

The Prairie Astronomer

September 2019 Volume 60, Issue #9

Pavonis Mons

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Mantrap Skies: ARP 9

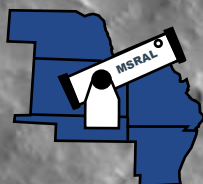
Club Officer Nominations

October Observing

Two in the View Observing Program

Titan Lakes May Be Explosion Craters

Another Interstellar Visitor?



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

**NEXT PAC MEETING: September 24 at 7:30pm
at Hyde Observatory**

PROGRAM

September: "Bro do you even Telescope?" - Brian Sivill
It's an amusing look at telescopes and people who use them in the internet age. Guaranteed to be entertaining for all ages.

FUTURE PROGRAMS (Tentative)

October: Club Star Party at Branched Oak Observatory
November: How to Buy a Telescope
December: Club Holiday Gathering
January: How to Use Your Telescope


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COVER: This VIS image shows part of the southwestern flank of Pavonis Mons. Pavonis Mons is the central volcano of the three large Tharsis volcanoes. All three volcanoes form a line located along a tectonic bulge caused by extensional forces in the region. Pavonis Mons is the smallest of the three with a summit of only 14km (46,000 ft). The linear features in the image are concentric faults. Pavonis means peacock in Latin, making the name peacock mountain. Captured: 2019-07-31 19:21

*NASA/JPL-
Caltech/Arizona State
University*

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

PAC Meeting
Tuesday September 24, 2019, 7:30pm

Lead Up Night at Hyde Observatory, October 5

Howling Halloween at Homestead Memorial in
Beatrice, October 26th.

PAC Meeting
Tuesday October 29, 2019, 7:00pm
Club Star Party at Branched Oak Observatory

PAC Meeting
Tuesday November 26, 2019, 7:30pm
Program: How to Buy a Telescope

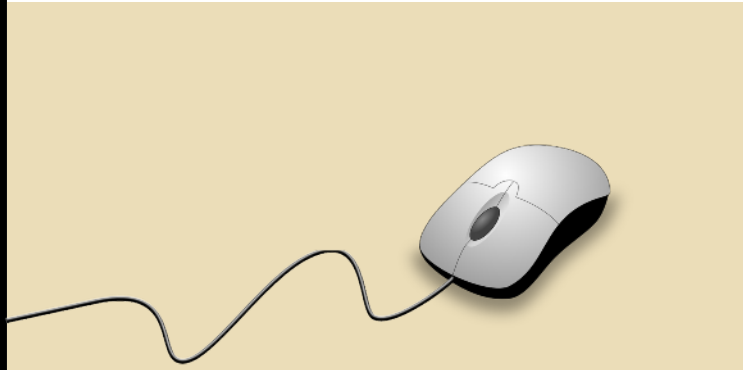
2019 STAR PARTY DATES



Photo by Brian Sivill

	Star Party Date	Star Party Date
January	Dec 28	Jan 4
February	Jan 25	Feb 1
March	Mar 1	Mar 8
April	Mar 29	Apr 5
May	Apr 26	May 31
June	Jun 21	Jun 28
July	Jul 26	Aug 2
NSP	July 28 - Aug 2	
August	Aug 23	Aug 30
September	Sep 20	Sep 27
October	Oct 18	Oct 25
November	Nov 22	Nov 29
December	Dec 20	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

ADDRESS

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P.O. Box 5585
Lincoln, NE 68505-0585

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 August 27, 2019 as recorded by Bill Lohrberg

Dan Delzell filling in for President Bob Kacvinsky who is in Wisconsin. 15 members present, and 3 visitors
No formal meeting agenda but Dan began by welcoming all and asking for guests to introduce themselves – Mike from Columbus, Lynn from Lincoln, and Corey from Lincoln.

Announcements

- scheduled PAC star party Friday August 30
- Sept 7 Wildwood house star party in Nebraska City
- September 20 Mourning Hope

- Branched Oak observatory annual “StarBQ” fundraising event Sept 21 5pm
- Brian and Brett reminds PAC members are welcome to go to Branched Oak any time, it’s a good idea to notify someone ahead of time (by phone or email)
- October 5th Hyde observatory – international observe the moon event with the lead-up program

Lee Thomas provided an update for the Hyde roof repair. Parts are ordered for all 4 trolleys and springs etc. Aiming for the middle of September to begin the project. A crane will remove the deck roof and set off to side,

containers will be built to cover the telescopes on the deck while the roof is off. Expected completion of repairs is by end of September early October. With no further PAC business, meeting adjourned to the program – summary and report of the Nebraska Star Party which unfortunately had only one good enough night for observing for about 4 hours and a few hours Tuesday and Wednesday. Despite the poor observing conditions there were many positive comments about the Nebraska Star Party – especially the programs and speakers. Some photos were shared.



The latest view of Saturn from NASA's Hubble Space Telescope captures exquisite details of the ring system — which looks like a phonograph record with grooves that represent detailed structure within the rings — and atmospheric details that once could only be captured by spacecraft visiting the distant world. Hubble's Wide Field Camera 3 observed Saturn on June 20, 2019, as the planet made its closest approach to Earth, at about 845 million miles away. This image is the second in a yearly series of snapshots taken as part of the Outer Planets Atmospheres Legacy (OPAL) project. OPAL is helping scientists understand the atmospheric dynamics and evolution of our solar system's gas giant planets. In Saturn's case, astronomers will be able to track shifting weather patterns and other changes to identify trends. Credits: NASA, ESA, A. Simon (GSFC), M.H. Wong (University of California, Berkeley) and the OPAL Team

The President's Message

Bob Kacvinsky

First of all THANK YOU to all who helped cover during the August PAC meeting. I had just gotten back from a trip to Wisconsin where I fell and broke a couple of vertebrae in my back. I basically was unable to walk or move around much until after Labor Day weekend. I'll have 3 months of a back brace and unable to do any kind of lifting or carrying, so I will have limited ability to help out much during Outreach Events.

September has a couple of events coming up including our training / practice session with the Lincoln Youth Lead Up Program Sunday, September 22nd from 8-9 PM. We have a couple volunteers already signed up but if you would be willing to help out please stop by to meet the youth and join in. The training is in preparation for the Saturday, October 5th Hyde Night when the Lead Up youth will completely run the normal Saturday Observing Night with PAC mentors providing oversight. Oct 5th should be a big night with many of the High Schools being informed of the Youth Leadership. If you are a Deck Lead or helper and would like to help please let me know at kacvinskyb@yahoo.com. Should be a fun event. We will

include the normal shows, have the deck scopes up, and plan to have a constellation tour going out on the lawn. Extra volunteers would be greatly appreciated.

Several of us have already certified to help conduct an outreach star party at Camp Erin held near Ashland that includes campers 6-18 years of age who have lost a family member recently. This is the second year that PAC has helped provide a program for these very special campers.

Our September meeting this month will be on Sept 24th, so a bit earlier in the month so don't forget. The **October Club Meeting is our Observing Star Party and we have been invited to host the event on the new cement slab PAC funded at the Branched Oak Observatory**. We tried last year but the weather did not cooperate, as for most observing star parties. I'd like to ask everyone, even if you do not have a telescope, to please try and attend the Oct meeting. We will have several telescopes along with the existing Branched Oak facilities. Oct 29th is just 2 days from a new moon so the skies should be nice and dark and sunset is early enough to be able to observe from 7-9 PM –

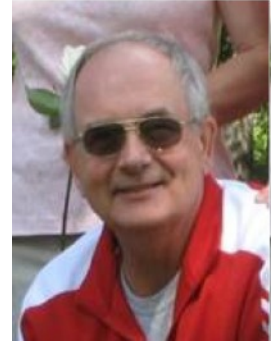
or later if you wish.

The last public Outreach Event on our calendar is the Howling Halloween Program at the Homestead Memorial in Beatrice October 26th. This is typically well attended so if you would like to help out please let Mike Kerns or me know so we know we have enough help.

Please let me or any of your PAC Board know if you would like us to consider a future program, activity, or function. PAC is YOUR Astronomy Club, so please help us make it enjoyable to all.

Dark Clear Skies to you.

Bob Kacvinsky



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 9/NGC 2523 is in Arp's class for spiral galaxies with split arms. Arp's comment reads: "Bifurcated arm does not start at end of bar". In fact, it has several arm segments not related to the bar. It is in Camelopardalis just above the northwest corner of Ursa Major. By redshift, it is about 160 million light-years away though a single Sosies estimate says it is only about 93 million light-

years away. If the 160 million light-year estimate is right the galaxy is very large, about 135,000 light-years across measuring its longest diameter out to the far reaches of its stars in my FITS data (174 arc seconds). But if the 93 million light-year figure is correct then it is 78,000 light-years across. I found nothing in the literature to explain the difference. In fact, there's little in the literature on

the entire field. Apparently, the far northern sky is poorly studied. For reasons explained below, I will go with the redshift distance estimate being most accurate. In fact, it may be slightly shy of its distance.

Arp 9 is classed as SB(r)bc by NED and SBb I by the NGC



project. Most of what I found on this one in the literature was descriptive telling me little I couldn't see in my image. Notes like: "The nucleus and bar are still strong, but the ring is narrower and knotty. Two main spiral arms, narrow and knotty (one with branching) emerge from the ring near the extremities of the bar. Additional, weaker arms start near the minor axis of the elliptical ring (here appearing circular). Note the slight asymmetry." aren't very helpful. The galaxy was discovered by Edward Swift on September 7, 1885.

There's little on the rest of the field. The edge on spiral to the west (right) is NGC 2523B. It too is at a redshift distance of 177 million light-years. If correct that makes it about 100,000 light-years across. About the same as our galaxy but larger than the majority of spiral galaxies. I found no other distance estimates for it. It is classed as SA(s)b: by NED. Most papers consider it a companion of Arp 9

though one referred to the very diffuse galaxy south of Arp 9 that is seen at the bottom of the cropped image as a companion. It is MAILYAN 026 which refers to the Mailyan Dwarf Galaxy Catalogue. I found nothing useful on it. If it is 160 million light-years away then it is 27,000 light-years across. If 93 million light-years is right then it is 16 million light-years across. The larger figure seems more reasonable for its brightness as most dwarfs of the smaller size are so faint I'd not likely see it at that distance. To its east (left) is what appears to be a short asteroid trail. It shows in the DSS images and all my subs so is not an asteroid but a distant edge on galaxy. Really a weird object. Unfortunately, neither NED nor SIMBAD shows anything at that position. But then the vast majority of the galaxies in the image are anonymous.

The only other galaxy in the image NED has redshift data on is UGC 04279. It is the odd-looking linear galaxy with fuzz

around it to the northeast of Arp 9. It has a bright linear core surrounded by a blue halo with a few knots mostly on the east (left) side. It is classed by NED as SBdm or a barred spiral with wide arms of the Magellanic type. It is listed at 177 million light years with virtually the same redshift as NGC 2523B. That would make it about 56,000 light-years across which is reasonable for such galaxies. With three galaxies in this field at a redshift of 160 to 177 thousand light-years, I have to conclude that is most likely the distance to Arp 9 and it really is a large spiral.

Only 4 other galaxies of the hundreds in the image are mentioned in NED, none with even a magnitude estimate let alone redshift data. So there's no annotated image.

Arp's image:

http://ned.ipac.caltech.edu/level5/Arp/Figures/big_arp9.jpeg



October Observing: What to View

Jim Kvasnicka

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

Planets

Venus: Sets about a half hour after the Sun at magnitude -3.9.

Mercury: Starts the month to the upper left of Venus at magnitude 0.0.

Jupiter: Dims to magnitude -1.9.

Saturn: At magnitude +0.6 with its rings tilted 25.2°.

Uranus and Neptune: In Aries and Aquarius.

Mars: Visible mid-October in the early dawn at magnitude +1.8.

Meteor Showers

Orionids: Peaks the night of October 21-22. Expect a ZHR of 20, the last quarter Moon will interfere.

Messier List

M11: The Wild Duck Cluster in Scutum.

M16: Open cluster in the Eagle Nebula.

M17: The Swan Nebula in Sagittarius.

M18/M25: Open clusters in Sagittarius.

M24: The Small Sagittarius Star Cloud.

M26: Open cluster in Scutum.

M55: Class XI globular cluster in Sagittarius.

M75: Class I globular cluster in Sagittarius.

Last Month: M13, M14, M22, M28, M54, M69, M70, M92

Next Month: M27, M30, M56, M57, M71, M72, M73

NGC and other Deep Sky Objects

NGC 7006: Galaxy in Aquarius.

NGC 7009: The Saturn Nebula in Aquarius.

NGC 7293: The Helix Nebula in Aquarius.

NGC 7331: Galaxy in Pegasus.

NGC 7479: Galaxy in Pegasus.

Double Star Program List

8 Lacerta: Four white stars.

Beta Cephei: White primary with a blue secondary.

Struve 2816: White star with two blue stars.

Xi Cephei: Yellow pair.

Delta Cephei: Yellow and pale blue stars.

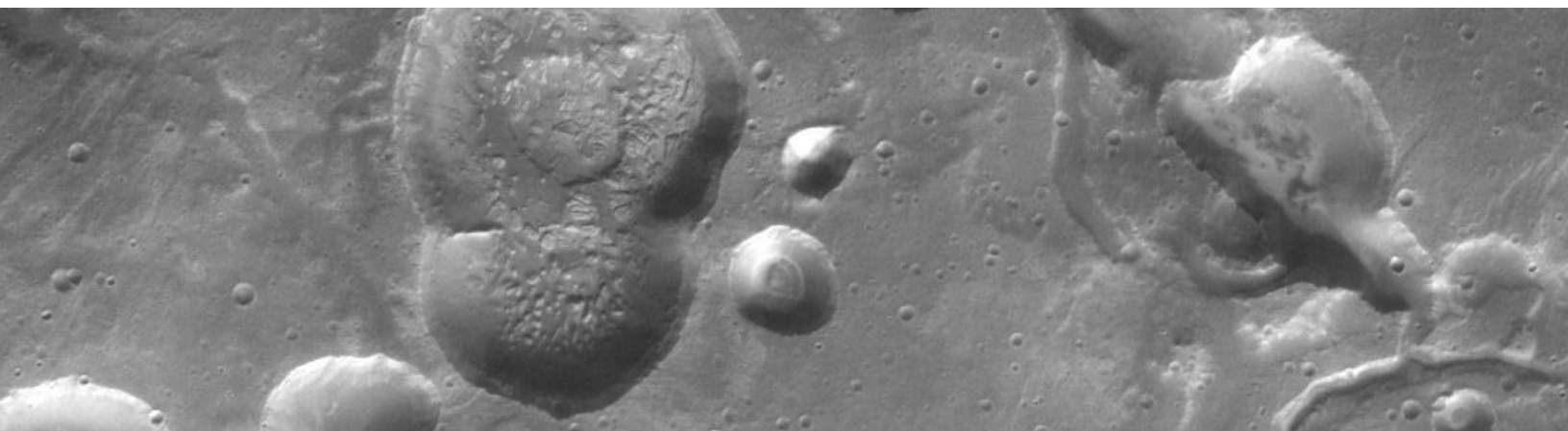
Eta Persei: Bright yellow primary with a pale blue secondary.

Struve 331: White and blue stars.

Epsilon Pegasi: Bright yellow and white stars.

Challenge Object

NGC 7769/7770/7771: Galaxy trio in Pegasus with NGC 7769 the brightest.



Arabia Terra

The pits and channels in the VIS image are located along the margin between Arabia Terra and Acidalia Planitia. Arabia Terra is one of the oldest surface regions on Mars and contains a large variety of surface features. Image credit: NASA/JPL-Caltech/Arizona State University.

Two in the View Observing Program

Jim Kvasnicka

The Two in the View Observing Program is one of the newer observing programs offered by the Astronomical League. Many times we look for a specific object and overlook objects that are very close by. We also tend to look at some objects as a set such as the Double Cluster, M81/M82, or the Andromeda Galaxy and her companion galaxies. This observing program is a continuation of that theme.

The Two in the View Observing Program includes different types of deep sky objects including galaxies, open clusters, double stars, and globular clusters. You should take time to understand if the objects are interacting with one another or just happen to fit in the same field of view. While you are doing the program you will have to balance magnification to fit the objects in the same field of view.

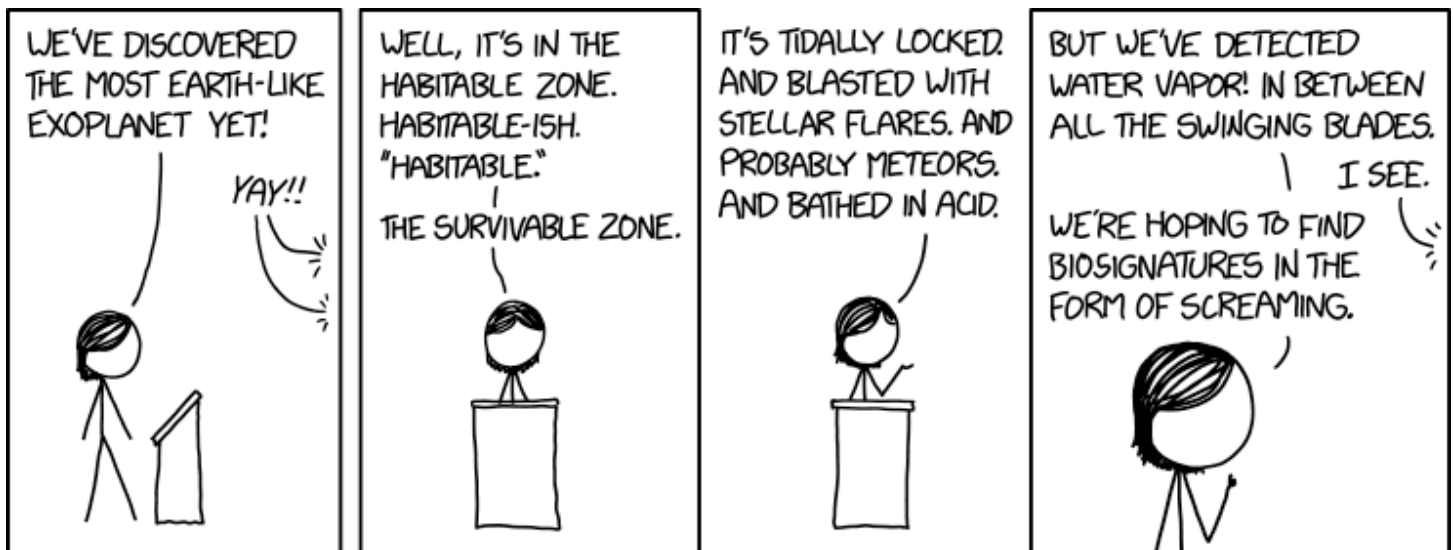
To record your observations any log sheets can be used. Your logs must include the object, date, time, magnification, seeing conditions, telescope

type, observing notes, and a simple sketch of your observation.

To complete the Two in the View Observing Program you will have to observe 100 groupings from a list of 114. Items 109 – 114 allow you to observe your own favorite objects that fit in the same field of view. You can only do a maximum of 15 “make up your own” pairs.

When you complete the Two in the View 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 Two in the View 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 Two in the View Observing Program or any other observing program, or need help getting started please contact me and I will be glad to help.



xkcd.com

Club Offices and Duties

Nominations for next year's officers will begin at the September meeting, and remain open until election at the October meeting.

Club officer nominations are made in September and elections are held in October. The following is a list of responsibilities of each of the officers and what is required to maintain a functioning club.

As stated in the bylaws, the club has five officers: President, Vice President, Secretary, Treasurer and Second Vice President. The business of the club is managed by a Board of Directors. The Board consists of the five elected officers. Each decision of the Board requires an affirmative vote by at least three Board members. The Board can also create additional non-elected offices as required and can initiate impeachment proceedings against officers who have been negligent in performing their duties.

The Prairie Astronomy Club has a fifty year history of service to club members and the community. Potential club officers should have a good understanding of the history of the club, its formation and mission, its relationship with Hyde Observatory and the types of events, activities and outreach that is part of the tradition of the club. The most complete resource is the book *The Prairie Astronomy Club: Fifty Years of Amateur Astronomy*, which is in the club library or available as a PDF document.

President

The President organizes and directs the regular monthly meetings and all other club activities. The President also prepares the meeting agenda and PowerPoint for the meeting.

The President also officially represents the club at meetings at the regional and national level where he/she is in attendance or delegates this authority. The President has the authority to call meetings of the Board and to appoint non-elected officers.

The President should have good communication skills and be comfortable interacting with the media and public, be a good public speaker, be available to do radio and TV interviews and to deliver prepared introductions and remarks at club-sponsored events.

Another duty of the President is the annual club audit. Within 10 days of assuming office, the President must appoint a committee of three club members to perform the audit. The audit must be completed within 45 days of the close of the fiscal year which is October 31.

When assuming office, the President should hold a meeting of the Board to present his/her direction and ideas for the club for the coming year, and appoint any unfilled non-elected positions.

Vice President

The Vice President is responsible for running club meetings and other events in the absence of the President. The VP is also to be the mediator in cases of procedural dispute and must be available to assume the duties of any officer at the direction of the President. The VP also maintains control of the current inventory of all club property.

Secretary

The Secretary handles all Club correspondence, is responsible for the distribution of information received through official club correspondence and is in charge of Club publicity (often the job of Publicity or Outreach Coordinator is delegated to a non-elected member). The Secretary also sends out membership renewal notices and delivers meeting minutes to the newsletter editor. The Secretary is responsible for maintaining an accurate club membership roster. The master copy of the roster is currently maintained on the Night Sky Network website. The bylaws also require publication of the complete roster in the newsletter on an annual basis.

Treasurer

The Treasurer is responsible for all Club funds and for keeping accurate records of all monetary transactions. The Treasurer

must submit a written report of the club's monetary status at the request of the President or give a verbal report at the request of any member during regular meetings. He/she also prepares an annual financial report in November for publication in the newsletter and presentation at the November meeting. The Treasurer is also responsible for all tax filings and reporting requirements, to maintain the club's 501c3 status.

Second Vice President (and Program Chair)

The Second Vice President is responsible for the formation and presentation of the monthly club programs. Ideally the 2nd VP should try to plan ahead six months to one year to build a list of potential presenters or programs. The 2nd VP also sends out email announcements of upcoming programs to the membership, and sends a program description to the newsletter/website editors.

The club usually has several non-elected officers:

The **Publications Chairperson** (or Newsletter Editor) is responsible for editing and publishing the Prairie Astronomer. The newsletter editor may also be the website manager/editor. The newsletter editor should have a good working knowledge of desktop publishing software (and computers in general), graphics, photo editing, some design and layout experience and some experience with social networking and Internet marketing. The Website editor needs to be familiar with WordPress (or similar CMS software) and HTML, graphics

and word processing applications. Ideally the newsletter and website editor(s) should have prior experience with the publication of a newsletter or website, or demonstrated skills. The publications chairperson is also responsible for social networking for the club - posting Facebook and Twitter announcements for club meetings and events.

If the club has an appointed **Outreach Coordinator**, the coordinator takes on some of the roles performed by other officers – organizes outreach events, shares in media communications tasks, puts together flyers, etc.

The **Club Librarian** (often the Vice President) manages the club library. He/she keeps a current bibliographic listing of all Club library material including the archive of all back issues of The Prairie Astronomer. The Club Librarian and Secretary work together to maintain a record of club activities and regularly update the official club history.

The **Observing Chairman** presents a monthly report at Club meetings and/or in the Prairie Astronomer. He/she keeps members informed of upcoming celestial events, sky objects of special interest and star parties.

The **Recording Secretary** (often the Club's elected Secretary) is responsible for keeping the minutes of the club meetings and filing a copy with the Club Secretary. Minutes need to be kept in a systematic fashion as they record the history and life of the club and need to be published in the

Prairie Astronomer on a monthly basis.

The **Site Chairperson** (if one is appointed) is responsible for establishing a site committee to oversee the maintenance and security of the club observing site.

While not a requirement of the bylaws, all club officers and appointees should have good computer and social media skills, should be accessible and responsive via email and phone.

New Models Suggest Titan Lakes Are Explosion Craters

Using radar data from NASA's Cassini spacecraft, recently published research presents a new scenario to explain why some methane-filled lakes on Saturn's moon Titan are surrounded by steep rims that reach hundreds of feet high. The models suggests that explosions of warming nitrogen created basins in the moon's crust.

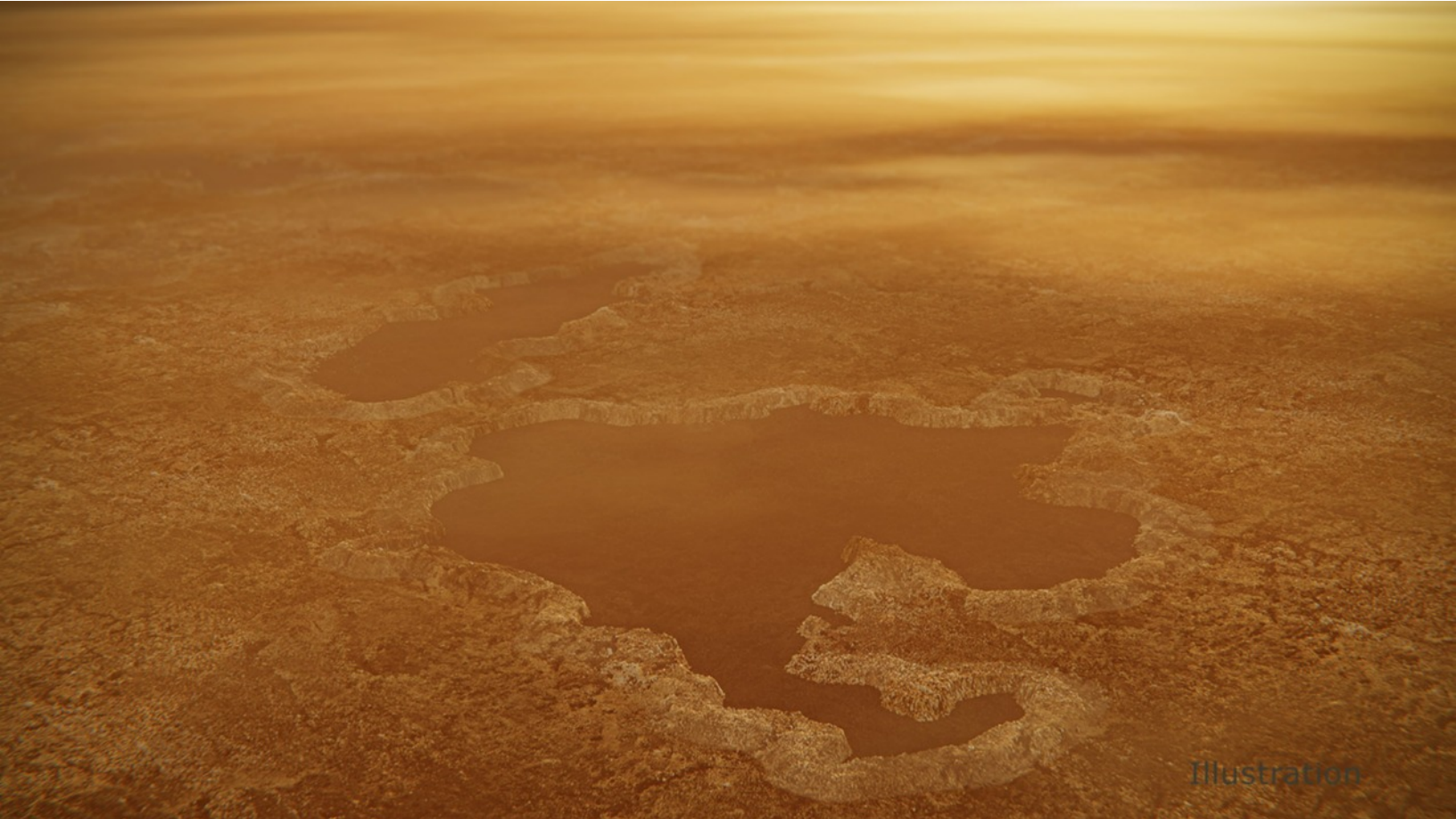
Titan is the only planetary body in our solar system other than Earth known to have stable liquid on its surface. But instead of water raining down from

clouds and filling lakes and seas as on Earth, on Titan it's methane and ethane - hydrocarbons that we think of as gases but that behave as liquids in Titan's frigid climate.

Most existing models that lay out the origin of Titan's lakes show liquid methane dissolving the moon's bedrock of ice and solid organic compounds, carving reservoirs that fill with the liquid. This may be the origin of a type of lake on Titan that has sharp boundaries. On Earth, bodies of water that formed similarly, by

dissolving surrounding limestone, are known as karstic lakes.

The new, alternative models for some of the smaller lakes (tens of miles across) turns that theory upside down: It proposes pockets of liquid nitrogen in Titan's crust warmed, turning into explosive gas that blew out craters, which then filled with liquid methane. The new theory explains why some of the smaller lakes near Titan's north pole, like Winnipeg



Illustration

This artist's concept of a lake at the north pole of Saturn's moon Titan illustrates raised rims and rampartlike features such as those seen by NASA's Cassini spacecraft around the moon's Winnipeg Lacus. Credit: NASA/JPL-Caltech

Lacus, appear in radar imaging to have very steep rims that tower above sea level - rims difficult to explain with the karstic model.

The radar data were gathered by the Cassini Saturn Orbiter - a mission managed by NASA's Jet Propulsion Laboratory in Pasadena, California - during its last close flyby of Titan, as the spacecraft prepared for its final plunge into Saturn's atmosphere two years ago. An international team of scientists led by Giuseppe Mitri of Italy's G. d'Annunzio University became convinced that the karstic model didn't jibe with what they saw in these new images.

"The rim goes up, and the karst process works in the opposite way," Mitri said. "We were not finding any explanation that fit with a karstic lake basin. In reality, the morphology was more consistent with an explosion crater, where the rim is formed by the ejected material from the crater interior. It's totally a different process."

The work, published Sept. 9 in Nature Geosciences, meshes with other Titan climate models showing the moon may be warm compared to how it was in earlier Titan "ice ages."

Over the last half-billion or billion years on Titan, methane in its atmosphere has acted as a greenhouse gas, keeping the moon relatively warm - although still cold by Earth standards. Scientists have long believed that the moon has gone through epochs of cooling and warming, as methane is depleted by solar-

driven chemistry and then resupplied.

In the colder periods, nitrogen dominated the atmosphere, raining down and cycling through the icy crust to collect in pools just below the surface, said Cassini scientist and study co-author Jonathan Lunine of Cornell University in Ithaca, New York.

"These lakes with steep edges, ramparts and raised rims would be a signpost of periods in Titan's history when there was liquid nitrogen on the surface and in the crust," he noted. Even localized warming would have been enough to turn the liquid nitrogen into vapor, cause it to expand quickly and blow out a crater.

"This is a completely different explanation for the steep rims around those small lakes, which has been a tremendous puzzle," said Cassini Project Scientist Linda Spilker of JPL. "As scientists continue to mine the treasure trove of Cassini data, we'll keep putting more and more pieces of the puzzle together. Over the next decades, we will come to understand the Saturn system better and better."

The Cassini-Huygens mission is a cooperative project of NASA, ESA (the European Space Agency) and the Italian Space Agency. JPL, a division of Caltech in Pasadena, manages the mission for NASA's Science Mission Directorate in Washington. JPL designed,

developed and assembled the Cassini orbiter. The radar instrument was built by JPL and the Italian Space Agency, working with team members from the U.S. and several European countries.

More information about Cassini can be found here:

<https://solarsystem.nasa.gov/cassini>

Newly Discovered Comet Is Likely Interstellar Visitor

A newly discovered comet has excited the astronomical community this week because it appears to have originated from outside the solar system. The object - designated C/2019 Q4 (Borisov) - was discovered on Aug. 30, 2019, by Gennady Borisov at the MARGO observatory in Nauchnij, Crimea. The official confirmation that comet C/2019 Q4 is an interstellar comet has not yet been made, but if it is interstellar, it would be only the second such object detected. The first, 'Oumuamua, was observed and confirmed in October 2017.

The new comet, C/2019 Q4, is still inbound toward the Sun, but it will remain farther than the orbit of Mars and will approach no closer to Earth than about 190 million miles (300 million kilometers).

After the initial detections of the comet, Scout system, which is located at NASA's Jet Propulsion Laboratory in Pasadena, California, automatically flagged the object as possibly being interstellar. Davide Farnocchia of NASA's Center for Near-Earth Object Studies at JPL worked with astronomers and the European Space Agency's Near-Earth Object Coordination Center in Frascati, Italy, to obtain additional observations. He then worked with the NASA-sponsored Minor Planet Center in Cambridge, Massachusetts, to

estimate the comet's precise trajectory and determine whether it originated within our solar system or came from elsewhere in the galaxy.

The comet is currently 260 million miles (420 million kilometers) from the Sun and will reach its closest point, or perihelion, on Dec. 8, 2019, at a distance of about 190 million miles (300 million kilometers).

"The comet's current velocity is high, about 93,000 mph [150,000 kph], which is well above the typical velocities of objects orbiting the Sun at that distance," said Farnocchia. "The high velocity indicates not only that the object likely originated from outside our solar system, but also that it will leave and head back to interstellar space."

Currently on an inbound trajectory, comet C/2019 Q4 is heading toward the inner solar system. On Oct. 26, it will pass through the ecliptic plane - the plane in which Earth and the other planets orbit the Sun - from above at roughly a 40-degree angle.

C/2019 Q4 was established as being cometary due to its fuzzy appearance, which indicates that the object has a central icy body that is producing a surrounding cloud of dust and particles as it approaches the Sun and heats up. Its location in the sky (as seen from Earth) places it near the Sun - an area of sky not usually scanned by the large

ground-based asteroid surveys or NASA's asteroid-hunting NEOWISE spacecraft.

C/2019 Q4 can be seen with professional telescopes for months to come. "The object will peak in brightness in mid-December and continue to be observable with moderate-size telescopes until April 2020," said Farnocchia. "After that, it will only be observable with larger professional telescopes through October 2020."

Observations completed by Karen Meech and her team at the University of Hawaii indicate the comet nucleus is somewhere between 1.2 and 10 miles (2 and 16 kilometers) in diameter. Astronomers will continue collect observations to further characterize the comet's physical properties (size, rotation, etc.) and also continue to better identify its trajectory.

The Minor Planet Center is hosted by the Harvard-Smithsonian Center for Astrophysics and is a sub-node of NASA's Planetary Data System Small Bodies Node at the University of Maryland. JPL hosts the Center for Near-Earth Object Studies. All are projects of NASA's Near-Earth Object Observations Program and elements of the agency's Planetary Defense

Coordination Office within NASA's Science Mission Directorate.

More information about asteroids and near-Earth objects can be found at:

<https://cneos.jpl.nasa.gov>

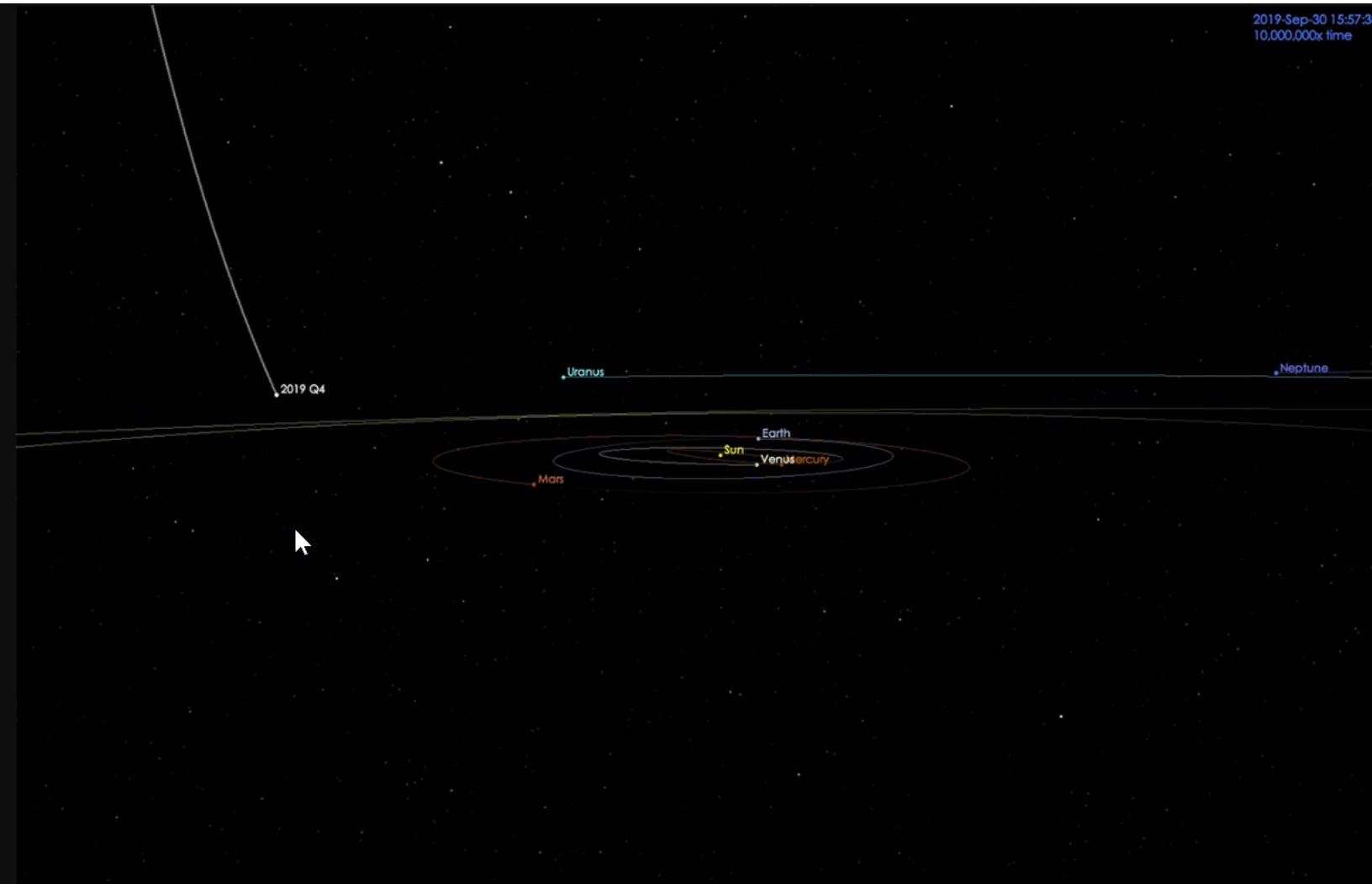
<https://www.jpl.nasa.gov/asteroidwatch>

For more information about NASA's Planetary Defense Coordination Office, visit:

<https://www.nasa.gov/planetarydefense>

For asteroid and comet news and updates, follow AsteroidWatch on Twitter:

twitter.com/AsteroidWatch



This illustration depicts Comet C/2019 Q4's trajectory. Deemed a possible interstellar object, it will approach no closer to Earth than about 190 million miles (300 million kilometers). Credit: NASA/JPL-Caltech

PRESIDENT'S REPORT:

If you were at Lincolnfest last weekend, I hope you stopped and visited the Prairie Astronomy Club booth. We were displaying the solar scope, handing out free materials, and selling posters, postcards, star charts, etc., to raise money for the club and the observatory. If there are any of these materials left, we will have them for sale at the meeting. Many thanks to all the members who helped out by volunteering to man the booth.

This has been a busy month for me in connection with the club's activities. Along with Lincolnfest, I was interviewed on KFOR and X103 radio stations, and started teaching another telescope-making class at the observatory for the Parks Department. All of this has brought a lot of publicity to the club and it's now paying off in new memberships.

While we're on the subject, I'd like to personally welcome all our new members and invite them to join in any and all club activities. Just let your presence be known. We're glad to have you in the club and would like to share all the fun with you.

The results of the questionnaire of a few months ago show that many members are interested in doing more observing. Because of this demonstrated interest, the club will be stressing observing programs in the future. We've already formed the Messier Group (see story on Page 1 of this newsletter) and we've started setting up dates at the meetings for at least one star party a month.

Dave Knisely will also start presenting an Observing Chairman's report at each meeting, pointing out some of the more interesting objects viewed. If you have any other ideas or anything we could use as an observing program, please let me know.

See you at the meeting.

---RON VEYS

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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The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: **Regular \$30/yr, Family \$35/yr.** Address all new memberships and renewals to: **The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585.** For other club information, please contact one of the club officers listed to the right. Newsletter comments and articles should be submitted to: **Mark Dahmke, P. O. Box 5585, Lincoln, NE 68505** or mark@dahmke.com, no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.