

The Prairie Astronomer

December 2019 Volume 60, Issue #12

In this issue:

Mantrap Skies: Arp 12

Mars 2020

Jupiter Vortex



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

**NEXT PAC MEETING: December 17 at 6:30pm
at Mueller Planetarium**

PROGRAM

Our December Christmas Celebration Meeting will be Tuesday, December 17th hosted at the UNL Planetarium starting at 6:30 PM. Please plan to join us for dinner, social, and a planetarium show.

FUTURE PROGRAMS (Tentative)

January: How to Use Your Telescope
February: Astrophotography

CONTENTS


- 4 Minutes
- 5 President's Message
- 6 Mantrap Skies
- 8 January Observing
- 9 Astrophotography
- 10 Apollo 12 and Mars 2020
- 12 Sunspotters Program
- 13 From the Archives
- 14 Club Information

Cover photo: *Soft pastels enhance the rich colors of the swirls and storms in Jupiter's clouds. This image of a vortex on Jupiter, taken by the Juno mission camera, JunoCam, captures the amazing internal structure of the giant storm.*

The exquisite processing of the original JunoCam image by Gerald Eichstädt and Seán Doran delights our senses while at the same time giving scientists a sense of the complexity of the dynamics of Jupiter's storms.

JunoCam's raw images are available for the public to peruse and process into image products at

<https://missionjuno.swri.edu/junocam/processing>.



The Prairie Astronomy Club:
Fifty Years of Amateur Astronomy

Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy.
Order online from [Amazon](https://www.amazon.com) or [lulu.com](https://www.lulu.com).

COMPILED AND EDITED BY MARK DAHMKE

EVENTS



December PAC Meeting
 Tuesday, December 17 at 6:30pm, Mueller
 Planetarium
 Holiday Gathering

PAC Meeting
 Tuesday January 28, 2020, 7:30pm
 Program: How to Use Your Telescope

PAC Meeting
 Tuesday February 25, 2020, 7:30pm
 Program: Astrophotography (tentative)

PAC Meeting
 Tuesday March 24, 2020, 7:30pm
 Program: TBA

2020 STAR PARTY DATES



Photo by Brian Sivill

	Star Party Date	Star Party Date
January	Jan 17	Jan 24
February	Feb 14	Feb 1
March	Mar 1	Mar 8
April	Apr 19	Apr 5
May	May-19	May 22
June	Jun 21	Jun 19
July	Jul 10	Jul 17
NSP	July 19 - 24	
August	Aug 23	Aug 30
September	Sep 20	Sep 27
October	Oct 18	Oct 16
November	Nov 22	Nov 13
December	Dec 11	Dec 27

Dates in **BOLD** are closest to the New Moon.



PAC E-MAIL:

info@prairieastronomyclub.org

PAC-LIST:

Subscribe through [GoogleGroups](#).
 To post messages to the list, send
 to the address:

pac-list@googlegroups.com

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WEBSITES

- www.prairieastronomyclub.org
- <https://nightsky.jpl.nasa.gov>
- www.hydeobservatory.info
- www.nebraskastarparty.org
- www.OmahaAstro.com
- Panhandleastronomyclub.com
- www.universetoday.com/
- www.planetary.org/home/
- <http://www.darksky.org/>



Night Sky Network

PAC meeting minutes November 26, 2019

President Bob Kacvinsky started the meeting at 7:30pm welcoming 11 members in attendance, 2 guests (low turnout due to inclement weather)

Jim Kvasnicka announced the upcoming star party dates for November 29, and Dec 20 and Dec 27. Alternating sites between Branched Oak Observatory and the Cortland PAC observing site, as to which site for each date will be determined and announced in newsletter.

Jim proceeded with the observing report:

- Planets visible in December, Venus Jupiter and Saturn to start the month,

December 10 & 11, Saturn & Venus less than 2 degrees apart from each other,

Night planets Uranus and Neptune, AM planets Mars and Mercury before sunrise.

- Geminids meteor shower, (unfortunately waning gibbeous moon will impact observing)

- Messier list for December M2, 15, 29, 31, 32, 39, 110

- NGC objects 246, 247, 869/884, 972, 1365

Bob continued with notes of interest in the news

- Rover BRUIE (Buoyant Rover for Under-Ice Exploration) to be tested in the oceans of Antarctica for future exploration in ocean worlds beyond earth.

- Neptune – two of the moons are locked in orbital “dance of avoidance”

- Both Voyager probes 1 and 2 launched in the 1970’s have traveled outside the Sun’s heliosphere

- Hyde Observatory deck roof is back on and rolls easily now.

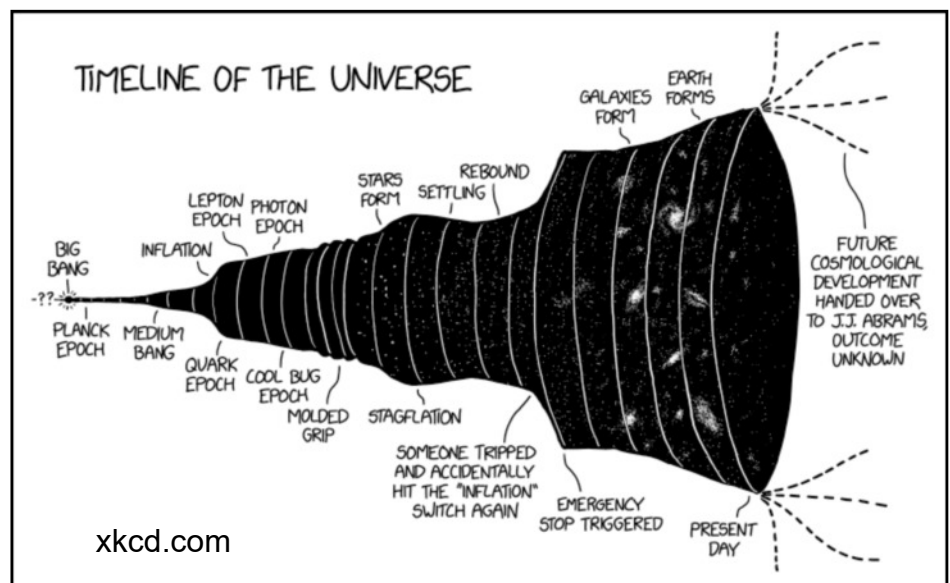
Bob continued with recognition of thanks to volunteers who helped at October’s outreach events including Howling Halloween, Lazy horse Brewery in Ohiowa NE, South Pointe shopping center scavenger hunt event.

Confirmation from Zach Thompson the December PAC meeting for our annual Holiday party at UNL Mueller planetarium is the 17th at 6:30pm (no meeting at Hyde as the last two Tuesdays fall on Christmas Eve and New Year’s Eve)

New Business

- review of recommendations by committee for disbursement of Jim Rains’ donated equipment was approved by club officers and presented for final approval by PAC. John Lammers put forth a motion to approve recommendations, seconded by Jim Kvasnicka and Bill Lohrberg, all present in favor, none opposed.

With no further business the meeting was adjourned to the program “How to buy a telescope”



The President's Message

Bob Kacvinsky

Special thanks to everyone who helped out at the November "How To Buy A Telescope" program even though the weather impacted attendance. It seems only fitting that weather would play a factor in a public program. Common theme throughout 2019.

At the November meeting the membership approved the recommendations from the Board and Special Committee to begin the distribution of the donated astronomy materials from Jim Rains' Estate. Thanks to all who helped to get everything cataloged and recommendations for disbursement. There will be more information coming around those items that will be offered to the club membership for purchase through auction. Stay tuned.

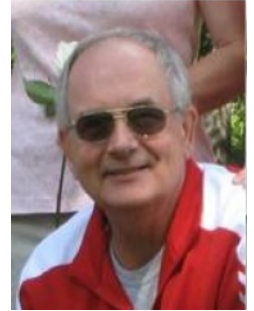
Reminder that our December Christmas Celebration Meeting will be Tuesday, December 17th hosted at the UNL Planetarium starting at 6:30 PM. Please plan to join us

for dinner, social, and a planetarium show.

As you continue your Holiday shopping, please consider upgrading the default Amazon to using Amazon Smile. This is a free service from Amazon that does everything the same as the base Amazon website except Amazon donates .5% of all purchases to your designated charity – ie Prairie Astronomy Club. Set up is very easy:

1. Go to smile.amazon.com and log in the same as you would with your amazon account
2. Once signed in, you will be directed to the charity selection page
3. Select "or pick your own charitable organization"; enter "CHEST Foundation"; then click search for Prairie Astronomy Club and hit enter. Follow any other directions. Simple. Easy. Free to you.
4. After set up, when you search the internet and it takes you to an Amazon page, there should be a pop up screen that asks

you to switch to Amazon Smile. Click yes. Then when you make a purchase Amazon will automatically add the donation into the PAC account. No action needed.



<https://foundation.chestnet.org> > way to go > amazon smile set instructions

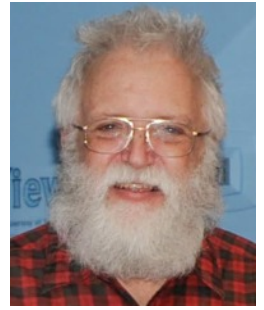
Our January meeting program will be a special public meeting to help those that have brought a telescope or members who would like to bring in their scopes to have help with collimation, setup, and any other questions.

Dark and Clear Skies to you during this joyous holiday season.

Bob Kacvinsky PAC President

Björn Jónsson created this [enhanced color image](#) using data from the JunoCam camera. It was taken on Nov. 3, 2019 at 2:13 p.m. PST (5:13 p.m. EST) at a latitude of about 38 degrees north.

Rick Johnson, a founding member of the Prairie Astronomy Club, passed away in January, 2019. His legacy lives on through his comprehensive catalog of over 1600 images at www.mantrapskies.com.



Arp 12, NGC 2608 is a "grand design" barred spiral about 110 million light-years away. The bar is short running nearly east to west so at first glance it may appear to have a bar. It is classed by Arp under "Spiral galaxies: Split arm". In this case, the arm on the western side splits into three parts while the arm on the east (left) side is normal. I took and am displaying the image at 0.5" per pixel rather

than my normal 1" per pixel. Seeing wasn't really up to it however so I likely would have had better results using my normal 1" pixel. Only thing is, looking at Arp's image it appears seeing on Mt. Palomar was even worse than mine. Must go with imaging this galaxy. It was so poor in fact that he couldn't tell if the second object in the galaxy was a second core (due to a merger) or a star. His comment

was; "Nucleus may be double or superposed star." Even with my seeing it is obviously a blue star. Though being able to image using color filters makes the task of separating star from galaxy core much easier. In fact, there's no sign of any merger or disturbing galaxy. So why the one arm is split like it is, remains



a mystery. You can see there is an outer halo of the galaxy though such halos are rather common with most spiral galaxies if you expose long enough. Still, it is unusually bright and may have been due to the same cause as the split arm, whatever that was. Several other papers refer to "2 stars superimposed on the bar". I only see the blue star and the nucleus though in my processing the core does look much like a star. Are these the two stars these papers refer to? If so the blue star isn't on the bar

but I don't see any hint of other stars but these two.

The galaxy was discovered by William Herschel on March 12, 1785. It is neither of the two Herschel 400 Observing program. NED classifies it as SB(s)b., the NGC Project says SBb/SBc and Seligman says SB(s)b. They all pretty much agree for once. I measure it at a bit over 60,000 light-years in size.

There's not much else going on in this image. The only other galaxy of note is to the northeast (upper left). It is trying to hide

behind a field star (one in our galaxy). It is ASK 281454.0 shining at a rather bright magnitude 18.6. What's surprising is its redshift distance. That is 2.2 billion light years. It must be a spectacular sight to those no farther from it than we are from Arp 12.

Arp's image:
http://ned.ipac.caltech.edu/level5/Arp/Figures/big_arp12.jpeg

Urban Astrophotography



Yes, you can do astronomy in central London, but don't expect much. This is a photo of Jupiter above Westminster Abbey and Parliament, taken at 4:45pm on December 9, 2019. Big Ben is on the right, under all the scaffolding.

Panasonic Lumix G9, 20mm lens at f/2.8, 1/20 second. It was a clear night and I saw only Jupiter and Saturn - no stars were visible through the light pollution.

By Mark Dahmke

This is a partial list of objects visible for the upcoming month.

Planets

Venus: Starts the month 25° above the horizon and ends the month 34° high setting three hours after the Sun.

Uranus and Neptune: Finder charts are in the September issue of Sky & Telescope.

Mercury: Sets around 70 minutes after the Sun in the SW the last days of January.

Mars: Rises about three hours before the Sun at magnitude 1.5.

Jupiter: Not visible until the second week of January before sunrise at magnitude -1.9.

Saturn: Not visible in January.

Meteor Showers

Quadrantids: Peaks the night of January 3-4 with the best viewing after 2 am.

Messier List

M33: The Pinwheel Galaxy in Triangulum.

M34: Open cluster in Perseus.

M52: Open cluster in Cassiopeia.

M74: Galaxy in Pisces.

M76: The Little Dumbbell in Perseus.

M77: Galaxy in Cetus.

M103: Open cluster in Cassiopeia.

Last Month: M2, M15, M29, M31, M32, M39, M110

Next Month: M1, M35, M36, M37, M38, M42, M43, M45, M78, M79

NGC and other Deep Sky Objects

NGC 1425: Galaxy in Fornax.

NGC 1857: Open cluster in Auriga.

NGC 1907: Open cluster in Auriga.

NGC 1980: Emission nebula and open cluster in Orion just south of M42.



Double Star Program List

Beta Orionis: Rigel, bright white and dim blue stars.

Delta Orionis: Mintaka, white and blue pair.

Struve 747: White pair of stars.

Lambda Orionis: White stars.

Theta 1 Orionis: The Trapezium.

Iota Orionis: White primary with a blue secondary.

Theta 2 Orionis: Three white stars.

Sigma Orionis: White primary with three pale blue stars.

Zeta Orionis: Bright white primary with two white secondary stars.

Challenge Object

B33: The Horsehead Nebula in Orion. Use a Hydrogen-Beta filter.



Mark Dahmke
PHOTOGRAPHY



Above: Orion is high in the Hawaiian sky, November 22nd.

Left: an alien invasion? No, just more light pollution. This is a two second exposure out of a twenty minute long pass of dozens of recently launched SpaceX Starlink satellites. November 21, 5am, Kailua-Kona, Hawaii.

Photos by Mark Dahmke

Fifty years ago on November 20, 1969 during their second moonwalk, Charles "Pete" Conrad Jr. and Alan Bean became the first humans to reach out and touch a spacecraft that had previously landed on another celestial body. NASA's 1969 Apollo 12 Moon mission and the upcoming Mars 2020 mission to the Red Planet may be separated by half a century and targets that are 100 million miles apart, but they share several mission goals unique in the annals of space exploration.

"We on the Mars 2020 project feel a special kinship with the crew of Apollo 12," said John McNamee, Mars 2020 project manager at NASA's Jet Propulsion Laboratory in Pasadena, California. "They achieved the first precision landing, deployed the most advanced suite of science instruments of the time, and were the first to interact with another spacecraft that put down on another world. That's all part of the Mars 2020 playbook as well."

NASA needed Apollo 12 to prove a precision landing was possible because future Apollo missions would target locations in the lunar highlands, where mountains, massive craters, boulder fields and rilles could ruin their day if the lunar modules strayed from their prescribed landing path. And while the previous mission, Apollo 11, was a monumental success, it overshot its intended

landing site in the Sea of Tranquility by about 4 miles (6 kilometers).

To demonstrate a precision landing, Apollo 12 mission planners could have chosen just about anywhere on the nearside of the Moon by targeting any of literally millions of known geologic features. In the end, they chose for Pete and Al a relatively nondescript crater in the Ocean of Storms because JPL had plunked down a spacecraft there two-and-a-half years earlier.

"When Pete and Al put the lunar module Intrepid down within about 520 feet [160 meters] of Surveyor 3, it gave NASA the confidence to later send Apollo 15 to Hadley Rille, Apollo 16 to go to the Descartes Highlands and Apollo 17 to land at Taurus Littrow," said McNamee. "We also have to be precise with our landing on Mars - not only to pave the way for future precision landings on the Red Planet for both robotic and human-crewed missions, but also because Mars 2020's scientifically appealing landing site at Jezero Crater has all sorts of cliffsides, sand dunes, boulders and craters that can adversely affect us during landing."

Mars 2020 will be history's first planetary mission to include terrain relative navigation, a computerized autopilot that utilizes optical imagers and computers to help Mars 2020 avoid landing hazards and make

the most accurate landing on a planetary body in history.

Sweet Suite Science

There are other similarities. During their first moonwalk, Conrad and Bean deployed the Apollo Lunar Surface Experiments package (ALSEP). Powered by a radioisotope thermoelectric generator, the five science instruments (seismometer, atmospheric sensor, solar wind spectrometer, lunar dust collector and magnetic field sensor) were the most advanced ever to be carried to another celestial body, and they sent back groundbreaking data on the lunar environment from November 1969 to September 1977. When Mars 2020 alights at Jezero Crater, it also will be equipped with the most advanced science instruments ever to travel to another world.

"The science instruments we carry benefit not only from advances in technology, but the hard lessons learned by those missions of exploration, including Apollo, that preceded us," said Ken Farley, project scientist for Mars 2020 from Caltech in Pasadena. "Our seven state-of-the-art science tools will help us acquire the most information possible about Martian geology, atmosphere, environmental conditions, and potential biosignatures, giving

us insight into the Red Planet like never before."

Return to Sender

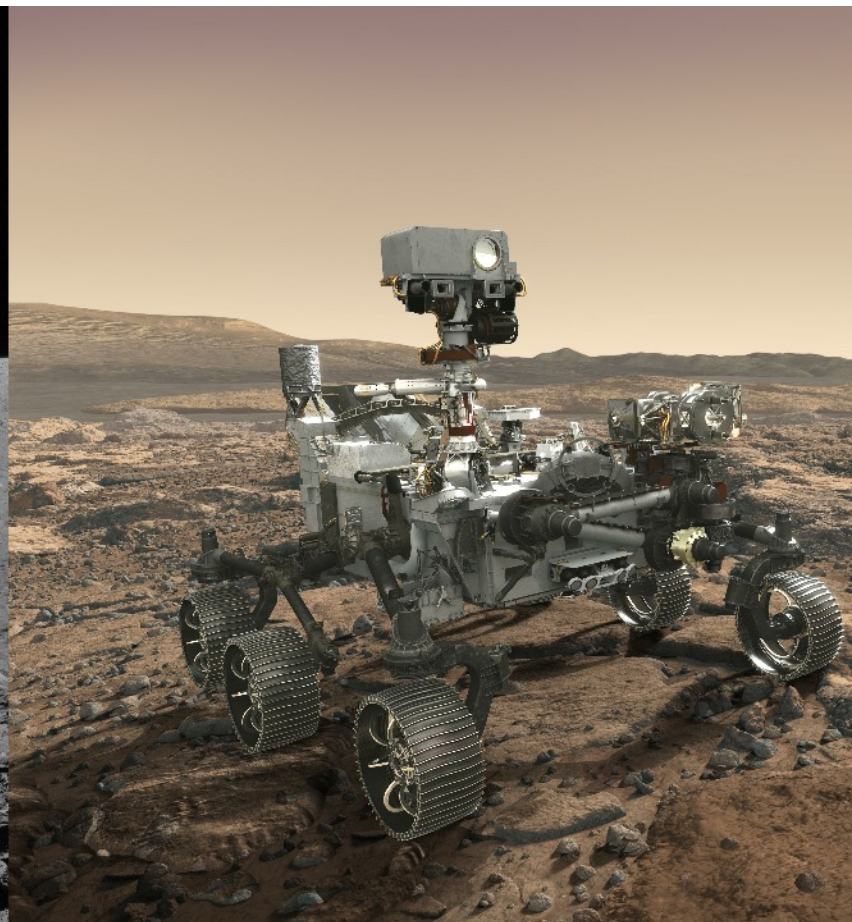
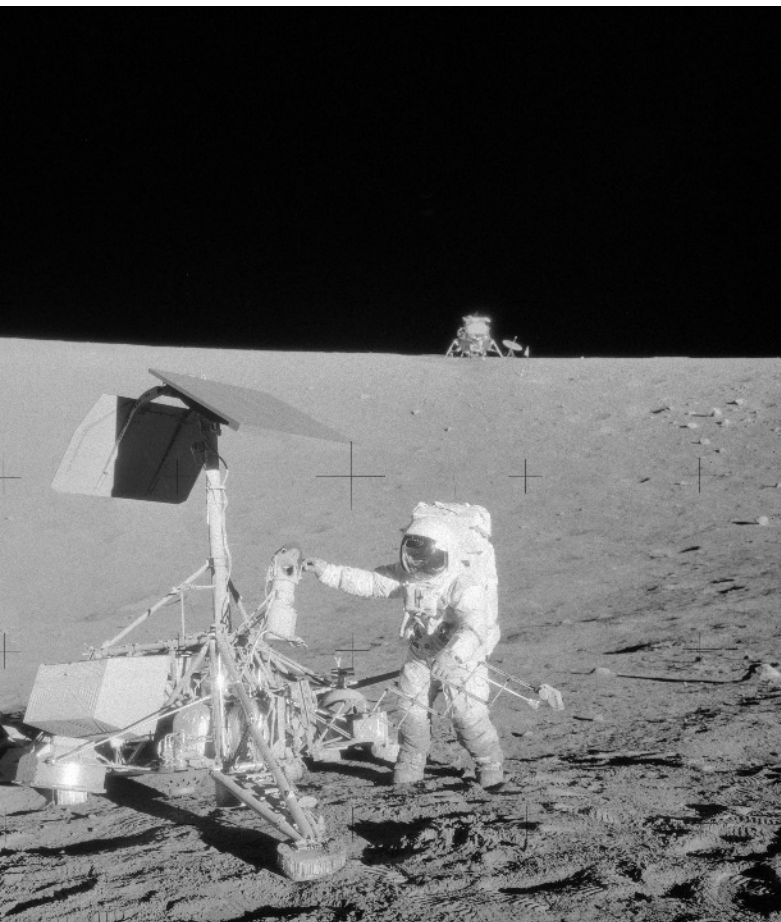
During their second moonwalk, Conrad and Bean reached the Surveyor 3 lander - one of the robotic missions that explored the Moon in advance of astronauts. They not only collected images and samples of the lunar surface surrounding the spacecraft, but cut, sawed and hacked parts off the three-legged spacecraft, including Surveyor's TV camera and its surface-soil sampling scoop.

"NASA wanted to see what happened to materials that were

exposed to the lunar environment for an extended period," said McNamee. "To this day, the samples of Surveyor 3, which endured 31 months at the Ocean of Storms, are our best and only demonstrations of the natural processes that can affect spacecraft components left on the Moon."

One of Mars 2020's major mission goals is to seek signs of past microscopic life, collecting the most compelling rock core and Martian dust samples. Subsequent missions, currently under consideration by NASA, would send spacecraft to Mars to collect these samples from the surface and return them to

Earth for in-depth analysis. To help engineers design spacesuits to shield astronauts from the elements, NASA is sending five samples of spacesuit material along with one of Mars 2020's science instruments, called Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals (SHERLOC). A piece of an astronaut's helmet and four kinds of fabric are mounted on the calibration target for this instrument. Scientists will use SHERLOC, as well as a camera that photographs visible light, to study how the materials



(Left) Apollo 12 astronaut Charles "Pete" Conrad Jr. stands beside NASA's Surveyor 3 spacecraft; the lunar module Intrepid can be seen in the distance. Apollo 12 landed on the Moon's Ocean of Storms on Nov. 20, 1969. (Right) Mars 2020 rover, seen here in an artist's concept, will make history's most accurate landing on a planetary body when it lands at Mars' Jezero Crater on Feb. 18, 2021.

degrade in ultraviolet radiation. It will mark the first time spacesuit material has been sent to Mars for testing and will provide a vital comparison for ongoing testing at NASA's Johnson Space Center.

Robots First, Astronauts Later

Just as NASA's Surveyor missions helped blaze a trail for Neil and Buzz on Apollo 11, Pete and Al on 12, as well as Al and Ed (Apollo 14), Dave and Jim (Apollo 15), John and Charlie (Apollo 16), and Gene and Harrison (Apollo 17), Mars 2020 is helping set the tone for future crewed missions to Mars.

Mars 2020's landing system includes a suite of sensors that will document the descent to the surface in never-seen-before detail so that future robotic and crewed missions factor those details into their landings. When on the surface, the rover's MOXIE instrument is designed to demonstrate that converting Martian carbon dioxide to pure oxygen is possible, and RIMFAX could teach us how to use ground-penetrating radar so that future missions can use it to find sources of fresh water.

"Isaac Newton once wrote, 'If I have seen further it is by standing on the shoulders of Giants,'" said McNamee. "When

Mars 2020 flies, it will allow us to see farther into the geologic history of the Red Planet than ever before - and that is happening because we too are standing on the shoulders of giants - giants like the crew of Apollo 12."

The launch period for Mars 2020 opens on July 17, 2020. It will land at Mars' Jezero Crater on Feb. 18, 2021.

For more information about the mission, visit:

<https://mars.nasa.gov/mars2020/>

Sunspotters Observing Program

Jim Kvasnicka

This month we focus on the Sunspotters Observing Program. The purpose of the Sunspotters Observing Program is to encourage solar observing. By doing this observing program the observer will learn the various features of solar activity and how these features change, and learn how to develop a regular solar observing program.

Before starting any solar observing program make certain you have safe solar filters to use.

In the Sunspotters Observing Program you will make two sets of drawings. The first set is 5 detailed sketches of sunspot groups. The second set is 20 or more sketches of the whole solar disk during two solar

rotations (one rotation is about 30 days).

The 5 sunspot sketches must be done on five different days. These sketches must include time, observing conditions, equipment used, and sunspot class. Several features of the sunspot must be identified. These features are identified on the Astronomical League website.

For the second set of drawings you will need to sketch the whole disk of the Sun throughout the passage of large sunspot groups during two different solar rotations. Your sketches must identify the sunspot penumbrae and umbrae. You must also classify the sunspot groups on the disk and perform a sunspot count.

You should have a minimum of 20 whole disk drawings for two rotations.

When you complete the Sunspotters Observing Program you will need to submit a copy of your observing logs to me for review. If your logs are accurate and complete I will submit your name to the Sunspotters Observing Program chair for approval. The chair will mail to me your certificate and pin which I will present to you at the next monthly PAC meeting. If you have any questions regarding the Sunspotters Observing Program or any other observing program, or need help getting started please contact me and I will be glad to help.

Prairie Astronomy Club members had an enjoyable time on the Dec. 10th planetarium and observatory show in Fremont. On behalf of the club I would like to thank Dr. Lueninghoener for his invitation to our club to attend this fine event. The first part of the program was the special planetarium Christmas shows. After that we were privileged to witness a special slide show that few people have seen. Dr. Lueninghoener has equipped his planetarium with a sort of "still picture cinerama"- he has three slide projectors that simultaneously project three correlated pictures on the inside of the dome.

This gives the audience a 90 degree panoramic view. The scenes of the Grand Canyon were breathtaking to say the least. We adjourned for the evening meal at a local restaurant. About 7:00 we re-assembled at the observatory and had a good look at some of the fine telescopes. We had cloudy weather, and as a result, we didn't get to do any observing. The Omaha and St. Jo clubs also attended this program.

It has been suggested that since our club is having a little trouble in raising money for the telescope, that we sell it. Some people have given quite a bit of

money to help pay for this scope, but we need more. If it's all right with those who have given money, then it is ok with me to sell it. Of course the money we get for selling the scope will have to pay the debt. The balance left over will have to go into the treasury. After a considerable build-up in the treasury we then will go ahead and make the down payment on the new telescope that we all seem to want.

Earl Moser



Observatory of Midland College in Fremont (probably 1967). Dr. Gilbert C. Lueninghoener is behind the telescope.

CLUB MEMBERSHIP INFO

REGULAR MEMBER - \$30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - \$35.00 per year. Same as regular member except gets 2 votes at club meetings.

STUDENT MEMBER - \$10.00 per year with volunteer requirement.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

CLUB TELESCOPES

To check out one of the club telescopes, please contact a club officer. Scopes can be checked out at a regular club meeting and kept for one month. Checkout can be extended for another month if there are no other requests for the telescope, but you must notify a club officer in advance.

100mm Orion refractor: Available
10 inch Meade Starfinder Dobsonian: Available
13 inch Truss Dobsonian: Needs repair
10 inch Zhumell: Needs mount

CLUB APPAREL



Order club apparel from cafepress.com:



Shop through Amazon Smile to automatically donate to PAC:



CLUB OFFICERS

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