astronomical Research. InStAR is a 501c3 which conducts research seminars for high-school and college students and their teachers/instructors. Over the past decade over 500 students have co-authored scientific research papers that have been published in scientific journals; real research, real papers, real scientific journals.

Participants – students and instructors alike - are put together in teams who identify research topics, generate proposals, gather and analyze data, present the results in a published paper, and provide a public presentation, often at prestigious conferences or workshops. The coursework runs over 8 weeks with papers generally published within two weeks of the conclusion of the coursework.

PlaneWave and InStAR are interested in introducing this remarkable program to our area, and have arranged to have the InStAR President, co-founder, and Seminar instructor, Rachel Freed, present a one hour overview of the program to area teachers, instructors, professors and high-school and college students who would be interested in taking the research seminar in Winter 2021. PlaneWave has tentatively planned to present this one-hour overview in October 2020, and would like to hear from anyone, adults or students, who may be interested so that plans can be finalized, and attendance optimized.

If you or someone you know would like to participate in the one-hour overview via a zoom conference call, please email cmiller@planewave.com or call Chris Miller @ 517.902.6100. Questions are welcomed.

Kalamazoo Astronomical Society

Looking Up Since 1936

Greetings from the Kalamazoo Astronomical Society!

These have been difficult times for everyone, including astronomical organizations such as ours. However, there has been one silver lining. As noted recently in an article on *Sky* & *Telescope's* website, telescope sales have been *booming* during the pandemic. Indeed, the KAS itself has experienced a surge in membership. And it comes at a time when we can't hold in-person activities! One day, soon I hope, the pandemic will end and things will gradually return to normal. When that time *finally* comes, the trick for us will be to maintain those new members. To that end, the KAS is offering three special online activities and I'd like to extend an invitation to your members to attend:

Online Viewing Sessions

These unique sessions will be on Zoom and feature the KAS Remote Telescope, a 20-inch PlaneWave CDK and Takahashi FSQ-106 on a Paramount MEIi mount. It is located under the dark desert skies of Arizona Sky Village. While attendees enjoy fresh images from the two telescopes, we'll provide background information and interesting scientific tidbits on each target. We also hope to enjoy some comradery with other amateur astronomers - basically turn it into an on line star party! Some of you previously received an invitation, but since then we've decided to allow Zoom reservations through our website. You can also register using the links below:

November 7th | December 5th | January 9th | February 6th

If weather conditions necessitate a cancellation, there will be a second "cloud date" scheduled the following Saturday. These will be posted on our website, but we encourage people to join our OVS email list for notifications of postponements, cancellations, and reminders. We also plan to live-stream the sessions on our YouTube channel in case we reach our Zoom limit.

Introduction to Amateur Astronomy

This five-part lecture series covers all the basics of getting started in amateur astronomy. For the first time ever, it's being offered online and meets every two weeks starting **January 23rd**. Those interested are encouraged to visit the series' webpage and register today. Many of you no doubt already offer similar introductory programs, but if not, then your members are welcome to attend ours. There's nothing better to retain members and encourage new ones.

Introduction to Astronomy Course

For those looking for something more challenging than an introduction to amateur astronomy, I offer this 12-week course on the basics of the science of astronomy. It begins on **January 12th** and meets twice a week. This is a class of personal enrichment being offered by an amateur astronomer, for amateur astronomers. As with any course there will be assignments to complete and exams to be taken, but no grades or credits will be given. This is a great way for people to be challenged and better themselves while self-quarantining this winter during the pandemic. There is a fee, but it's only a fraction of the cost of taking a similar course at a community college. Check out the course syllabus to learn more and contact me to register.

Thank you for taking the time to read this invitation. We hope you do us the courtesy of passing it along to your membership. If you have any unique on line events coming up as well, please let me know and I'd be happy to notify the KAS membership. At times like this we need to band together! Clear skies and stay healthy.

Richard S. Bell, KAS President

c/o KAMSC • 600 West Vine, Suite 400 • Kalamazoo, MI 49008 • www.kasonline.org

Forwarded e-mail from Gerald Persha by Gary Ross:

You have seen his splendid Mars work before, *but see* the spectral results and informative commentary. Jerry used to say he was more interested in invention and engineering whilst an undergraduate at "O.U." But as a scientist, he must be one of the more interesting specimens from their Department of Physics in the 1970's.

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

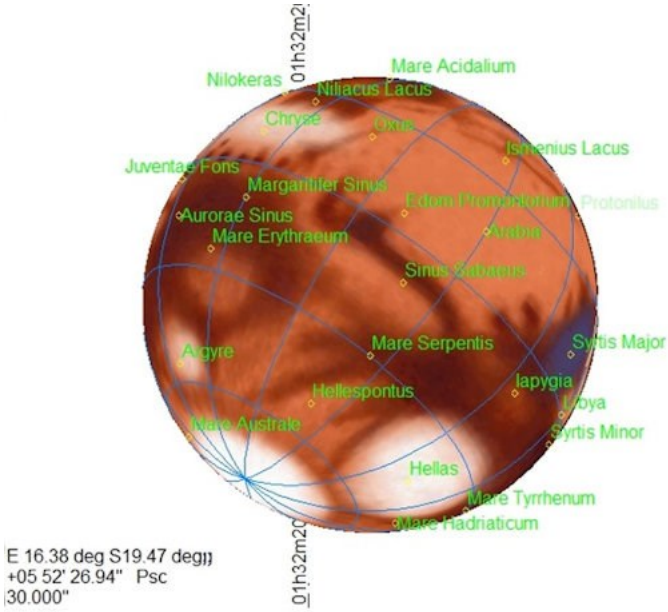
Subject: mars

Date: 2020-10-07 15:05

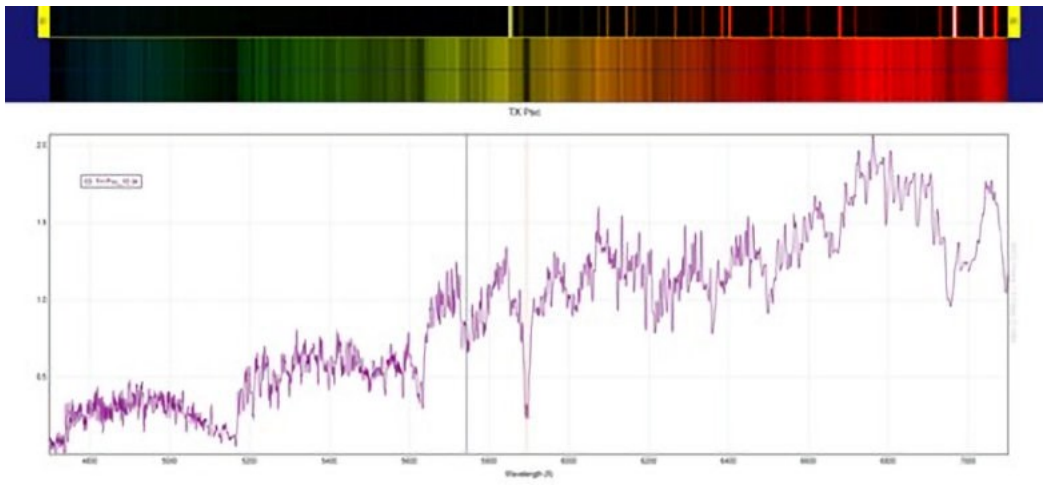
From: Gerald Persha

I'm still waiting for the best seeing. It has been clear almost every night for the past two weeks and things don't look much different going forward as far as the forecast goes.

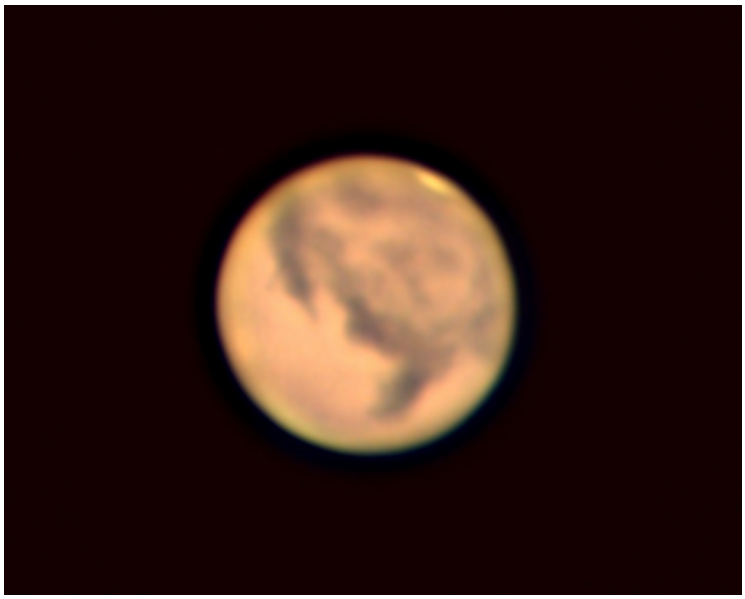
Mark, I took your suggestion and bought an SSD card with 250 GBytes of data storage for $40. Things have really improved since the last time I looked at that option many years ago. The card goes into a PCIe slot and has a write speed of 2000Mbytes/sec. I also bought an extra 8 Gbytes of RAM since I'll have the case opened might as well stuff it. The stuff will be delivered on Thursday.



Doing a lot of spectroscopy of my program variables. The variable TX Psc is a low temperature carbon star with most of the absorption lines due to C2 and CN except for the hump in the blue area which is predominately SiC2(silicon dicarbide). Not proved until 1955 by physicist Bengt Kleman. Right in the middle is the double sodium line. Very much unlike cool M stars with most of the absorption due to TiO.

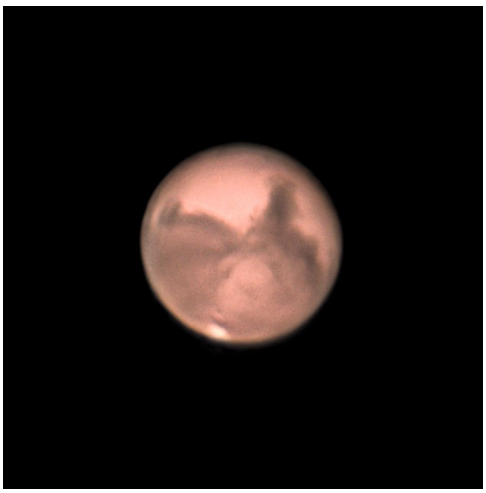


More Mars



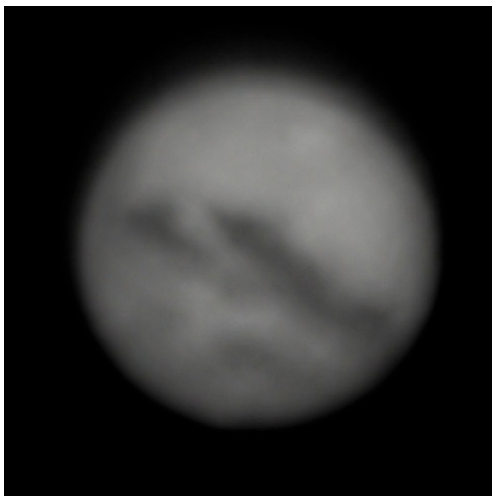
Here is one taken by former WAS member Kenneth Wilson. Ken says: Last night (*10-14-2020 -ed.*) was clear with average seeing conditions from my neck of the woods. So I spent some time shooting Mars, now at opposition and dazzlingly bright, high in the sky from my latitude. Here's a quick processing (AutoStakkert/RegiStax/PScs2) of the best 20% of 5000 frames captured using my 8" f/10 SCT with a 2x Barlow.

From Dale Hollenbaugh:



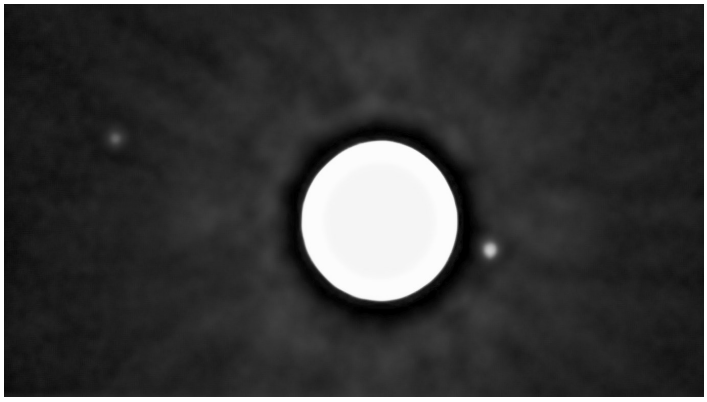
Left: Mars at closest approach (10/06/2020)

- Imaging telescopes: Celestron C11 Edge HD
- Imaging camera: ZWO ASI462MC
- Focal reducers: TeleVue Powermate 2.5x



Right: Mars at Opposition in IR (10/13/2020)
Filter: ZWO IR 850nm Pass Filter

Dale says: The transparency was good, but the seeing was poor and I just couldn't get any surface details of Mars. Since my new planetary camera is especially sensitive in infrared, I tried my 850nm IR pass filter to cut through some of the bad seeing conditions. It helped, but the image was dimmer and I only got marginally better detail. This was my first use of infrared.



Bottom Right: Mars with moons Phobos & Deimos - at opposition (10/13/2020)
Transparency was good, but seeing was quite poor and I couldn't get good photos of Mars, but the positions of the moons was perfect for capturing them. Both moons were at the ends of their orbits farthest from Mars making them easier to capture. I could see both in live view while taking the photos and stacking and wavelet processing brought out them pretty sharply.

The View From C.W. Sirius Observatory

Our “Red Planet” Mars

This year has been a great time to view our red planet. Mars came closest to earth on Oct 6, 2020, when it was only 39 million miles away. And being high in the sky it is in the perfect location for telescope viewing as well as imaging.

Mars is the fourth planet from the Sun and the second-smallest planet in the Solar System, being larger than only Mercury. In English, Mars is named for the Roman god of war and is often referred to as the "Red Planet". Mars gets its reddish appearance due to the surface being predominantly made up of red oxide. The bright areas are now known to be locations where fine dust covers the surface. The dark surface features represent areas that the wind has swept clean of dust, leaving behind a lag of dark, rocky material. The dark color is consistent with the presence of mafic rocks, such as basalt. Mars will normally have huge global dust storms which inhibit us from seeing much detail in the dark features. But this year we have been lucky so far that no dust storms have hindered our viewing pleasure. Since Mars rotation period is very close to Earth's rotation of 24 hours, when you view Mars, the dark features are constantly changing throughout the night.

Like Earth, Mars has frozen polar caps, but unlike Earth, these caps are made of carbon dioxide ice as well as water ice. During the southern hemisphere's summer, much of the ice cap sublimates, a process in which the ice turns straight back into gas, leaving behind what is known as the residual polar cap. Then during the winter months the gas vapor now turns back into solid ice. From my photo you can see the small polar ice cap in the southern hemisphere. Since I took this photo in October, the ice cap in much smaller than if I would have taken it in the early summer months.

There is still plenty of time to get outside and enjoy the “red planet”. Whether using binoculars or a telescope, Mars will not disappoint. And....don’t forget to get out those cameras. Mars is close enough to provide some memorable photos.

-Bill Beers

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

I spent a week up at the River Valley RV park where the Great Lakes Star Gaze is held. I went up on the 13th and came home on the 21st. During that time, I imaged 7 different objects. This was one of them.

The **Iris Nebula** (also known as **NGC 7023** and **Caldwell 4**) is a bright reflection nebula in the constellation Cepheus. The designation NGC 7023 refers to the open cluster within the larger reflection nebula designated LBN 487.

The nebula, which shines at magnitude +6.8, is illuminated by a magnitude +7.4 star designated SAO 19158. It is located near the Mira-type variable star T Cephei, and near the bright magnitude +3.23 variable star Beta Cephei (Alphirk). It lies 1,300 light-years away and is six light-years across

Data: September 18, 2020
SGPro, PHD2, FocusLock
10" f/8 RC Telescope, Losmandy G11 mount
ZWO asi071mc PRO camera @ 0C, gain 300,
27 x 10 minute subs, 24 darks, 50 flats
Stacked in Deep Sky Stacker (DSS), Processed in PixInsight

-Doug Bock

Presentations

Monday, November 2, 2020
Virtual Presentations

Main Talk:

By Jenny Pon

We will be taking a look at some celestial objects that have ghostly appearances. These space ghosts reside in our solar system (comets), in our Milky Way Galaxy (nebulae, star clusters) and beyond our home galaxy (galaxies). We'll learn where stars come from and our connection to the cosmos.

Jenny Pon has shared the wonders of the night sky for over 30 years under both the night sky and planetarium domes in East Lansing, Pittsburgh and Detroit. She did a night sky tour under the dark skies at the 2016 Grand Canyon Star Party. She has been involved with the Amateur Astronomers Association of Pittsburgh and the Farmington Community Stargazers.

(Continued on page 14)

Thursday, November 19, 2020
Virtual Presentation

Unsung Historical Observatories

By Diane Hall

You've heard of Harvard and Yerkes and Lick and Mt. Wilson... but there are some other observatories in the US and Canada whose historical achievements never garnered them cultural immortality. Some are long gone, while others face demolition in the present day. Here are a few of their stories.

Diane Hall is the past and current president of the Warren Astronomical Society. Moon Shot Enthusiast, binocular astronomer, chronic Space Pirate, and frequent astronomy tourist. Has a woolen blanket featuring the entire fleet of US Space Shuttles on the bed and a matryoshka of famous cosmonauts close at home in the office.
Still eats freeze-dried ice cream for fun.

(Continued from page 13)

Elections

Annual election of the W.A.S. Board

Presided over by Ken Bertin

This is the first year of the new by-law change (2019) for number of consecutive years each board member may serve, three. The actual term length is one year, so the board member needs to be elected each year.

This year's candidates are:

Diane Hall	President
Dale Partin	1st Vice President (speaker scheduling)
Riyad Matti	2nd Vice President (observatory chair)
?	Treasurer
Mark Kedzior	Secretary
Bob Trembley	Outreach
Dale Thieme	Publications

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

Update on October 15 meeting

A big thank-you to John Dumar for filling in for Dr. Straat when she couldn't present her "Life on Mars" talk.

Modeling the Galilean Orbits

John Dumar gathered orbital positional data of the Galilean moons. With this data, the periods and radii of their orbits could be calculated. This enabled him to verify Kepler's Third Law of Planetary Motion and calculate the mass of Jupiter. The results were affected not only by Jupiter's and Earth's orbits, but also by gravitational perturbations of neighboring moons. This investigation was an attempt to find a model that would include these effects, obtaining more accurate periods and radii leading to a more accurate mass of Jupiter.

John Dumar has been teaching Physics and Mathematics at Lutheran North High School since 1982. He has a Masters in Science Education degree from Wayne State University. He worked at the Thermalwave Laboratory at US Army TACOM in the 1990's. He also coached high school wrestling for 24 years and is a professional archer. More recently, he joined the ranks of amateur astronomers!

If you missed the presentation, you can see the recording on YouTube.
https://www.youtube.com/watch?v=6cxdsuquRZY

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.

Hello, Bennu!

Not long ago OSIRIS-REx, a spacecraft sponsored by the University of Arizona and flown by NASA gently touched the surface of asteroid No. 101955, an asteroid named Bennu, tried to grab some material, and then quickly took off again. It was the first try, but it was a huge success! The craft gathered more than twice what was expected—so much that some small pieces of material started to leak out.

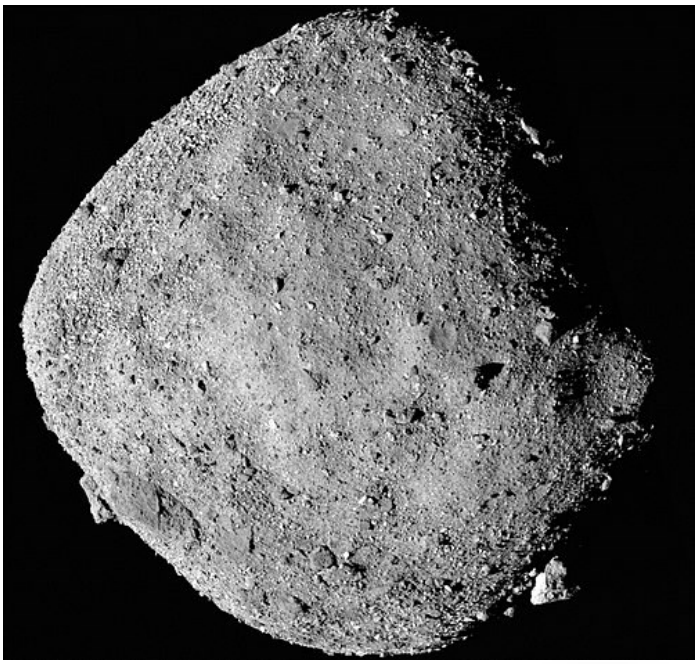
Of course, if all the sample leaked out, then there was no sample. But that won't happen. NASA plans to transfer the material to a safe storage container earlier than expected, and then the sample will be safe.

The mission, run jointly by NASA and the University of Arizona, cost the U.S. taxpayers about eight hundred million dollars, plus about 185 million for the launch aboard an Atlas V rocket. The Osiris-Rex is an acronym for Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer. Asteroid Bennu is an interesting choice. Bennu was the name for an Egyptian mythological bird associated with creation, the Sun, and rebirth. But much as the name might inspire us to look back at the early days of our solar system (which it does), that's not the real reason this particular asteroid was chosen. Bennu is a C-type asteroid. It is also a sort of time capsule dating back to the birth and early evolution of the solar system. C is for carbonaceous asteroid, but it is a B sub-type because it is primitive. The reason for this is that it had undergone almost no geological change since it formed.

Especially if you pay taxes to the government of the United States, you may wonder why more than 800 million dollars was sent to this distant spot of light in the sky. I could begin to answer this by saying that Bennu's sample will teach us about what the solar system was made of at its formation. From that, Bennu could give us a healthy idea about what the Earth itself was like at its birth. Sometime after it was formed, its orbit changed so that now, every few dozen years it gets pretty close to Earth. There is a very small chance that it might hit Earth in the distant future. Dolores Hill, a long-time member of the OSIRIS-Rex team adds: "NASA sent this mission to Bennu, a primitive body, to return a *pristine, protected sample* so we could better understand the beginning and history of the solar system, formation of organic compounds important to life, and understand how Main-belt asteroids migrate to the inner solar system to become Near-earth asteroids."

All this is fine, but couldn't that money be better spent on Earth, to feed the starving, cure those afflicted with coronavirus, house the homeless, and do all the other things we thought we could dop when we decided to go to the Moon in the 1960s?

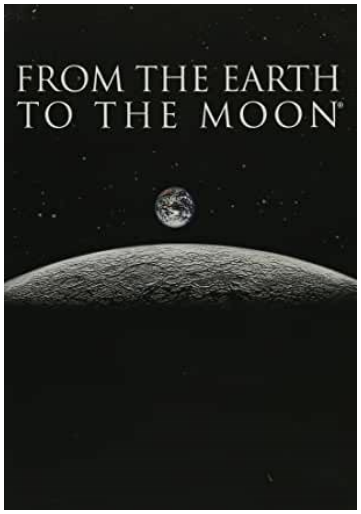
Yes, it could. Except for one thing. Going to the Moon seemed pointless until we all were glued to television, watching breathlessly as one human stepped onto the surface of another world. Dear readers, we are explorers. It is in our blood, our DNA, in our hopes and dreams. And in the midst of this horrible pandemic, a small piece of human-built machinery tapped the surface of a distant world and grabbed a sample. Indeed, space journeys like this one help make life worth living. We live here. This is our neighborhood. We reach for the stars.



Movie Review with Diane Hall

From the Earth to the Moon (1998) "Le voyage dans la lune"

We've reached the end of *From the Earth to the Moon*. I've been saving this for a while, and the month in which Election Day falls in the US is a good time to remember that space exploration and space science are, after all, as political an endeavor as anything else adjacent to ballistic missiles.



Instead of the familiar intro with Tom Hanks in front of a statue reminiscent of the Apollo 13 mission patch, we hear the voice of Blythe Danner as our narrator for this final and most ambitious episode of the series. Hanks appears in this episode not as himself or his astronaut alter ego, but as Jean-Luc, an assistant to French film director Georges Melies, whose production of the 1902 silent classic *Le Voyage dans la Lune* is recounted documentary-style as a counterpoint to the final footsteps taken on the moon.

Apollo 17 makes for a bittersweet finale of the program; it didn't have to be the last voyage to the moon, yet was; it was scientifically triumphant yet failed to excite the passions of an American citizenry. The astronauts do their best to make 17 the pinnacle of the program, despite orders from Chris Kraft (Stephen Root) to, above all else, come home safely, they petitioned for extra time on the surface, the better to show America what Apollo was and could be. The main faces are familiar at this point; Jack Schmitt (Tom Amandes) made a strong debut two episodes back, and Gene Cernan (Daniel Hugh Kelly) has provided color to several episodes along the way, and that's a key point because they carry so much of the non-Melies part of the episode. Two new faces wouldn't cut it, and perhaps for this reason Command Module Pilot Ron Evans isn't even glimpsed.

Cernan's a flyboy-turned-scientist, Schmitt is a geologist-turned-rocketman. Cernan's got some poetry in his soul as he looks up at the fragile blue Earth, while Schmitt just wants to spend every possible second on moon rocks. They present another staging of the tension between The Mission and The Deeper Meaning of the All that we saw in Mare Tranquilitatis, but instead of conflict it registers as camaraderie, even a kind of band-of-brothers love. Both sides have merit, this episode appears to say, as suiting up for an EVA registers as a display of tenderness instead of simple donning of protective gear. Humanity needs both sides to be, well, human. And being a human in space is, in a sense, what this is all about.

But Project Apollo ends with their footsteps in the dust, and Melies has his career wrecked by Thomas Edison's goons, and all these years later we're still imagining a new way of closing the distance from the earth to the moon.

Rating: 4.5 out of 5 Moons. A little schmaltzy in parts but a beautiful coda to the series.

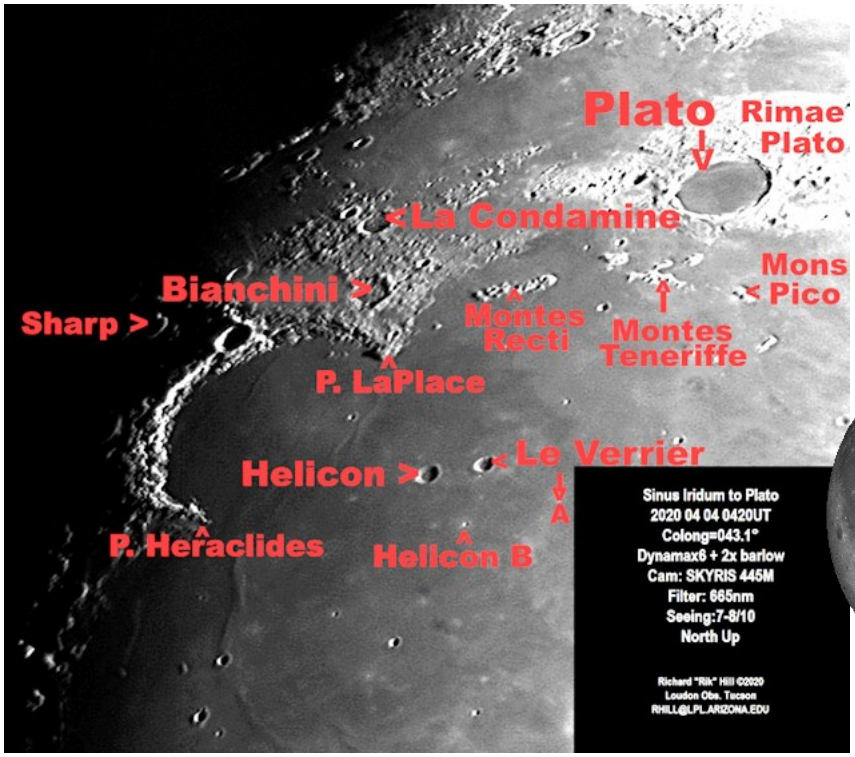
From the Original 1902 movie, Le Voyage dans la Lune

Over the Moon with Rik Hill

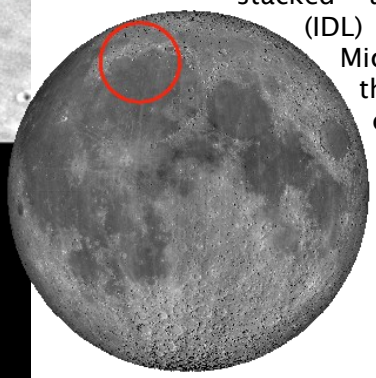
From the Philosopher to the Bay of Rainbows

When Sinus Iridum, or the Bay of Rainbows, is on the terminator it always draws you in. This half flooded 411km diameter crater is breathtaking when the mountains on the west side, the Montes Jura catch the morning sunlight on their 6km high peaks.The crater on the north side of these mountains is Bianchini (39km) filled with shadow but the rim is well shown. The two cusps of this mountainous arc are Promontorium Heraclides (height 1700m) as the south point and Promontorium Laplace (2600m) north casting a nice triangular shadow. Two similar sized craters sit outside the mouth of the bay like a couple of sentinels. Helicon (26km) on the left and Le Verrier (20km) on the right. Below them forming a rough equilateral triangle is the crater Helicon B (6km). To the right of this near the edge of the nameplate of this image is the small crater Le Verrier A (4km).

Moving up from P. Laplace we see a large isolated range of mountains, Montes Recti (88x19km) rising 1.8km above the surrounding plain of northern Mare Imbrium. A little farther on you see a scattering of mountains. These are the Montes Teneriffe ending with the isolated Mons Pico (2.4km) on the right end. Above these mountains is the great crater Plato (104km). Coming out on the right side you can see the largest of the Rimae Plato. Above Plato is a long flat area. This is Mare Frigoris stretching nearly 2000km from the crater Harpalus just behind Sinus Iridum (in shadow here) all the way to Atlas and Hercules. Before leaving notice the subtle shadings on the floor of Mare Imbrium. These are well shown with the deep red filter used here.



Two 1800 frame AVIs were used to make the montage shown here. They were stacked using AVIStack2 (IDL) combined with Microsoft ICE and then further processed using GIMP and IrfanView.



Location maps by Ralph DeCew

History S.I.G.

November 1984

The cover features a group photo, presumably from a meeting night.

Inside, we find letters from 1) Cranbrook Inst. of Science, thanking us for helping out with an October Star Party and 2) from Linda Blanchard with a proposal to assemble an observing location list. Wonder how that went.

A chart, "Location of the Sun, Moon and Planets" is submitted by Raymond Bullock, who also provides our monthly Star Charts in the current newsletters. The "Positions for Comet Austin - 1984l" chart also appears but no one is taking credit-or blame.

"Observing Report" by Doug Bock offers this tidbit: he was searching for a name for his observatory, which was under construction in 1984.

November 1994

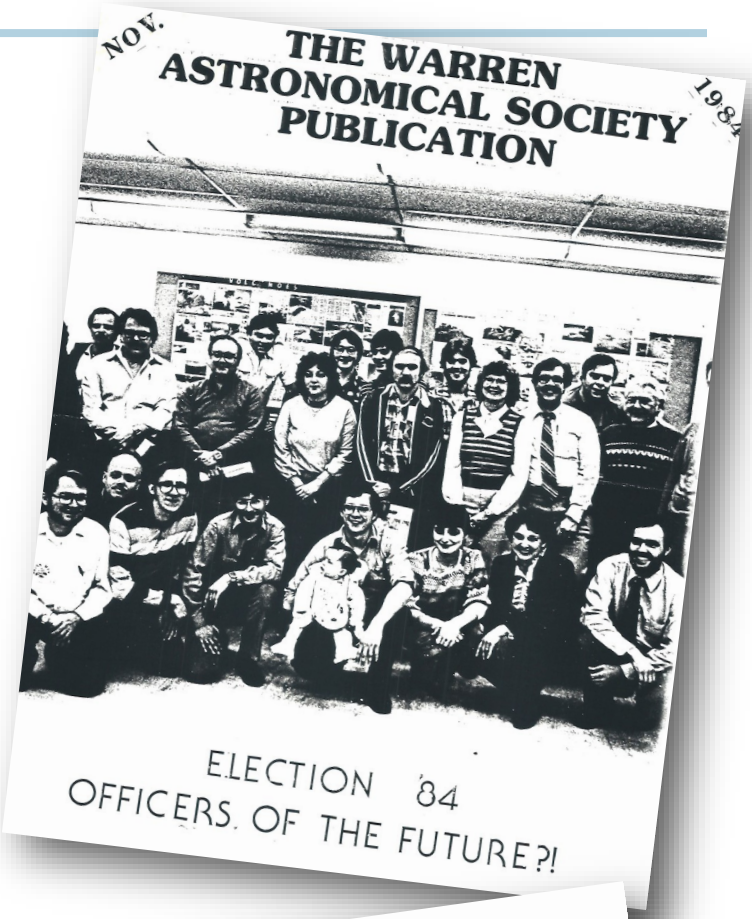
This issue leads off with, by judging from the editor's comment, a guest report: "NCO Observing Commentary" by Doug Bock. Nice to see he found a name for the observatory, "Northern Cross Observatory", though I'm confident it didn't take him ten years to do so. Glenn Wilkins also makes an appearance in the report.

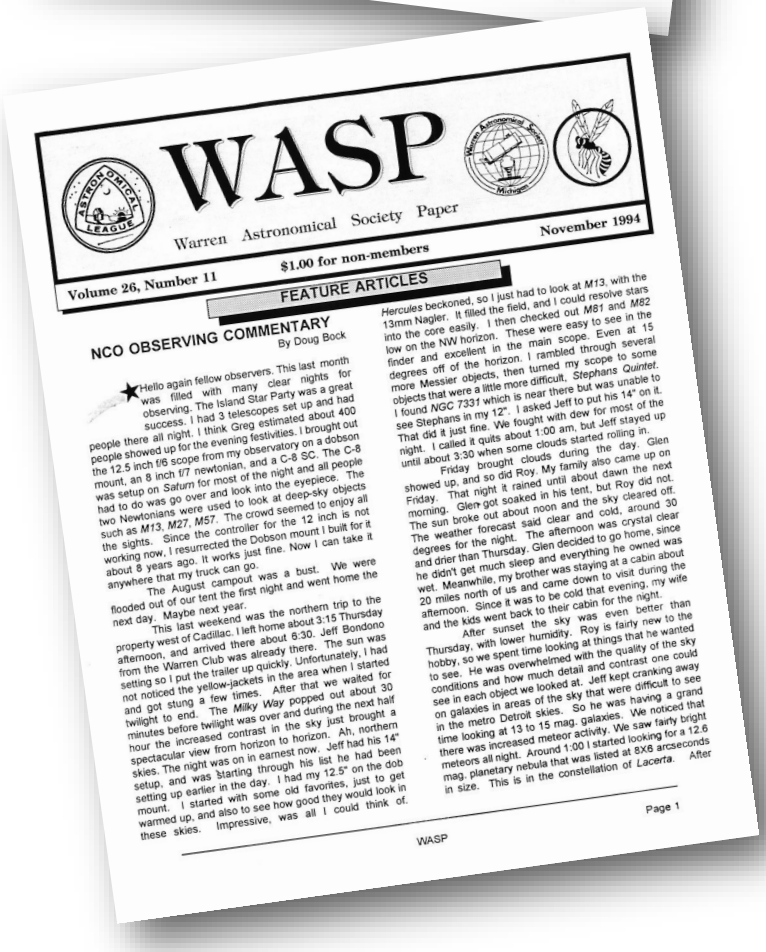
Star Party Notes and M31 through an 8-inch by Jeff Bondono, reflects on an outing to Doug Bock's property near Cadillac, MI.

Larry Kalinowski continues to lead off with astronomy in "Computer Chatter", I sense a column name change coming soon.

Louie the Librarian's Book of the Month finishes the newsletter with a review of *Larousse Encyclopedia of Astronomy.*

Dale Thieme,
Chief scanner




WASP
Warren Astronomical Society Paper
Volume 26, Number 11
$1.00 for non-members
November 1994
FEATURE ARTICLES
NCO OBSERVING COMMENTARY
By Doug Bock
Hello again fellow observers. This last month was filled with many clear nights for observing. The Island Star Party was a great success. I had 3 telescopes set up and had people there all night. I think Greg estimated about 400 people showed up for the evening festivities. I brought out the 12.5 inch f/6 scope from my observatory on a dobson mount, an 8 inch f/7 newtonian, and a C-8 SC. The C-8 was setup on Saturn for most of the night and all people had to do was go over and look into the eyepiece. The two Newtonians were used to look at deep-sky objects such as M13, M27, M57. The crowd seemed to enjoy all the sights. Since the controller for the 12 inch is not working now, I resurrected the Dobson mount I built for it about 8 years ago. It works just fine. Now I can take it anywhere that my truck can go.
The August campout was a bust. We were flooded out of our tent the first night and went home the next day. Maybe next year.
This last weekend was the northern trip to the property west of Cadillac. I left home about 3:15 Thursday afternoon, and arrived there about 6:30. Jeff Bondono from the Warren Club was already there. The sun was setting so I put the trailer up quickly. Unfortunately, I had not noticed the yellow-jackets in the area when I started and got stung a few times. After that we waited for twilight to end. The *Milky Way* popped out about 30 minutes before twilight was over and during the next half hour the increased contrast in the sky just brought a spectacular view from horizon to horizon. Ah, northern skies. The night was on in earnest now. Jeff had his 14" setup, and was starting through his list he had been setting up earlier in the day. I had my 12.5" on the dob mount. I started with some old favorites, just to get warmed up, and also to see how good they would look in these skies. Impressive, was all I could think of. *Hercules* beckoned, so I just had to look at *M13*, with the 13mm Nagler. It filled the field, and I could resolve stars into the core easily. I then checked out *M81* and *M82* low on the NW horizon. These were easy to see in the finder and excellent in the main scope. Even at 15 degrees off of the horizon. I rambled through several more Messier objects, then turned my scope to some objects that were a little more difficult. *Stephans Quintet*. I found *NGC 7331* which is near there but was unable to see Stephans in my 12". I asked Jeff to put his 14" on it. That did it just fine. We fought with dew for most of the night. I called it quits about 1:00 am, but Jeff stayed up until about 3:30 when some clouds started rolling in.
Friday brought clouds during the day. Glen showed up, and so did Roy. My family also came up on Friday. That night it rained until about dawn the next morning. Glen got soaked in his tent, but Roy did not. The sun broke out about noon and the sky cleared off. The weather forecast said clear and cold, around 30 degrees for the night. The afternoon was crystal clear and drier than Thursday. Glen decided to go home, since he didn't get much sleep and everything he owned was wet. Meanwhile, my brother was staying at a cabin about 20 miles north of us and came down to visit during the afternoon. Since it was to be cold that evening, my wife and the kids went back to their cabin for the night.
After sunset the sky was even better than Thursday, with lower humidity. Roy is fairly new to the hobby, so we spent time looking at things that he wanted to see. He was overwhelmed with the quality of the sky conditions and how much detail and contrast one could see in each object we looked at. Jeff kept cranking away on galaxies in areas of the sky that were difficult to see in the metro Detroit skies. So he was having a grand time looking at 13 to 15 mag. galaxies. We noticed that there was increased meteor activity. We saw fairly bright meteors all night. Around 1:00 I started looking for a 12.6 mag. planetary nebula that was listed at 8X6 arcseconds in size. This is in the constellation of *Lacerta*. After
Page 1
WASP

Adventures in Armchair Astronomy

Cast Adrift on the Maria

We now turn our attention to the moon's maria (Latin for "seas", pronounced 'MAHR-ya', mare is the singular form: 'MAHR-ey'. The moon is divided between the bright, or highland, areas and the lower, dark maria, so named because they were once thought to be seas (or at least thought to appear so) on the Moon. The maria are the easiest features to spot on the Moon. Then it all goes downhill.

First, allow me to digress: The book by Charles Wood, *The Modern Moon*, has served as a jumping off point for my lunar journeys. It is an entertaining read, but I am increasingly finding it a bit hyperbolic in Wood's renditions of the history of lunar study. I thought it a bit over the top when I worked out the crater wars and now as I dive in the maria…yikes!

Like the craters, the maria are no strangers to controversy. When NASA considered the Apollo lunar landings, the question of possibly not having a firm surface to land on was raised. There were two camps of thought: one was dust/regolith would be negligible and the other, said dust/regolith would be deep enough to be unstable for landing and, more importantly, for lift-off. According to Woods, Thomas Gold (1920 – 2004) claimed the dust would swallow landers whole. Interviews and statements from Gold indicate, to me, that he may have been misquoted in the newspapers and apparently this is what Woods went by. I found this bit in Gold's obituary posted in The Guardian:

> *"…In the 60s, on the run-up to the manned space programme and a possible lunar landing, there was much confused debate about the nature of the surface of the moon. Was it hard rock or was there a deep layer of fine dust? If the moon lander and its astronauts had to cope with dust layers that were metres thick, then designers needed to know, and know quickly.*
>
> *By making use of evidence from microimpacts, moon cratering, electrostatic fields, and various other tools, Gold made a prediction the astronaut's boots would sink in no more than three centimetres. Within the range of possibilities, this turned out to be very close to the truth…"*

None of that makes it into the paragraphs that Woods devoted to the dust controversy. He instead prolongs the issue to past Apollo 11 with Gold "digging in his heels" despite the evidence. The reality was that Gold was right in his assessment that there could be centimeters of depth and the astronauts did sink in it at times. NASA failed to credit Gold for his prediction and eventually Gold left the program (not amicably, either) over other issues he had with the powers that be (Thomas Gold's biography would make a good presentation topic -*hint, hint*, Ken Bertin)

Thomas Gold

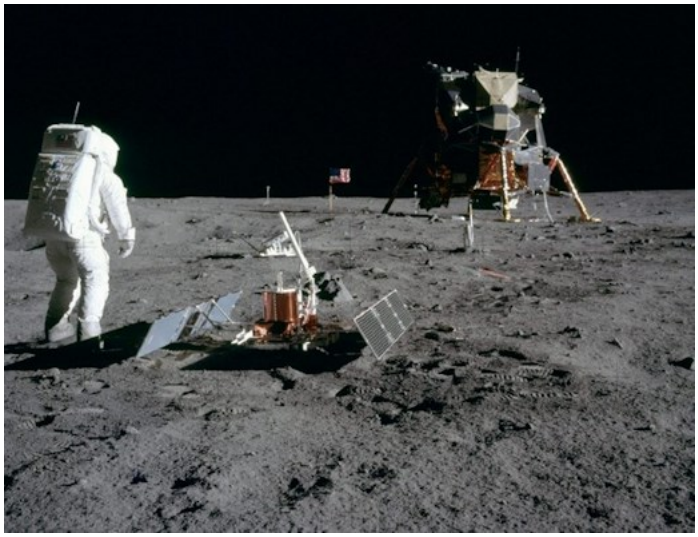
Digression over. My delight upon (re-)discovering that I had a lunar book has dimmed a bit, but it is still a fun read and does make a good jumping off point. Back to the maria:

In the sky, the Moon's size is about half a degree, and at that size, unlike craters, maria are easily discernible, giving us the "Man in the Moon", the "Woman in the Moon", the "Rabbit in the Moon", and whatever your imagination can conjure up while gazing up at the Moon. There are 22 named maria, near and far side, plus one getting a promotion to ocean status (Oceanus Procellarum). Smaller areas are named as bays (example: Sinus Iridium, Bay of Rainbows), lakes (example: Lacus Mortis, Lake of Death), and marshes (example: Palus Somni, Marsh of Sleep) -keeping the watery theme going.

These maria are "frozen seas", primarily basalt, with a sprinkling of crater ejecta. For once the "volcanists" and the "craterists" seem to agree, the

(Continued on page 20)

(Continued from page 19)
maria are volcanic in origin, that is, they are the product of magma flows. There are volcanic domes on the moon, perhaps not enough to account for all the flooding, but then we have the results of impacting to help. After all, getting whacked by something big enough to create something like Mare Crisium is bound to break something in the crust. Also, early volcanic domes may be buried under newer magma flows. That said, there are various theories about the exact mechanisms involved in the lunar structure, but as more pieces of the puzzle are discovered, our understanding will be refined. For now, impact cratering, aided by magma flows and some genuine volcanic activity is the current explanation for the moon we see in the sky. I find no system of lunar maria classification effort like there was for craters. Why would there be? They are simply basalt filled low lying areas.



Buzz Aldrin on Mare Tranquillitatis (Image: NASA)

Latin Name	English Name	Lat.	Long.	Diameter (km)
Mare Anguis	Serpent Sea	22.6° N	67.7° E	150
Mare Australe	Southern Sea	38.9° S	93.0° E	603
Mare Cognitum	Sea of Knowledge	10.0° S	23.1° W	376
Mare Crisium	Sea of Crises	17.0° N	59.1° E	418
Mare Fecunditatis	Sea of Fecundity	7.8° S	51.3° E	909
Mare Frigoris	Sea of Cold	56.0° N	1.4° E	1596
Mare Humboldtianum	Sea of Alexander von Humboldt	56.8° N	81.5° E	273
Mare Humorum	Sea of Moisture	24.4° S	38.6° W	389
Mare Imbrium[2]	Sea of Showers	32.8° N	15.6° W	1123
Mare Ingenii	Sea of Cleverness	33.7° S	163.5° E	318
Mare Insularum	Sea of Islands	7.5° N	30.9° W	513
Mare Marginis	Sea of the Edge	13.3° N	86.1° E	420
Mare Moscoviense	Sea of Moscow	27.3° N	147.9° E	277
Mare Nectaris	Sea of Nectar	15.2° S	35.5° E	333
Mare Nubium	Sea of Clouds	21.3° S	16.6° W	715
Mare Orientale	Eastern Sea	19.4° S	92.8° W	327
Mare Serenitatis	Sea of Serenity	28.0° N	17.5° E	707
Mare Smythii	Smyth's Sea	1.3° N	87.5° E	373
Mare Spumans	Foaming Sea	1.1° N	65.1° E	139
Mare Tranquillitatis	Sea of Tranquility	8.5° N	31.4° E	873
Mare Undarum	Sea of Waves	6.8° N	68.4° E	243
Mare Vaporum	Sea of Vapors	13.3° N	3.6° E	245
Oceanus Procellarum	Ocean of Storms	18.4° N	57.4° W	2568

Here is the listing of the lunar maria:

Sources:

The Guardian, Thomas Gold's obituary
https://www.theguardian.com/news/2004/jun/24/guardianobituaries.obituaries
Biographical sketch of Thomas Gold:
https://www.famousscientists.org/thomas-gold/
Wikipedia:
https://en.wikipedia.org/wiki/List_of_maria_on_the_Moon

The Modern Moon, Charles A. Wood, ISBN-10: 0933346999

CRANBROOK INSTITUTE OF SCIENCE
Michigan's Museum of Natural History

NOVEMBER 2020

Notable Sky Happenings

Nov. 1 - 7

Daylight Saving Time ends at 2:00am on the 1st. Set clocks back one hour at bedtime on Oct. 31. Moon is above Aldebaran, the "eye" of Taurus, on the 2nd (E evening).

Nov. 8 - 14

The Moon is above Regulus on the 9th (SE morn.) and above Venus on the 12th (ESE). On the 13th the Moon is above Mercury and to the left of Spica. Look around 6:15 close to the ESE horizon. Binoculars will help spot Mercury.

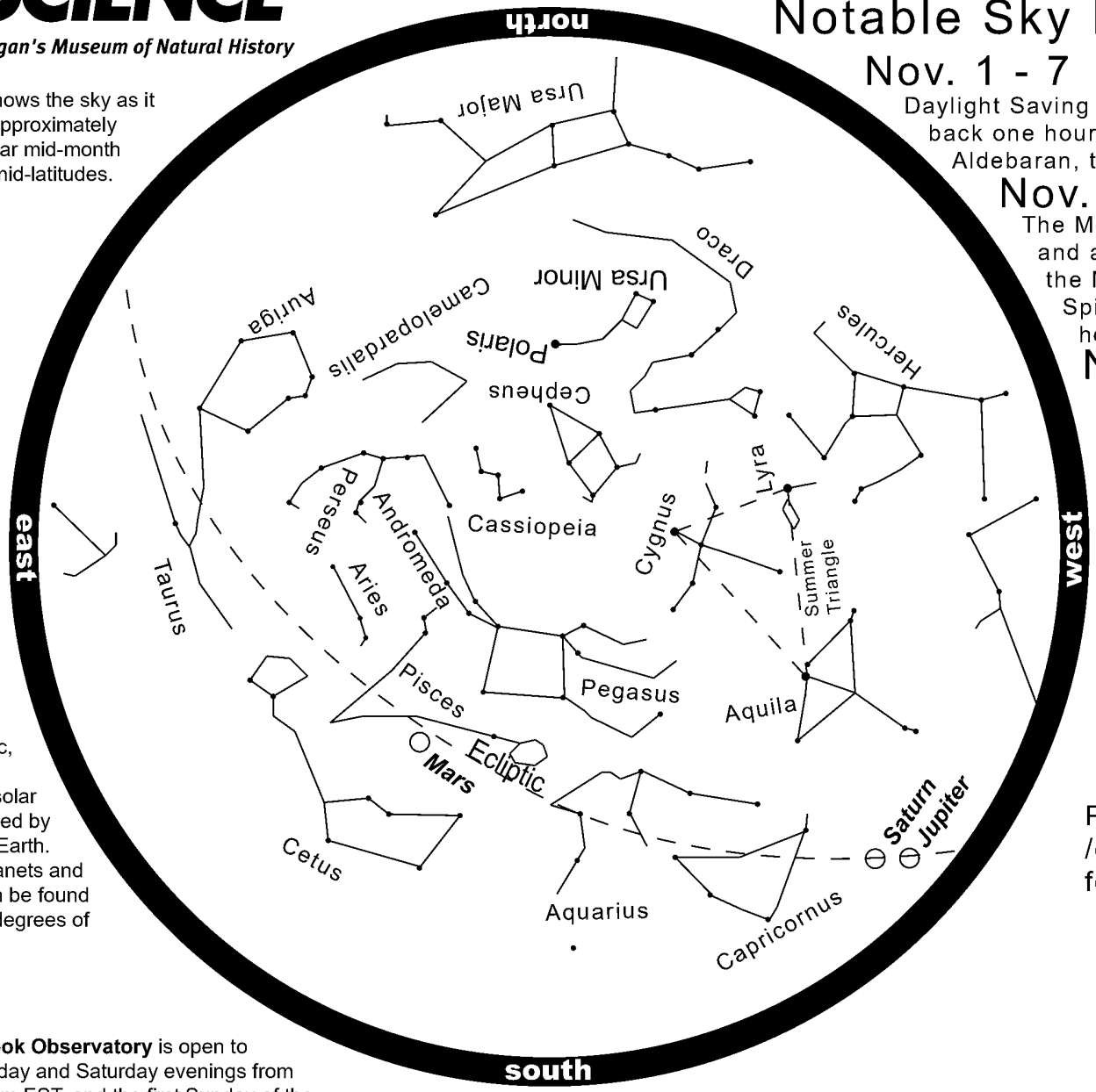
Nov. 15 - 21

The Leonid meteor shower peaks on Nov. 17-18. Expect an average of 15 per hour.

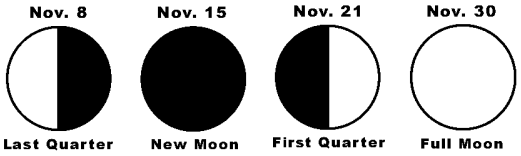
Nov. 22 - 30

Moon is below Mars on the 25th (SSE evening) and above Aldebaran on the 29th (E evening).

This chart shows the sky as it appears at approximately 8pm EST 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 be found within a few degrees of this plane.



Now Showing

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

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/explore/observatory

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

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 November 1, 2020 at 3:00 pm.

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

Riyad I. Matti
2020 WAS 2nd VP,
Observatory Chairperson

Treasurer's Report

Treasurer's Report for 10/31/2020

MEMBERSHIP

We have 93 current members

INCOME AND EXPENDITURES (SUMMARY)

We took in $2006 and spent/transferred $1769 We have $21274 in the bank $0 in checks and $585 in cash, totaling $21859 as of 10/31/2020

INCOME

AL 2020	$67.50
calendar 2020	$150.00
Donation	$348.88
Membership	$552.00
Merch	$84.00
Renewal	$831.00

EXPENSES

Calendar Shipping Cost	30.35
PO Box 2020	92.00
Snack Reimbursement	70.00
Snack Supplies	2.12
Speaker Expense, Dinner	54.23
Speaker Expense, Driving	261.00
Env. & Stamps for Beg Letters	19.32
Batteries for AP Hand Controller	33.07
Meetup Fees	89.94
Club Insurance Premium	1117.00

GLAAC REPORT 10/31/2020

Beginning Balance: $3,025

INCOME

Donation for AATB 2020, Ottums $50

EXPENSES

No activity

Ending Balance: $3,075

Mark Jakubisin
Treasurer

Astronomical Events for November 2020

Add one hour for Daylight Savings Time
Source:
http://www.astropixels.com/ephemeris/astrocal/astrocal2020est.html

Day	EST (h:m)	Event
01	22:00	Mercury at Perihelion
03	01:58	Aldebaran 4.6°S of Moon
03	21:39	Moon at Ascending Node
05	01:00	S Taurid Meteor Shower
06	14:52	Pollux 3.9°N of Moon
07	14:34	Beehive 2.3°S of Moon
08	08:46	LAST QUARTER MOON
09	05:20	Regulus 4.7°S of Moon
10	12:00	Mercury at Greatest Elong: 19.1°W
12	00:00	N Taurid Meteor Shower
12	16:30	Venus 3.1°S of Moon
13	15:45	Mercury 1.7°S of Moon
14	06:48	Moon at Perigee: 357839 km
15	00:07	NEW MOON
16	08:27	Venus 3.6°N of Spica
16	19:07	Moon at Descending Node
17	06:00	Leonid Meteor Shower
19	03:54	Jupiter 2.5°N of Moon
19	09:57	Saturn 2.9°N of Moon
21	23:45	FIRST QUARTER MOON
25	14:45	Mars 4.9°N of Moon
26	19:29	Moon at Apogee: 405891 km
30	04:30	FULL MOON
30	04:43	Pen. Lunar Eclipse; mag=0.829
30	08:07	Aldebaran 4.6°S of Moon

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

Outreach Report

Now that Astronomy at the beach is over, I want to start promoting GLAAC member clubs, and let the public know that we have presenters that are willing to do remote sessions for in-home and in-school classrooms. If you are interested in doing this type of presentation, please let me know!

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

AATB 2020 Meeting: Nov. 12 2020, at 7:00PM - *Everyone is Welcome!*

Online at: https://umich.zoom.us/j/584733345 (Password: 0000)
W.A.S. Calendar Entry: [LINK]

Even if you can't make it to the next planning meeting, you can join the groups.io site to get emails and updates from the planning committee. https://glaac.groups.io/g/main.

GLAAC Board Meeting Minutes

October 16, 2020 - ONLINE, 7pm
https://umich.zoom.us/j/584733345

Call to order: 7:05 pm

Online:

- Adrian Bradley - GLAAC President, Lowbrows
- John Wallbank - GLAAC Vice President, Lowbrows
- Jeff Kopmanis - GLAAC Secretary, Lowbrows
- Brian Ottum - GLAAC Communication, Lowbrows
- Bob Trembley - WAS
- Mike Ryan - GLAAC Board, Ford
- Shannon Murphy - Lowbrow, EMU

Discussion:

1. Victory Lap! (What went well)
    a. Basic statistics
    b. Bring back popular events
2. What To Fix for 2021
    a. See Debrief document
        https://docs.google.com/document/d/1vHbiOXQue3EbXZe9UL2d83aQTeuwV_9iHRwMdRJJyOk/edit?usp=sharing
    b. Survey should be part of the planning for 2021
    c. Need to make it easier to find the survey site
    d. After-video pitch for likes, survey site (video or host)
3. Visitor Survey Results - Brian Ottum https://www.surveymonkey.com/stories/SM-F8VWT6CY/
    a. Survey should be part of the planning for 2021
    b. Need to make it easier to find the survey site
    c. Ask for unmet expectations/needs
    d. Ask for favorites
    e. Ask for "what pissed you off"

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4. Date for AATB 2021
    a. Covid-19 will dictate live event
    b. First Quarter Moon is ideal
    c. UM starts on Aug 30; EMU starts on ??;
    d. September 10/11 - too close to Labor day?
    e. September 17/18 - International Observe the Moon Night - Oct 16
    f. **September 24/25** - Moon rise is around 9:30 with more terminator
    g. Tentative 2021 Date: Sept 24/25
    h. *Send out Poll in groups.io for thumbs up/down*
5. Incorporation & Bank Account status - John/Adrian
    a. Status
        i. Michigan EIN and IRS Tax ID established
        ii. Bank account forthcoming
        iii. Transferring GLAAC funds from WAS
        iv. Gnucash will be used for accounting
        v. SAVE YOUR RECEIPTS until bank acct established
    b. 503c(3)
        i. Plenty of paperwork to accomplish
    c. Bylaws stipulate that there must be a delegate from each club to the AATB planning committee
        i. Poses more problems for expansion beyond SE Michigan
6. Groups.io list: What's the primary purpose?
    a. Groups.io: AATB Planning
    b. MCommunity: Board
    c. No events list, due to list management - MailChimp
7. Next Meeting?
    a. December 3, 2020. 7pm. -- Nominations for 2021 officers.
        i. Can be made by Email to Pres & VP until January 14, 2021
    b. Send announcement out to groups.io and clubs

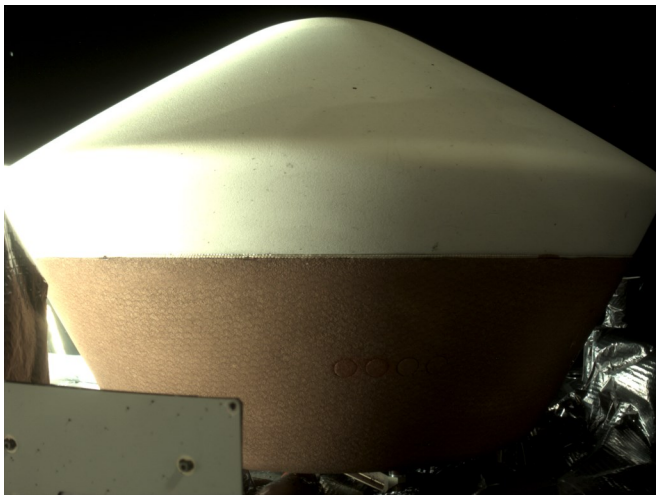
Adjourn:

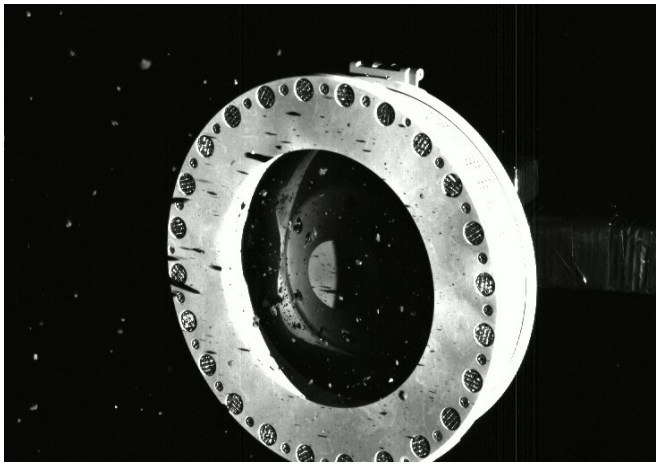
Motion to adjourn by JW, seconded by JK. Approved by unanimous vote.

Meeting Adjourned at 8:30 pm.

OSIRIS-REx Acquires Sample from Surface of Asteroid Bennu!

I'm a volunteer ambassador for NASA's OSIRIS-REx asteroid sample return mission; unfortunately with COVID-19, I've been unable to lecture about it at libraries like I've wanted to - I have been covering it in my weekly posts for the Vatican Observatory Foundation. I can not tell you how excited I am about the recent successful, maybe *overly successful*, sample acquisition from the surface of asteroid Bennu! The sample head is full of rocks and dust, and apparently a large rock has prevented a mylar flap from sealing the sample head, and some smaller rocks were escaping!





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The sample head has been stowed successfully in the sample return capsule, and will return to Earth in 2023.

I *REALLY* want a piece of Bennu; I asked Dolores Hill several questions about a possible privately-funded sample return mission with a larger sample head.

Dolores said *"A huge sampling head may or may not be helpful. If ours had been too big, it would have made it harder to locate a large enough, safe site. A larger head would be heavier - require more gas to flow through it, etc. But, who knows, the engineers know how to scale up. Almost anything is possible given enough resources.*

Regarding paying for itself...In my opinion, it would depend on what the investors wanted from such a mission" - in my case samples for sale to collectors or researchers.

Dolores said that the OSIRIS-REx mission cost ~$800 million over 14 years, not including the launch vehicle! *YIKES!* I'd need to find some wealthy investors or collectors!

I asked if there were any quarantine requirements for extraterrestrial samples? *"Not for Bennu samples because of its history and the surface has been bathed by solar UV for a long time. That said, we will try to keep the pristine returned sample as clean as possible from us (terrestrial contaminants)."*

Dolores told me that The TAGSAM head will undergo studies and be archived at NASA-JSC as space hardware; she thinks the next sample return mission will be a NASA-ESA Mars mission.

Kerbal Space Program Partners with NASA *(again)* to Celebrate the International Space Station's 20th Anniversary!

The developers of Kerbal Space Program are asking players to send them time-lapse videos of Kerbals doing spacewalks, science experiments, eating snacks, and everything in between aboard your most accurate recreation of the International Space Station over its 20-year lifespan. They'll choose their favorites based on accuracy and creativity.

On November 2, join @Space_Station expert Dr. Gary H. Kitmacher for a @Reddit Ask Me Anything where they'll comment on the engineering accuracy of the top submissions, and answer your questions about #SpaceStation20th.

Bob Trembley

Meeting Minutes

BOARD MEETING – October 5, 2020

Board Members logged in: All present. Diane Hall called the meeting to order at 6:30.

Old Business

Diane reported that even though GLAAC was unable to have a live Astronomy at the Beach event this year, the virtual program proved to be a great success!

Dale Partin reported that we are in good shape for speakers into early next year. He noted, however, that it is proving somewhat difficult to sign up highly qualified outside speakers because many of them are reluctant to commit to a presentation far in advance. Solutions?

Riyad Matti noted that wasps continue to be a concern in the walls of the observatory. He plans to have the openings caulked soon after the insects become dormant for the season. The grounds are still not available for night use. Glenn noted that there may be changes now that the state Supreme Court has ruled that our governor can no longer issue emergency COVID restrictions without approval from the legislature.

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Jonathan Kade reported that the September WASP is up. Also, **help** is needed to complete the Year in Review program for our "banquet", & 2020 mailer.

Mark Jakubisin reported payment was wired for our annual insurance bill at the end of September. Ken Bertin was able to achieve a $29 reduction.

Glenn Wilkins reported that all the September minutes were submitted for review and released for publication shortly after the Macomb meeting to reduce the timing pressure for WASP publication.

Bob Trembley reported that interest was highest for the virtual Astronomy at the Beach event on Friday. He also noted that the GLAAC website is still open for those wishing to view any of the recorded presentations. **Should we advertise this?**

New Business

Paul Strong Scholarship – The Board closely reviewed qualifications for 3 finalists for this $500 scholarship at Macomb. It was agreed that it be awarded to Victoria Van Valkenburgh who ultimately plans to pursue a degree in Environmental Engineering at UofM. Dale will provide this information to the proper office at Macomb. When this scholarship was initiated there were only 3 applicants. This year there were 40 to sort through!

Remote elections – Diane indicated that feasibility has been established although some details still need to be worked out. Dr. Partin will be the committee chairman with support from Ken Bertin but an additional volunteer still needs to be found.

Calendar Committee – Bill Beers will likely be part of this team, but others are strongly encouraged to join. Photos other than comets are being sought to provide variety!

Banquet – Dale indicated that the speaker is confirmed and also offered Diane a couple of comedy astronomy videos for consideration. Door prizes will still be awarded for this virtual event, although it is not yet clear how they will be distributed. Glenn reported that 31 "beg letters" were mailed on 9-21 under WAS letterhead. The Board is looking for candidate recommendations for the 4 major awards plus any honorable mentions. Contact Dale.

Membership status – Jonathan agreed to update the 2020/21 membership list, including duration, to end confusion.

CRANBROOK VIRTUAL MEETING
October 5, 2020

Diane called this meeting to order at 7:30. 31 members continued to participate on Webex and an additional 14 joined on You Tube.

In the News/Sky was not available this time.

Officer/Viewing reports

Diane congratulated everyone who has contributed so much in creating an exceptional program for the GLAAC Astronomy at the Beach virtual gathering this year. She also requested members to nominate non-Board members for the Distinguished Service Awards or for other general service awards. Finally, she asked for suggestions for anything that could be added to the banquet program.

Dale reported that the October 15 meeting will feature Dr. Patricia Strait sharing her experience with projects searching for life on Mars.

Jonathan reported that the complete Treasurer's report, and minutes for all the meetings can be found in the current WASP which also includes a movie review and many other Mars topics. He further noted that this WASP issue received high compliments from Gary Ross!

Mark reported 93 members and a total balance of $23K at the end of September. On November 2 Jenny Ponds will talk about Space Ghosts! There will be no short presentation at the Cranbrook meeting due to election voting.

Bob reported that detailed results and recommendations regarding the Astronomy at the Beach event can be found in the WASP.

Short talk – Dr. Partin introduced grad student Anne Blackwell of U of M to share her experience analyzing supernovae emissions analysis entitled The Little Big Bangs. Anne first gave us examples of energy levels generated from various relatively small manmade explosions up though exploding stars. She then gave us a history of what was accomplished with visual equipment and compared that to new capabilities now made available through the Chandra X ray scope, and other refinements. The presentation was well-received, and Anne was encouraged to return with updates and further discoveries.

Break – 8:25 to 8:45

Dr. Dale Partin introduced Dr. David Levy to share his unique path to advanced amateur astronomy and entitled A Life in Astronomy. Along the way

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David managed to discover 22 comets, write 34 books and contribute many articles for popular astronomy-related magazines! He was close to his father who strongly influenced him to study Shakespeare and other great writers. Among these were G.M. Hopkins, Tennyson, Dante and Leonard Cohan. Many of these writers composed memorable, almost spiritual, verses about the night skies.

In talking about his amazing achievements with comet discovery, David noted this has become a bygone experience for amateurs as new discoveries are now almost the exclusive domain of automated, high-tech equipment. These impressive machines can quickly cover large swaths of sky and note movements of objects not previously cataloged.

The meeting was closed at 9:38

MACOMB VIRTUAL MEETING – October 15, 2020

Diane Hall called this meeting to order at 7:30 PM for 10 viewers on You Tube and 22 participants on Webex

IN-THE-NEWS/IN-THE-SKY presented by Diane
News highlights –

NASA will televise the expected landing of Osiris-Rex on asteroid Bennu next week. Expectations are that samples will be collected for return to Earth for analysis.

Astronomers announced the "spaghettification" of a star by a supermassive black hole in a galaxy only 215 million light-years away. A light flare was recorded on video at the conclusion of this tidal disruption event.

A shuttle Launch from Russia to the ISS arrived at the space station in a record time of just over 3 hours with 2 cosmonauts, and an astronaut celebrating her birthday. This represents a dramatic improvement from earlier days which usually took several orbits to achieve docking alignment.

The Bepi Columbo Mercury explorer performed a Venus flyby maneuver to adjust speed. It was one of many required to ultimately achieve the targeted Mercury orbit. Unfortunately, the launch was made before the discovery of phosphene in the atmosphere, so measurements were not possible.

Recently released New Horizons photos from 100 km over Pluto look very similar to photos of our Alps from the same altitude. The Pigafetta and Elcano Montes are composed of rock-hard water ice and the "snow" is actually frozen methane created by reverse atmospheric flow patterns not found on Earth.

Sky attractions include current extraordinary views of Mars, and expectations of a good showing for the Orionids on 20/21 this month.

OFFICER REPORTS

Diane reported that the **Calendar Committee** is soliciting proposed astro photos and additional help. Contact Bill Beers or Jonathan Kade. Also, the **Election Committee** still needs another member. Board candidates are especially needed for treasurer & secretary for election at the next Cranbrook meeting. Contact Dale Partin or Ken Bertin. Diane is also seeking additional nominations for **service awards** for presentation at the virtual banquet.

Dale reported additional speakers are needed for early 2021.

Riyad noted that the observatory is still closed.

Glenn was unable to report due to technical problems with audio, possibly due to recent Webex software changes.

Mark reported we currently have 93 members and $23k in bank deposits and cash.

Bob asked for outreach updates and noted that GLAAC has decided to actively promote member societies!

Jonathan asked that those providing WASP material please try to do so a few days earlier as considerable time is needed to prepare the monthly publication before the Cranbrook meeting. He also noted that automatic meeting notices from Webex are not reliably sent out prior to our virtual meetings. Alternative ways to publish notices are being considered although each meeting has its own number which remains constant from month to month.

OBSERVING REPORTS

Bob reported modest sunspot activity but lots of prominences.

Dale Hollenbaugh reported on the Pacman Nebula and Mars but found Miranda "elusive".

David Levy reported good views of Syrtis Major and the Hellas Bason on Mars.

The WAS received a detailed report from Gary Ross as an "announcement" for his viewings of Mars at the Veen Observatory from October 3-9 through a 5" Newtonian refractor.

Dale reported on the important relocation of the

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PlaneWave Instruments Company to Adrian, Michigan and the opportunities it brings to amateur astronomers. The campus is on 57 acres and open to touring. A report was E-mailed to WAS membership.

BREAK – 8:17 to 8:30

MAIN PRESENTATION – Dr. Dale Partin introduced John Dumar who graduated from Wayne State with a masters degree in science. John provided detailed data regarding positions of the Galilean moons over several months and then guided his high school physics and science students through impressive calculations to validate the mass of Jupiter. and resonances set up by gravitational interactions over long periods.

The presentation was quite technical with lots of charts and required an understanding of physics, calculus, trig and geometry to fully appreciate the accomplishment.

Diane closed the meeting at 9:20

Glenn Wilkins
Secretary

McMath-Hulbert Report

A group of us is bringing our 12-inch f/15 Maksutov nighttime telescope up to speed so that members can do evening observing and astrophotography. We successfully observed Mars at its opposition on October 14! Below is an image of Mars I took with my phone. It's big and it's orange!

Work continues on restoring the spectroheliograph in Tower 2 to get it back into operation. There were electrical issues with the motor that opens and closes the dome shutters. Now that these are resolved we can continue collimation of this the main instrument housed in the second tower. This fix also allows us to use the 12" Mak up at the top too.

Other ongoing tasks are cleanup in the main building and working on one of the two furnaces in the main building to replace a fan limit switch. We keep the heat in the building to around 50F during the winter to protect the plumbing from freezing.

Unfortunately, we have had to suspend our monthly first Saturday open houses temporarily, but please watch for further updates.

With your continued contributions and participation, we will move forward to make this facility into a valuable educational resource and historic landmark in Michigan.

McMath-Hulbert Observatory Facebook Page:
https://www.facebook.com/MHObservatory/

McMath-Hulbert Observatory website:
http://www.mcmathhulbert.org/solar/

Check the Facebook page and website for open house announcements.

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!

The International Space Station: 20 Continuously Crewed Years of Operation

-David Prosper

Did you know that humans have been living in the International Space Station, uninterrupted, for twenty years? Ever since the first crew members docked with the International Space Station (ISS) in November 2000, more than 240 people have visited this outpost, representing 19 countries working together. They have been busy building, upgrading, and maintaining the space station - while simultaneously engaging in cutting-edge scientific research.

The first modules that would later make up the ISS were launched into orbit in 1998: the Russian Zarya launched via a Proton-K rocket, and the US-built Unity module launched about a week and a half later by the Space Shuttle Endeavour. Subsequent missions added vital elements and modules to the Space Station before it was ready to be inhabited. And at last, on November 2, 2000, Expedition-1 brought the first three permanent crew members to the station in a Russian Soyuz capsule: NASA astronaut William M. Shepherd and Russian cosmonauts Sergei Krikalev and Yuri Gidzenk. Since then, an entire generation has been born into a world where humans continually live and work in space! The pressurized space inside this modern engineering marvel is roughly equal to the volume of a Boeing 747, and is sometimes briefly shared by up to 13 individuals, though the average number of crew members is 6. The unique microgravity environment of the ISS means that long-term studies can be performed on the space station that can't be performed anywhere on Earth in many fields including space medicine, fluid dynamics, biology, meteorology and environmental monitoring, particle physics, and astrophysics. Of course, one of the biggest and longest experiments on board is research into the effects of microgravity on the human body itself, absolutely vital knowledge for future crewed exploration into deep space.

Stargazers have also enjoyed the presence of the ISS as it graces our skies with bright passes overhead. This space station is the largest object humans have yet put into orbit at 357 feet long, almost the length of an American football field (if end zones are included). The large solar arrays – 240 feet wide - reflect quite a bit of sunlight, at times making the ISS brighter than Venus to observers on the ground! Its morning and evening passes can be a treat for stargazers and can even be observed from brightly-lit cities. People all over the world can spot the ISS, and with an orbit only 90 minutes long, sometimes you can spot the station multiple times a night. You can find the next ISS pass near you and receive alerts at sites like NASA's Spot the Station website (spotthestation.nasa.gov) and stargazing and satellite tracking apps.

Hundreds of astronauts from all over the world have crewed the International Space Station over the last two decades, and their work has inspired countless people to look up and ponder humanity's presence and future in space. You can find out more about the International Space Station and how living and working on board this amazing outpost has helped prepare us to return to the Moon - and beyond! - at nasa.gov.

The ISS photobombs the Sun in this amazing image taken during the eclipse of August 21, 2017 from Banner, Wyoming. Photo credit: NASA/Joel Kowsky More info: bit.ly/eclipseiss

A complete view of the ISS as of October 4, 2018, taken from the Soyuz capsule of the departing crew of Expedition 56 from their Soyuz capsule. This structure was built by materials launched into orbit by 37 United States Space Shuttle missions and 5 Russian Proton and Soyuz rockets, and assembled and maintained by 230 spacewalks, with more to come! Credit: NASA/Roscosmos More info: bit.ly/issbasics

Last Word

-Jonathan Kade, Publisher

VOTE!