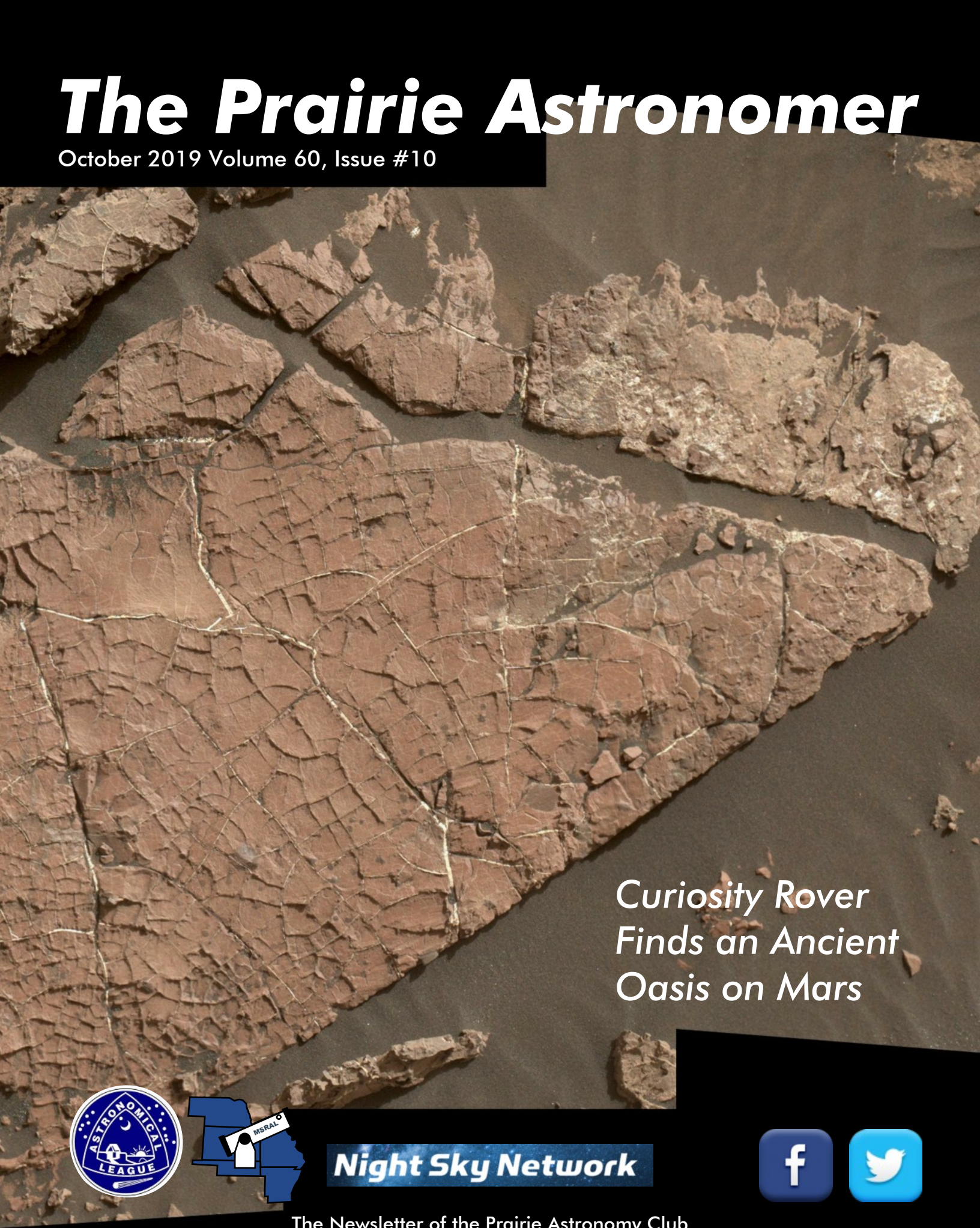
The Prairie Astronomer

October 2019 Volume 60, Issue #10



Curiosity Rover Finds an Ancient Oasis on Mars

Night Sky Network

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

NEXT PAC MEETING: October 29 at 7pm at Branched Oak Observatory

PROGRAM

October: Club Star Party at Branched Oak Observatory

FUTURE PROGRAMS (Tentative)

November: How to Buy a Telescope
December: Club Holiday Gathering
January: How to Use Your Telescope

Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy.
Order online from Amazon or lulu.com.

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Cover Photo: The network of cracks in this Martian rock slab called "Old Soaker" may have formed from the drying of a mud layer more than 3 billion years ago. The view spans about 3 feet (90 centimeters) left-to-right and combines three images taken by the MAHLI camera on the arm of NASA's Curiosity Mars rover. Credit: NASA/JPL-Caltech/MSSS

Full image and caption

EVENTS

Howling Halloween @ Homestead Memorial Monument in Beatrice
Saturday Oct 26th , 6:45pm-9pm

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

Lazy Horse Brewery Star Party - S of Ohiowa, NE
Friday November 1st, 6:45pm-9pm

SouthPoint Scavenger Star Party - SouthPoint Mall
Friday November 8th, 6:45pm-9pm

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

The Prairie Astronomer
c/o The Prairie Astronomy Club, Inc.
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

Meeting Minutes

Bill Lohrberg

PAC meeting minutes September 24, 2019 as recorded by Bill Lohrberg
President Bob Kacvinsky called the meeting to begin at 7:30 pm with 16 members present, no visitors
Bob thanked all for the well-wishes, and for those who stepped up to help in his absence while he began his recovery from accidental fall shattering vertebrae. Good news that the injury is not worse than it could have been and he will recover fully after 2 or 3 months of vigilant care.
Observing report was given by Jim Kvasnicka

- Scheduled PAC star parties Sept 27, October 18, and 25th.
- October Planets: Venus setting ½ hour after sun, Mercury to upper left of Venus, Jupiter sets about 2&1/2 hours after sun, followed by Saturn - rings tilted about 25.2 degrees, Uranus & Neptune found in Aries and Aquarius, Mars visible in mid-October early dawn.
- Orionids meteor shower peaks Oct 21 into morning of 22nd.
- Messier list for October: M11 Wild duck cluster, M16 open cluster, M17 swan nebula, M18 and M25 open clusters in Sagittarius, M24 small Sagittarius star cloud, M26 open cluster in Scutum, M55 GC in Sagittarius, M75 GC also in Sagittarius.
- Deep sky objects in October: NGC7009 Saturn nebula, NGC7293 Helix nebula, 7331 galaxy, 7479 galaxy, 7606 galaxy

In the News

- Bob showed some photo images of object seen impacting Jupiter, interesting that images are mostly captured by amateurs like us.
- Early Sept Chang'e lunar rover has lost contact
- New study and insights in 3D mapping of the shape of our Milky Way galaxy suggest that distribution of stars and their gravity is warping the galaxy's disk to an "s" like structure

Upcoming Events were Announced:

On October 5th international "observe the moon" night, a group of approximately 12 to 15 youth from Lincoln High schools in coop with the "lead up" program and supervised by volunteer/mentors will run Hyde for the public.

Brian Sivill reminded all that Branched Oak Observatory is also having an event the same night with concerns enough volunteers would be available at Hyde. Bob is satisfied and confident we'll have it covered and hopeful and excited for a great turnout for both locations.

Saturday October 26th "howling Homestead" event at Homestead National monument 6pm to 9pm. Dave Knisely will be on hand and other volunteers will be welcome and needed.

The October PAC meeting will be held at Branched Oak Observatory (not at Hyde). There is no plan for a formal meeting – just an observing event and gathering. Lee Taylor reminded that October is usually the meeting where we elect the officers. Dan Delzell also reminded that nominations for elected positions are supposed to be done at September meeting. We proceeded to name the following nominees:

President – Bob Kacvinsky incumbent

VP1 – Rick Brown incumbent (in absentia)

VP2 – open (Christine Parkyn declined nomination)

Secretary – Bill Lohrberg incumbent

Treasurer – John Reinert incumbent

These nominations remain open until the election which according to strict interpretation of bylaws are to be held at the October meeting. However, by review of the board may be delayed to the November meeting due to

change of location and to allow possibility of adding names to the list of nominees.

John Reinert Gave a Brief Treasurers Report:

PO box and Insurance policy were paid, current checking account and total asset values/balances were given.

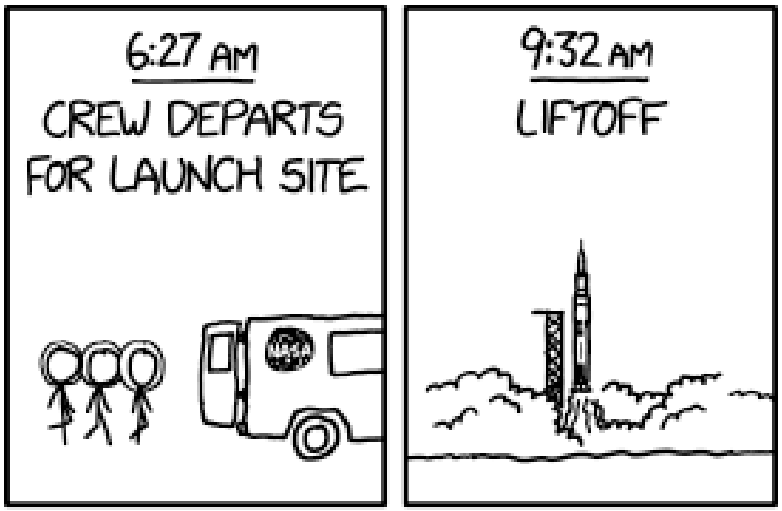
Many members are missing emailed dues notices. Evidently email notices are going to spam so members are encouraged to check spam folders.

The amount of stipend for Jim Kvasnicka for mowing and maintaining the observing site was agreed to be the same annual amount, and motion to authorize this amount to pay was carried forward and approved unanimously.

Other Business

Bob Kacvinsky announced that back in March a long-time member of PAC James Raines had passed away. His sister Liz contacted PAC to convey it was his wish to donate his astronomy equipment for the benefit of the club and the immediate community in such a way that it will get used for the hobby he loved. (not sold on e-bay or online auctions). Surprisingly, there are quite a few very nice instruments, and accessories. To honor James's request appropriately and fairly, Bob is putting together a committee of approximately 8 members to suggest a course of action to the membership as to how this equipment will be allocated or distributed.

With no further business the meeting was adjourned to the program by Brian Sivill "Dude, do you even Telescope?" A hysterical look at how telescopes and the various instruments for astronomy are often grossly misrepresented in the media, movies and advertising.



xkcd.com

The President's Message

Bob Kacvinsky

President Message:

First of all THANK YOU to all who helped mentor the Lead Up youth at Hyde on Oct 5th. We had a nice clear night and over 75 people came, of which half were first time high school youth. Special thanks to Jim Kvasnicka, Rick Brown, Lee Thomas, and Lee Taylor for their guidance and patience. It was nice to finally have a nice night to observe and the youth were having fun running the show. Thanks.

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**.

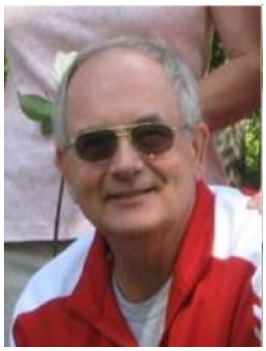
We tried last year but the weather did not cooperate, as for most observing star parties. I'd like to ask everyone, even if you do not have a telescope, to please try and attend the Oct meeting. We will have several telescopes along with the existing Branched Oak facilities. Oct 29th is just 2 days from 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. We will conduct a short meeting to hold elections if we have enough people attend or we will postpone the elections to the next regular meeting date. Remember, cold skies make for some great clear viewing.

We have one additional Star party in October, 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 (mkearns@neb.rr.com) or me (kacvinskyb@yahoo.com) know so we have enough help.

We have two public star parties scheduled in early November, **On Friday Nov 1st**, we have been invited to Ohiowa, NE to the Lazy Horse Brewery to host a star party for their patrons. We presently have 3 telescopes scheduled and could use one more if anyone would like to go. Ohiowa is just over an hour SW of Lincoln.

The second Star Party is at SouthPoint Mall on **Friday November 8th** from 7-8:30 PM. The star party is set up as a scavenger hunt for the kids. Each child picks up a sheet at Barnes and Noble, then visits each telescope to view Saturn or parts of the moon. When they complete the "hunt" they return to B&N for a gift prize. Last fall we did a similar program and it was really a lot of fun. We need a couple more volunteers to either set up their scopes or help hand out prizes. Please let me know if you can help out.

Our November 26th PAC meeting will be our tradition "How To Buy a Telescope" event and we hope to have a lot of public attend so members are encouraged to participate to help answer questions.



We will set of examples of different telescope types to demonstrate differences. If you are thinking of buying a telescope or upgrading, this is an excellent meeting to attend.

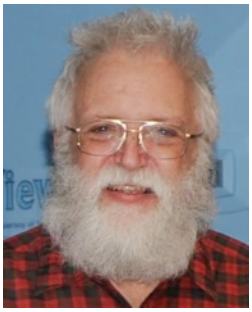
Please let me or any of your PAC Board know if you would like us to consider a future program, activity, or function. PAC is YOUR Astronomy Club, so please help us make it enjoyable to all.

Dark Clear Skies to you.

Bob Kacvinsky
kacvinskyb@yahoo.com
Text: 402-499-1816

Mantrap Skies Image Catalog: ARP 10

Rick Johnson



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 10 is in Arp's category Spiral galaxies: Split arm. It is located in Cetus about 400 million light years distant. While it appears to have a companion just to the north that galaxy, 2MASX J02182874+0540079, is over 700 million light years further away (1.15 billion total). But it apparently does have a companion. To me, it looks like a star, even on the SDSS image. It is the starlike object right beside the core to the southwest (lower right). It is identified in NED as ARP 010:[BMV2007] Companion with a redshift that puts it about 420 million light-years away. Arp's comment, "Nucleus off center in ring." I can't say I see the "split arm" that caused Arp to put it in that category. Is it the ring that is more a slight oval coil that doesn't quite overlap? Is it the faint arms at the southeast that seem to go in opposite directions? Or is it something else? Arp doesn't explain.

While NED lists the starlike object near the core of Arp 10 as a companion it gives it the classification of Sab? How you get that out of a starlike object is beyond me. NED classes Arp 10 itself as only S?. Looks like a

barred spiral with a ring to me. To add to the confusion one paper wonders if the brightest blob in the very blue arc in the northwest part of the galaxy is the core of a second galaxy. In other words, this object is still very much a mystery with all sorts of contrary information that has me going in circles. While not all the papers agree, to me this looks at least like a near head-on collision of two galaxies. If that starlike object is the core of the "bullet" galaxy it apparently lost most of its stars in the process and is now just a core. This could explain the apparent clockwise and counterclockwise shape of the faint arms on the southeast side of the galaxy's disk. Being so face on it may be difficult to tell if the stars really are orbiting in opposite direction. I found nothing indicating any measurements have been done. I'd expect radio telescopes to be best for this chore. One note at NED has this to say about this system:

"Faint "ripples" are seen at very faint levels around the galaxy. These ripples complicate the simple interpretation of Arp 10 as a collisional ring. Recent H I observations by Charmandaris & Appleton(1996) show that the bright inner ring is surrounded by an H I disk which extends beyond the faint "ripples." Although not as simple as ring galaxies like VII Zw 466, Charmandaris and Appleton suggest that the process that formed the rings and shells involved a central collision between a gas-poor early type galaxy and a large-type H I rich disk."

The full article is available for those with good hip waders at Harvard.edu.

The field's data has not yet been entered into NED's database even though the field has been imaged by the SDSS. So there's little information on the rest of the field. In fact, I've already covered all objects with a known redshift in NED's database. Normally I'd not prepare an annotated image for such a weak field but there's an asteroid that was caught right as it went from normal to retrograde motion. It appears as a faint star with no trail visible as it moved only a bit over one arc second during the exposure. It is 2004 FD41 at magnitude 20.6. So it won't be obvious without it being pointed out. The other asteroid (8604) Vanier is very easy to spot at magnitude 16.8 to the right of Arp 10. It is so bright it even shows in the color filtered images making a short blue-green and red trail before the white trail from the luminosity image. It is moving in normal eastward motion rather than retrograde as most asteroids I pick up earlier in the evening do.

Without any distance indicators, I've marked all galaxies with their catalog entry instead. There are so few cataloged I'm listing every one known to NED along with the red shift distances to the three main ones. There is one galaxy cluster in the image. A line goes to the approximate center identified in NED. No size or galaxy count is given, nor distance of course. I do see lots of faint fuzzies in the area but nothing out of the ordinary except for a small concentration to the NW of that position containing very faint small fuzzies. Enlarge the image for a better view.

While the Hubble Space Telescope imaged quite a few galaxy collisions this wasn't one of them.

Arp's image

November Observing: What to View

Jim Kvasnicka

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

Planets

Venus and Jupiter: Both shine in the twilight in the SW to start November separated by 23½°. The distance between them decreases and by November 22nd they are just 2° apart.
Saturn: Starts the month as part of the line of three planets.
Uranus and Neptune: In Aries and Aquarius.
Mars: By the end of the month it is rising 2½ hours before the Sun.
Mercury: Transits the Sun on November 11th. See page 48 of Sky & Telescope.

Meteor Showers

Leonids: Peaks the night of November 16-17. The waning gibbous Moon will interfere.

Messier List

M27: The Dumbbell Nebula in Vulpecula.

M30: Class V globular cluster in Capricornus.
M56: Class X globular cluster in Lyra.
M57: The Ring Nebula in Lyra.
M71: Class XII globular cluster in Sagitta.
M72: Class IX globular cluster in Aquarius.
M73: Asterism in Aquarius.

Last Month: M11, M16, M17, M18, M24, M25, M26, M55, M75
Next Month: M2, M15, M29, M31, M32, M39, M110

NGC and other Deep Sky Objects

NGC 7662: The Blue Snowball in Andromeda.
NGC 128: Elongated galaxy in Pisces.
NGC 253: The Silver Coin Galaxy in Sculptor.
NGC 288: Class X globular cluster in Sculptor.
NGC 457: The E. T. Cluster in Cassiopeia.

Double Star Program List

Iota Trianguli: Yellow primary with a pale blue secondary.
Gamma Arietis: Two equal white stars.
Lambda Arietis: Yellow and pale blue stars.
65 Piscium: Yellow pair.
Psi 1 Piscium: Equal bluish white pair.
Zeta Piscium: White primary with a secondary.
Alpha Piscium: Close white pair.
Gamma Andromedae: Almach, gold and greenish blue pair.

Challenge Object

NGC 7782 Group: NGC 7782 is the brightest in a group of five galaxies that include NGC 7778, NGC 7779, NGC 7780, and NGC 7781.

Solar System Observing Program

Jim Kvasnicka

The Solar System Observing Program consists of 27 selected observing projects designed to introduce you to the pleasures of planetary observing. With the increase in light pollution, the wonders of our own solar system may take on an increased importance among amateur astronomers. Dark skies and moonless nights are not required for any of the listed projects.
The 27 observing projects are divided into three categories:

- Sun and Moon Projects
- Inner Solar System Projects
- Outer Solar System Projects

The projects vary from simple observations to multiple observations over a period of months. They include special events such as solar and lunar eclipse. In November we have the Transit of Mercury, which would be a spectacular project to include.
To qualify for the Solar System Observing Program certificate you need to complete 25 of the 27 projects. Your observations need to include: name of the project, start and completion date, seeing conditions, telescope size, telescope type, magnification, and your observing notes. For a complete list of the 27 projects you can go to the Astronomical League website under Observing Programs / Solar System Observing Program.
When you complete the Solar System 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 Solar System 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 Solar System Observing Program or any other observing program, or need help getting started please contact me and I will be glad to help.

The Messenger Crosses the Sun: Mercury Transit 2019

David Prosper

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.org to find local clubs, events, and more!

Did you know that there are two other objects in our skies that have phases like the Moon? They're the inner planets, found between Earth and the Sun: Mercury and Venus. You can see their phases if you observe them through a telescope. Like our Moon, you can't see the planets in their "new" phase, unless they are lined up perfectly between us Earthlings and the Sun. In the case of the Moon, this alignment results in a **solar eclipse**; in the case of Mercury and Venus, this results in a **transit**, where the small disc of the planet travels across the face of the Sun. Skywatchers are in for a treat this month, as Mercury transits the Sun the morning of **November 11**!

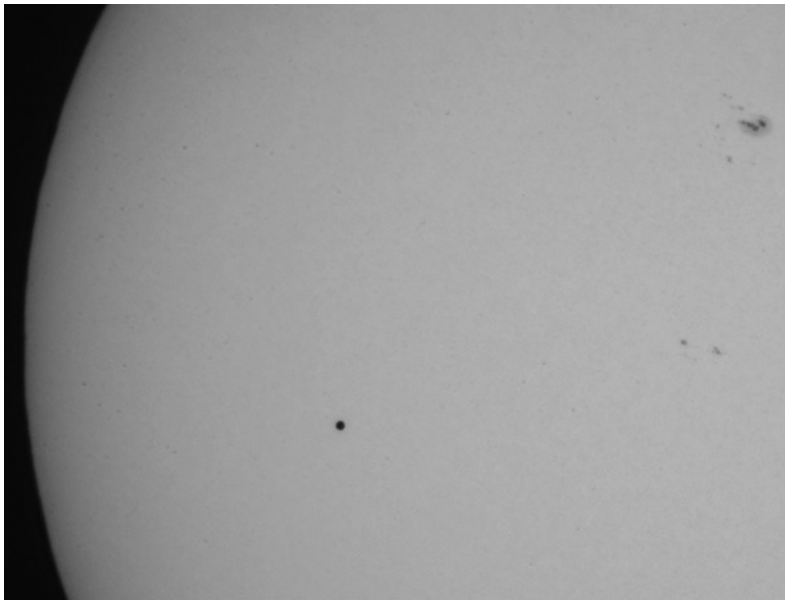
You may have seen the transit of Venus in 2012; you may have even watched it through eclipse glasses! However, this time you'll need a solar telescope to see anything, since eclipse glasses will only reveal the Sun's blank face. Why is that? Mercury is the smallest planet in our solar system, and closer to the Sun (and further away from Earth) during its transit than Venus was in its 2012 transit. This makes Mercury's disc too small to see without the extra power of a telescope. Make absolutely certain that you view the transit via a telescope equipped with a safe solar filter or projection setup. Do NOT

combine binoculars with your eclipse glasses; this will instantly burn a hole through the glasses – and your eyes! While most people don't have solar telescopes handy, many astronomy clubs do! Look for clubs hosting Mercury transit observing events near you at bit.ly/findnsn (USA) or at bit.ly/awbtransit (worldwide).

What a fun opportunity to see another planet during the day! This transit is expected to last over five hours. Folks on the East Coast will be able to watch the entre transit, weather permitting, from approximately 7:35 am EST until around approximately 1:04 pm EST. Folks located in the middle of North America to the west coast will see the transit already in progress at sunrise. The transit takes hours, so if your weather is cloudy, don't despair; there will be plenty of time for skies to clear! You can find timing details and charts via eclipse guru Fred Espenak's website: bit.ly/mercurytransit2019

Mercury's orbit is small and swift, and so its position in our skies quickly changes; that's why it was named after the fleet-footed messenger god of Roman mythology. In fact, if you have a clear view of the eastern horizon, you'll be able to catch Mercury again this month! Look for it before dawn during the last week of November, just above the eastern horizon and below red Mars. Wake up early the morning of November 24th to see Mars, the Moon, and Mercury form a loose triangle right before sunrise.

Discover more about Mercury and the rest of our solar system at nasa.gov



Left: Photo of the May 9, 2016 transit of Mercury. Mercury is the small dot on the center right. Note how tiny it is, even compared to the small sunspot on the center left. Credit: Dave Huntz

Right:This photo from the same 2016 transit event shows Mercury a bit larger, as it should; it was taken at a higher magnification through a large 16 inch telescope! Credit: J. A. Blackwell

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. If we don't have a quorum at the October meeting, the vote will be held in November.

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 Organic Compounds Found in Enceladus Ice Grains

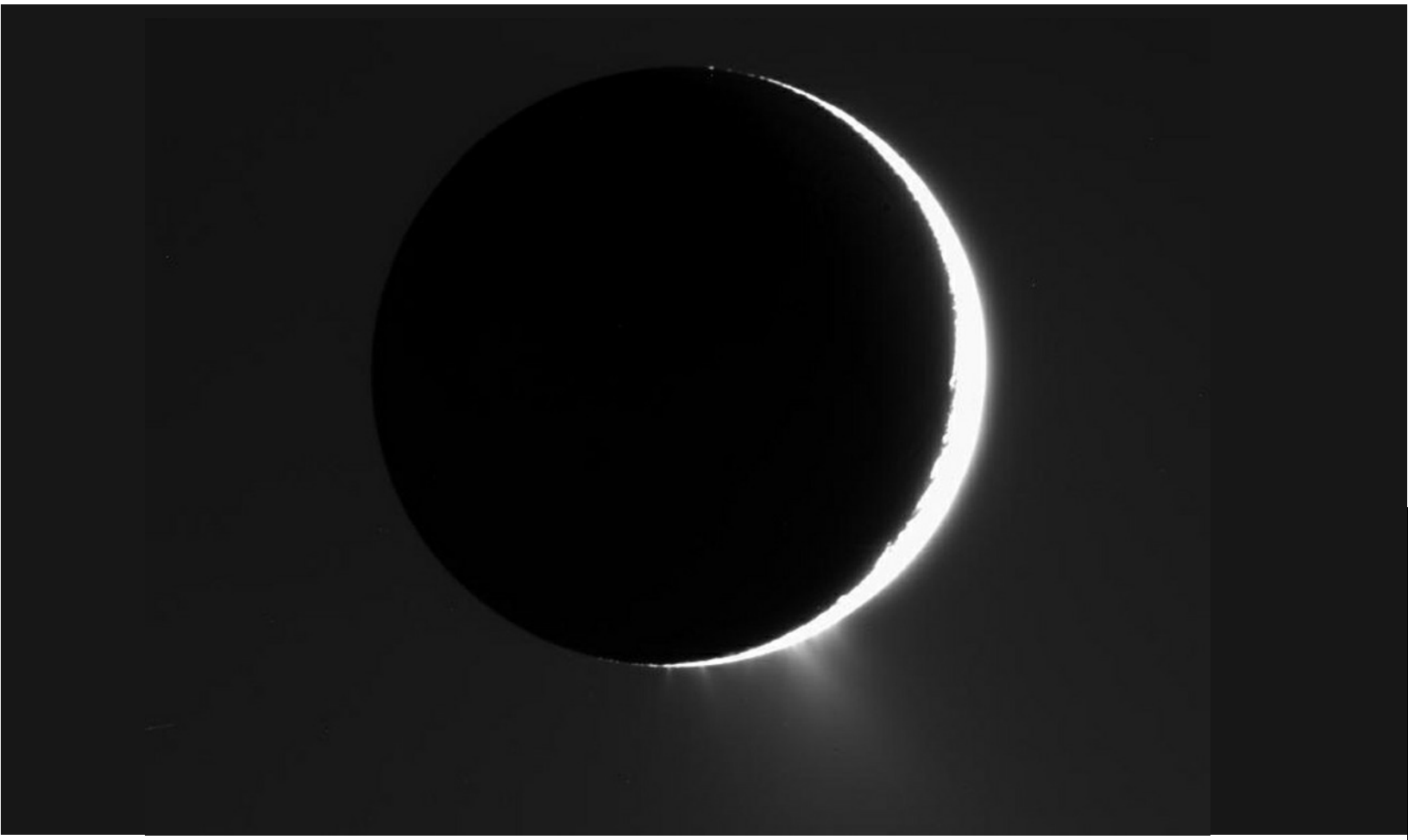
New kinds of organic compounds, the ingredients of amino acids, have been detected in the plumes bursting from Saturn's moon Enceladus. The findings are the result of the ongoing deep dive into data from NASA's Cassini mission.

Powerful hydrothermal vents eject material from Enceladus' core, which mixes with water from the moon's massive subsurface ocean before it is released into space as water vapor and ice grains. The newly discovered molecules, condensed onto the ice grains, were determined to be nitrogen- and oxygen-bearing compounds.

On Earth, similar compounds are part of chemical reactions that produce amino acids, the building blocks of life. Hydrothermal vents on the ocean floor provide the energy that fuels the reactions. Scientists believe Enceladus' hydrothermal vents may operate in the same way, supplying energy that leads to the production of amino acids.

"If the conditions are right, these molecules coming from the deep ocean of Enceladus could be on the same reaction pathway as we see here on Earth. We don't yet know if amino acids are needed for life beyond Earth, but finding the molecules that form amino acids is an important piece of the puzzle," said Nozair Khawaja, who led the research team of the Free University of Berlin. His findings were published Oct. 2 in the Monthly Notices of the Royal Astronomical Society.

Although the Cassini mission ended in September 2017, the data it provided will be mined for decades. Khawaja's



In this image captured by NASA's Cassini spacecraft in 2007, the plumes of Enceladus are clearly visible. The moon is nearly in front of the Sun from Cassini's viewpoint.Credit: NASA/JPL/Space Science Institute

team used data from the spacecraft's Cosmic Dust Analyzer, or CDA, which detected ice grains emitted from Enceladus into Saturn's E ring.

The scientists used the CDA's mass spectrometer measurements to determine the composition of organic material in the grains.

The identified organics first dissolved in the ocean of Enceladus, then evaporated from the water surface before condensing and freezing onto ice grains inside the fractures in the moon's crust, scientists found. Blown into space with the rising plume emitted through those fractures, the ice grains were then analyzed by Cassini's CDA.

The new findings complement the team's discovery last year of large, insoluble complex organic molecules believed to float on the surface of Enceladus' ocean. The team went deeper with this recent work to find the ingredients, dissolved in the ocean, that are needed for the hydrothermal processes that would spur amino acid formation.

"Here we are finding smaller and soluble organic building blocks - potential precursors for amino acids and other ingredients required for life on Earth," said co-author Jon Hillier.

"This work shows that Enceladus' ocean has reactive building blocks in abundance, and it's another green light in the investigation of the habitability of Enceladus," added co-author Frank Postberg.

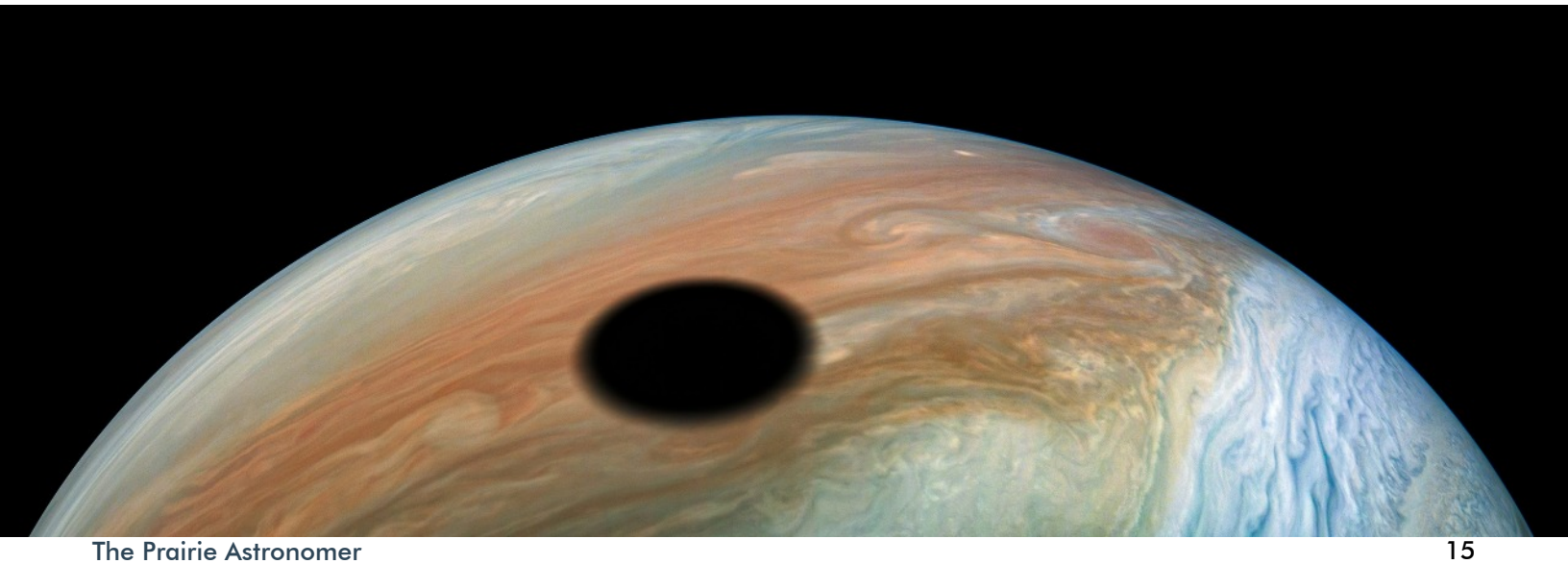
The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency (ESA) and the Italian Space Agency. NASA's Jet Propulsion Laboratory, a division of Caltech in Pasadena, California, manages the mission for NASA's Science Mission Directorate, Washington. JPL designed, developed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

Below: Jupiter's volcanically active moon Io casts its shadow on the planet in this dramatic image from NASA's Juno spacecraft. As with solar eclipses on the Earth, within the dark circle racing across Jupiter's cloud tops one would witness a full solar eclipse as Io passes in front of the Sun. Citizen scientist Kevin M. Gill created this enhanced-color image using data from the spacecraft's JunoCam imager. The raw image was taken on Sept. 11, 2019 at 8:41 p.m. PDT (11:41 p.m. EDT) as the Juno spacecraft performed its 22nd close flyby of Jupiter. At the time the image was taken, the spacecraft was about 4,885 miles (7,862 kilometers) from the cloud tops at a latitude of 21 degrees.

Image credit: Image data: NASA/JPL-Caltech/SwRI/MSSS, Image processing by Kevin M. Gill, © CC BY 3.0



Finding Strange Uranus in Aries

David Prosper

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.org to find local clubs, events, and more!

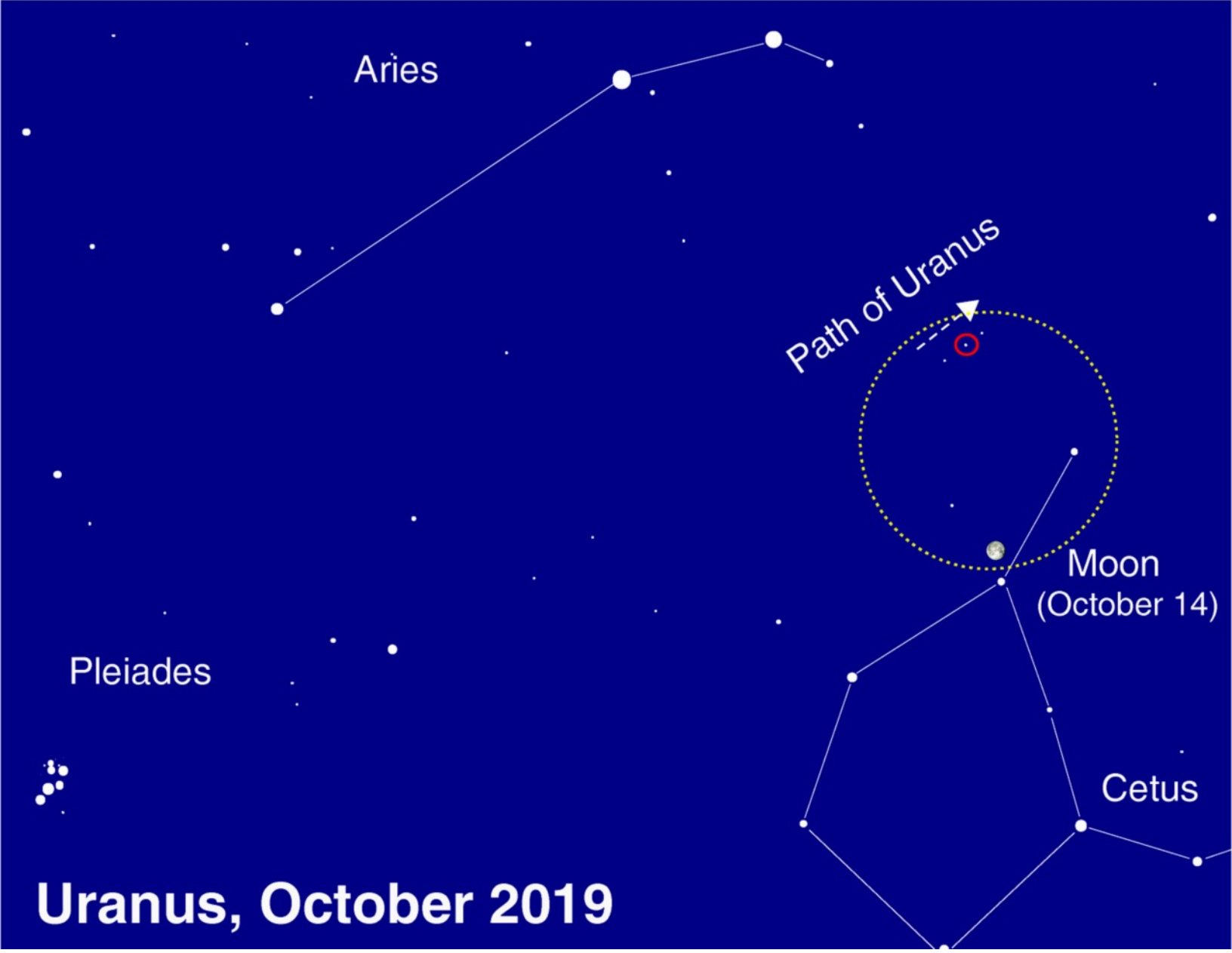
Most of the planets in our solar system are bright and easily spotted in our night skies. The exceptions are the ice giant planets: Uranus and Neptune. These worlds are so distant and dim that binoculars or telescopes are almost always needed to see them. A great time to search for Uranus is during its opposition on October 28, since the planet is up almost the entire night and at its brightest for the year.

Search for Uranus in the space beneath the stars of Aries the Ram and above Cetus the Whale. These constellations are found west of more prominent Taurus the Bull and Pleiades star cluster. You can also use the Moon as a guide! Uranus will be just a few degrees north of the Moon the night of October 14, close enough to fit both objects into the same binocular field of view. However, it will be much easier to see dim Uranus by moving the bright Moon just out of sight. If you're using a telescope, zoom in as much as possible once you find Uranus; 100x magnification and greater will reveal its small greenish disc, while background stars will remain points.

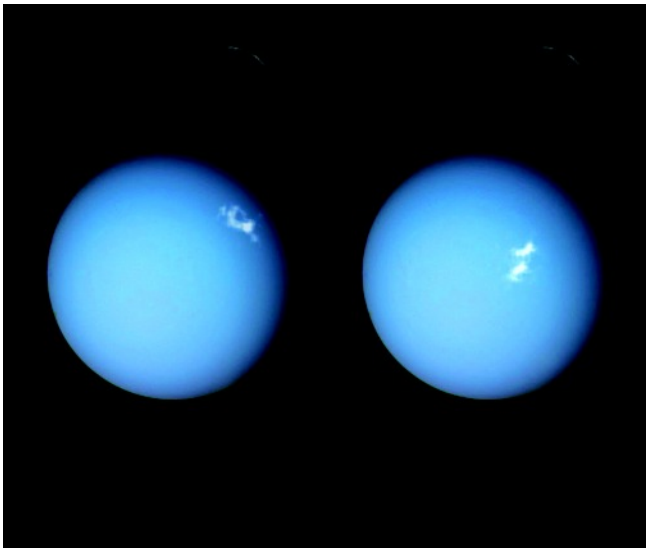
Try this observing trick from a dark sky location. Find Uranus with your telescope or binoculars, then look with your unaided eyes at the patch of sky where your equipment is aimed. Do you see a faint star where Uranus should be? That's not a star; you're actually seeing Uranus with your naked eye! The ice giant is just bright enough near opposition - magnitude 5.7 - to be visible to observers under clear dark skies. It's easier to see this ghostly planet unaided after first using an instrument to spot it, sort of like "training wheels" for your eyes. Try this technique with other objects as you observe, and you'll be amazed at what your eyes can pick out.

By the way, you've spotted the first planet discovered in the modern era! William Herschel discovered Uranus via telescope in 1781, and Johan Bode confirmed its status as a planet two years later. NASA's Voyager 2 is the only spacecraft to visit this strange world, with a brief flyby in 1986. It revealed a strange, severely tilted planetary system possessing faint dark rings, dozens of moons, and eerily featureless cloud tops. Subsequent observations of Uranus from powerful telescopes like Hubble and Keck showed its blank face was temporary, as powerful storms were spotted, caused by dramatic seasonal changes during its 84-year orbit. Uranus's wildly variable seasons result from a massive collision billions of years ago that tipped the planet to its side.

Discover more about NASA's current and future missions of exploration of the distant solar system and beyond at nasa.gov



The path of Uranus in October is indicated by an arrow; its position on October 14 is circled. The wide dashed circle approximates the field of view from binoculars or a finderscope. Image created with assistance from Stellarium.



Composite images taken of Uranus in 2012 and 2014 by the Hubble Space Telescope, showcasing its rings and auroras. More at bit.ly/uranusauroras Credit: ESA/Hubble & NASA, L. Lamy / Observatoire de Paris

As you've probably heard, our club recently finished refurbishing its 12-inch reflecting telescope, and now it needs a name! But first, a little history.

Our club bought the telescope in 1967 from a jeweler in Twin Falls, Idaho, for $800 plus shipping. Earl Moser found the scope when he was on vacation in that part of the country.

Earl reports that this jeweler had his own private planetarium and observatory dome on the roof of his house. He had built a new telescope and the club's present scope was just sitting in his back yard.

We're not sure exactly when the telescope was constructed, although we do know that the whole thing is homemade. Supposedly the mirror was constructed by a man named Melish, a rather renowned mirror grinder in the 1930's. The tube is a custom made job, made out of a material similar to fiberglass (probably built before fiberglass was developed.) The tube is thicker in the center and thinner at the ends. The rotating rings on the tube were unique at the time– most amateur scopes didn't have them.

The club replaced the old monocular finder scope with the present finder under the supervision of Larry Stepp. Jess Williams also reworked the clock drive, installing a new motor. Unfortunately,when the drive was plugged in, it was found that the telescope tracked backwards! Jess installed an idle gear and the problem was corrected.

Since the club didn't have $800 in the treasury when it purchased the scope, a loan (mortgage) was taken out to buy it. When the mortgage was paid off in April, 1969,the club set up the telescope at Gateway Shopping Center,and used it to focus the sun's heat on the mortgage to set it on fire. This event was well covered by newspapers and television, and was probably the club's first publicity event.

Since its purchase, the telescope has been stored out at Earl Moser‘s house in Hickman. At first, Earl kept it in the house, but eventually the club bought a steel shed from Wards for $107 and adapted; it so that it would tip back to expose the telescope to the sky. This shed blew down twice. The first time it was rebuilt, but the second time it was a total loss. Earl then built the sturdy shed in which the telescope is now housed.

In all the time we have had this instrument, it has never had a real name, just "the club telescope." But now that it's back in use, it needs a name. So the club is sponsoring a "Name The Telescope" contest, open to all club members and newsletter subscribers. Just think of a good name for the scope and submit it (in writing, or over the telephone), along with your name, to Ron Veys, before the December meeting. The winning name will be chosen by a vote of the membership at that meeting.

And what is a contest without a prize, right? The winner of this contest will receive a copy of T.W. Webb's book, CELESTIAL OBJECTS FOR COMMON TELESCOPES, VOL. I: THE SOLAR SYSTEM. This book was first written in 1859,and revised in 1917. It's been considered a classic reference in the field of observational astronomy. It can be yours! All you have to do is come up with a good name for the telescope.

January, 1980:

Balloting at the December club meeting produced a name for the long-nameless Club 12 inch telescope… and her name is PAT (Prairie Astronomy Telescope) . . PAT's name was submitted by Trixie Schmidt,who, for her efforts won a copy of T. W. Webb's CELESTIAL OBJECTS FOR COMMON TELESCOPES, VOLUME I: THE SOLAR SYSTEM.

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:

amazonsmile

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