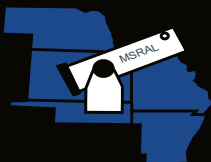


The Prairie Astronomer

August 2024 Volume 65, Issue #8

IN THIS ISSUE:

Perseverance Rover Finds Unusual Mars Rock
Citizen Scientists Find Fast Moving Object
Nebraska Star Party
Fall Outreach Events



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer



The next club meeting is August 27th at 7:30pm at Hyde Observatory

NEXT MEETING AND PROGRAM

The August Program will be a review of the Nebraska Star Party and also “Lunar Photogrammetry” by Mark Dahmke.

Mark will show examples of how to generate 3D spatial data (3D models) from Apollo-era photos using modern photogrammetry software. With as few as two photos taken on the surface of the Moon, it’s possible to reconstruct not only stereoscopic views but actual 3D models and animations.

UPCOMING PROGRAMS

September: The IceCube Neutrino project - by Ilya Kravchenko, Dept of Physics & Astronomy at UNL

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Cover: M20, The Trifid Nebula taken at NSP by Jim White



CALENDAR



Lincoln Parks & Recreation

Most of our club meetings are held at Hyde Memorial Observatory in Holmes Park.

The Observatory is owned and maintained by the City of Lincoln Parks and Recreation Department, but is operated by volunteers, many of whom are also members of the Prairie Astronomy Club.

PAC Meeting

*Tuesday, August 27th, 7:30pm at Hyde Observatory
Lunar Photogrammetry: 3D Views of Apollo landing sites created from Apollo Mission Photos.- Mark Dahmke*

PAC Meeting

*Tuesday, September 24th, 7:30pm at Hyde Observatory
Program: The IceCube Neutrino Project*

PAC Meeting

Tuesday, October 29th, 7:30pm at Branched Oak Observatory

<https://www.prairieastronomyclub.org/event-calendar/>



www.prairieastronomyclub.org

2024 STAR PARTY DATES

	Date	Date
January	5	12
February	2	9
March	1	8
April	3/29	5
May	4/26	3
June	5/31	7
July	6/28	5
NSP	7/28	8/2
August	7/26	2
September	8/30	6
October	9/27	4
November	11/22	29
December	20	27

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

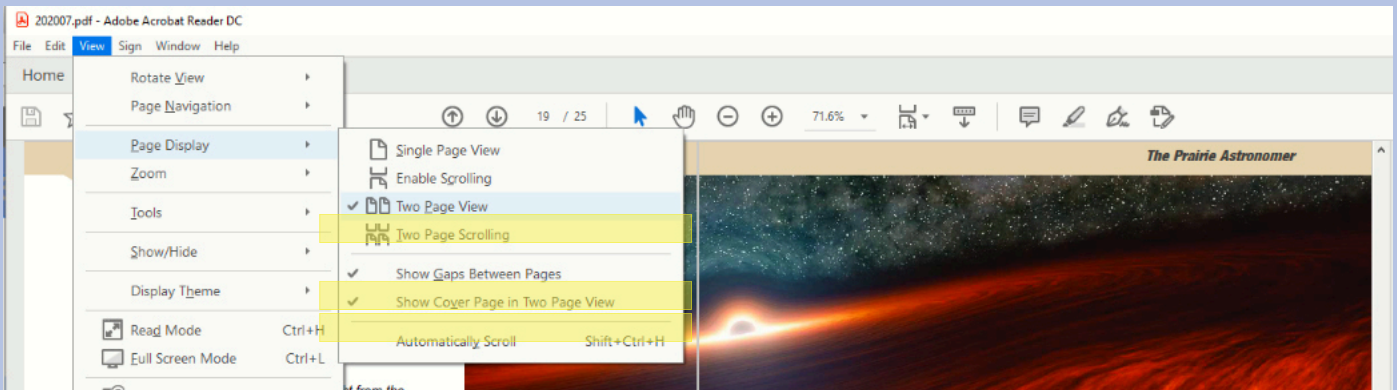
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Notices

Newsletter Page View Format

How to Adjust Adobe Acrobat Settings for Two Page View



To view this newsletter in magazine spread format in Acrobat, select View ->Page Display->Two Page View. Acrobat will then show two pages side by side. Also make sure the checkboxes “Show Cover Page in Two Page View” and “Show Gaps Between Pages” are checked. If you have it setup correctly, the cover page will be displayed by itself and subsequent pages will be side by side with the odd numbered pages on the left.

PAC Newsletter Archive

Back issues of the *Prairie Astronomer* from 1962 to present are available online:
<https://newsletters.prairieastronomyclub.org/>

Pay Dues Online

<https://www.prairieastronomyclub.org/dues/>

If you're already a member and are renewing within 30 days of your anniversary date, select the early renewal option for a discount.

PAC-LIST

Subscribe through [GoogleGroups](#) or contact Mark Dahmke to be added to the list. You'll need a Google/gmail account, but if you want to use a different email address, just associate that address with your google account to access Google Groups. Once subscribed, you can view message history through the GoogleGroups website.

To post messages to the list, send to this address: pac-list@googlegroups.com

The President's Message

Jason O'Flaherty

Dear PAC Members:

As we transition from the heat of summer to the approaching autumn, I hope you've been enjoying the spots of cooler weather, clear skies, and the opportunities they've brought.

The 31st Annual Nebraska Star Party had a great turnout this year! While I could only attend for one day, seeing so many familiar faces from our club was terrific. The camaraderie and shared passion for the night sky were genuinely inspiring. I enjoyed following along on social media. For those interested, here's a news article covering some of the event: [Stargazers Unite: Nebraska Star Party Draws Hundreds to Valentine](#).

I'd like to extend my congratulations to the winners of the astrophotography awards. We'll get another chance to view some of these stunning images at our annual photo and video presentation

during our next club meeting on Tuesday, August 27th. At this meeting, we'll be back to our usual routine, and I'm excited to announce that Mark Dahmke from the club will be our presenter. He will explain how to generate 3D spatial models of the moon, a topic I'm sure many of you will find interesting. Please invite friends and family who might be interested in this unique presentation.

As we move into fall, it's also a great time to get involved with our club's outreach activities. Our Outreach Coordinator, Don Hain, has lined up four events for September alone, offering plenty of opportunities to volunteer or simply attend and enjoy. More details can be found in the newsletter, and I encourage you to check it out. I will be volunteering at the "Cosmos and Cocktails" event at the University of Nebraska State Museum—if you're planning to attend,



please stop by and say hello!

Lastly, our upcoming Club Star Parties will be held at the Clatonia Recreation Area on Friday, August 30th, and Friday, September 6th. These are great opportunities to gather under the stars and share our love for astronomy. For a full list of dates and events, please visit the calendar section on our club's website: [PAC Event Calendar](#).

Wishing you all clear skies and a wonderful start to the autumn season.

Best regards,

Jason O'Flaherty

ARP 70

The Mantrap Skies Image Catalog

Arp 70, a pair of interacting galaxies, is in northeastern Pisces about 2 degrees due west of M33. It is about 460 million light-years from earth. Arp put it in his category of spirals with small, high surface brightness companions on arms. There does seem to be a very faint stream of stars coming from the southern, cut-off arm over to the companion galaxy. Though in Arp's image it is difficult to see. It's easier to see a connection from the northern arm down to the companion in Arp's image. There does appear to be a broad band of stars running from the main spiral to the companion coming from the entire western side of the galaxy and going beyond the companion a little ways, if a few thousand light-years can be considered a "little ways".

The main galaxy is UGC 934. It has other designations such as PGC 5085. NED classes it as S? The companion is LEDA 212740 among other designations. NED makes no attempt to classify it. While it appears to be related to UGC 934 NED has no redshift or other distance data so this is possibly an illusion though



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.



ARP70, continued.

most see it as a true interacting companion.

NED has no redshift data on any galaxies in the field except UGC 934. Only a dozen or so other galaxies are even identified, all from the 2MASS survey of IR galaxies. The Sloan SR8 Survey has been released but not included as yet. The Sloan image of Arp 70 from this data release comes the closest to my colors of any I've seen so far. Stars are different however. Arp 70 must not have much IR or UV emission for this to happen.

There is one asteroid in the image. It is (255475) 2005 YN165 at an estimated magnitude of 19.7. To find it look near the top of the image directly above Arp 70 to the right of the brightest blue star in the frame and a fainter one. The trail goes up at a rather steep angle and yes the asteroid was moving upward in retrograde motion when this was taken.

The stars in Arp's image are rather elongated. I've seen this when he was capturing two Arp's on one film plate and was pushing the limits of the

Winn Corrector that corrects for coma and flattens the field. But there's no other Arp's in the area. The nearest is over 2 degrees to the north, far beyond the field of the 200". Maybe there was something else that interested him but didn't make the catalog. BTW, his exposure was 30 minutes on 103a-D emulsion for this one. 103a-D is most sensitive to yellow-green light. I used 40 minutes for the luminance data with a telescope that gathers only 0.5% the photons. Yes, CCD's are more sensitive than film--a lot more sensitive.



Travel & Leisure Names Nebraska Star Party Best Astrotourism Spot in the US

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This Tiny Destination in the Midwest Was Just Named the Best Astrotourism Spot in the U.S. for Its 'Exceptionally Dark Skies'

Get out your telescope in Nebraska.

By [Stacey Leasca](#) | Published on August 2, 2024



PHOTO: COURTESY OF NEBRASKA STAR PARTY

Astrotourism has surged in popularity, partly fueled by recent solar eclipses and upcoming meteor showers. The travel booking site Omio analyzed 1,400 global locations for stargazing based on their Southern Horizon clearance, Transparency Rating, Light Pollution Rating,

and Bortle Scale Rating, which assesses sky brightness and light pollution—the lower the Bortle Scale, the better for viewing stars. Nebraska Star Party, held annually at Merritt Reservoir outside Valentine, Nebraska, was ranked the best location for astrotourism outside

Europe due to its exceptionally dark skies, high altitude, and low haze. In Europe, Ireland dominated the rankings with 8 out of the top 10 spots for stargazing.

[Read the full article here.](#)

September Observing

Jim Kvasnicka

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

Planets

Mercury: Morning planet, superior conjunction on September 30th.

Venus: Evening planet, best seen at the end of the month.

Jupiter: In Taurus at magnitude -2.4 with a disc 40.0" wide.

Saturn: In Aquarius at magnitude +0.6 with a disk 19.2" wide.

Uranus and Neptune: In Taurus and Pisces at magnitude +5.7 and +7.8.

Mars: Morning planet in Gemini. Near M35 on September 9th.

Messier List

M13: The Great Hercules Cluster, Class V globular cluster.

M14: Class VII globular cluster in Ophiuchus.

M22: Class VIII globular cluster in Sagittarius.

M28: Class IV globular cluster in Sagittarius.

M54: Class III globular cluster in Sagittarius.

M69: Class V globular cluster in Sagittarius.

M70: Class V globular cluster in Sagittarius.

M92: Class IV globular cluster in Hercules.

Last Month: M6, M7, M8, M9, M10, M12, M19, M20, M21, M23, M62, M107

Next Month: M11, M16, M17, M18, M24, M25, M26, M55, M75



NGC and other Deep Sky Objects

NGC 6826: The

Blinking Planetary in Cygnus.

NGC 6905: The Blue Flash Nebula in Delphinus.

NGC 6960: Veil Nebula – Western Segment, SNR in Cygnus.

NGC 6974/6979: Veil Nebula – Central Segment, SNR in Cygnus.

NGC 6992/6995: Veil Nebula – Eastern Segment, SNR in Cygnus.

NGC 7006: Class I globular cluster in Delphinus.

Double Star Program List

Otto Struve 525: Yellow and blue pair in Lyra.

Gamma Delphinus: Yellow primary with a yellow-green secondary.

Zeta Aquarii: Yellow and white pair.

94 Aquarii: Yellow primary with a pale blue secondary.

Alpha Capricornus: Wide pair of yellow stars.

Beta Capricornus: Yellow and blue stars.

36 Ophiuchi: Yellow-orange pair of stars.

Omicron Ophiuchi: Yellow primary with a light-yellow secondary.

70 Ophiuchi: Yellow and orange stars.

Challenge Object

Stephan's Quintet: Galaxy group in Pegasus containing NGC 7317, NGC 7318A, NGC 7318B, NGC 7319, and NGC 7320. A large aperture is required to identify individual galaxies.

Focus on Observing Programs

Jim Kvasnicka

Multiple Star Observing Program

The purpose of the Multiple Star Observing Program is to introduce observers to 114 of the finest multiple star systems. This program is to be conducted after completing the Double Star Observing Program. The multiple star systems in this program include three or more stars.

Requirements for the program include completing the Double Star Observing Program prior to submitting for the Multiple Star Observing Program. The observer must observe 100 multiple stars from the list of 114. The list can be downloaded from the Astronomical League web site. The objects can be sketched or imaged. The majority of objects can be observed with a small telescope but a few require a telescope of 4 inches or larger.

Some of the multiples are very close and require high magnification to separate the stars. If you can't separate

the stars make a note on your observing log.

You can use your own observing logs to record your observations or download observing logs from the Double Star program. Your observations should include: object name, date and time, power, seeing, telescope used, filters used, latitude and longitude, and your observing notes that include a drawing or image of the multiple system. Sketches of the multiple systems must show north and either east or west. The depiction of the primary star should be clear.

Once you complete the Multiple Star Observing Program you will need to submit your observing logs to me for review. I will contact the Multiple Star Observing Program chair for approval. Once I receive your certificate and pin I will present them to you at the next PAC meeting.

New Members

Jaxzen Marshall, Lincoln, NE

Welcome to the club!

Club Outreach

Jim Kvasnicka

Outreach has been and continues to be one of the core values of the Prairie Astronomy Club. It is written in the Prairie Astronomy Club Bylaws under the Purpose:

The purpose of the club is to encourage, and to participate in the study of astronomy and related subjects for the benefit of its members and of the general public...

Outreach is an important part of what we do and an excellent way to promote the club

to the public. To do outreach requires club members to volunteer. In September and October we have a number of requests for The Prairie Astronomy Club to help with public outreach events.

For the past couple of years we have had a small core group of members who have been doing most of the outreach events. We need some of our other members to step up and help as well. If you have never done an outreach event you will find it to

be a rewarding and uplifting experience. I strongly encourage you to volunteer and help. If you are worried that you have never helped with an outreach event we will pair you up with another club member to help you get started and show you what to expect.

Please consider the opportunity to share your love of astronomy with others. The look on children's faces when they look through your telescope makes it all worthwhile.

Upcoming Outreach Events

Thanks to everyone for the efforts so far in 2024! Many members of PAC volunteer at Hyde, and more would be welcome there. There are also some events that other astronomy groups (both the Omaha Astronomy Society and the Platte Valley Astronomical Observers) get involved

with that PAC members would be welcome to join in on. Such events may be beyond where we have reached out to in the past, but I may post some here in the future since they offer a chance to meet new folks and at times some skies that may be darker than what we have in the

eastern part of the state.

Please take a look at the following calendar and consider volunteering for some of these events.

Outreach Coordinator contact information:

Don Hain
dhain00@gmail.com
Phone: 402 440 5318

Outreach Calendar

Friday, 9/13/2024

9:00PM-11:30PM

Where: Mahoney State Park, 28500 W Park Hwy, Ashland, NE

What: Public astronomy viewing

Sponsored by: Nebraska Star Party /OAS/NE Game & Parks

Needs: handled by OAS but the more the merrier

Saturday, 9/14/2024

Sundown-11:00PM

Where: Hyde Observatory, Holmes Lake Park, 3701 S 70th St, Lincoln, NE

What: Public astronomy viewing

(regular Saturday night viewing at Hyde), International Observe the Moon night

Sponsored by: Hyde Observatory

Needs: handled by Hyde volunteers - contact Don if you would like more info about becoming a volunteer at Hyde

Saturday, 9/21/2024

5:15PM(setup), 6:00PM-9:00PM

Where: UN State Museum, Morrill Hall and Planetarium, 645 N 14th St, Lincoln NE

What: Cosmos and Cocktails: Dreaming of Autumn

(opportunity for adults in Lincoln community to learn about astronomy)

Sponsored by: University of Nebraska State Museum

Needs: two volunteer slots already filled (but contact Don if interested), feel free to attend the event

Friday, 9/27/2024

8:30PM(setup), 9:00PM-10:00PM

Where: Camp Carol Joy Hollings, 27416 Ranch Rd, Ashland, NE

What: Camp Erin

Sponsored by: Mourning Hope

Needs: three volunteer slots (already filled)

Saturday, 10/12/2024

5:00PM-8:00PM with astronomical viewing until 9:00PM (9:30PM if attendees are still interested)

Where: Spring Creek Prairie, 11700 SW 100th St, Denton, NE

Sponsored by: Spring Creek Prairie / Audubon Society

Needs: as many volunteers as want to come - please let me know so I can get an estimate

NASA's Perseverance Rover Scientists Find Intriguing Mars Rock

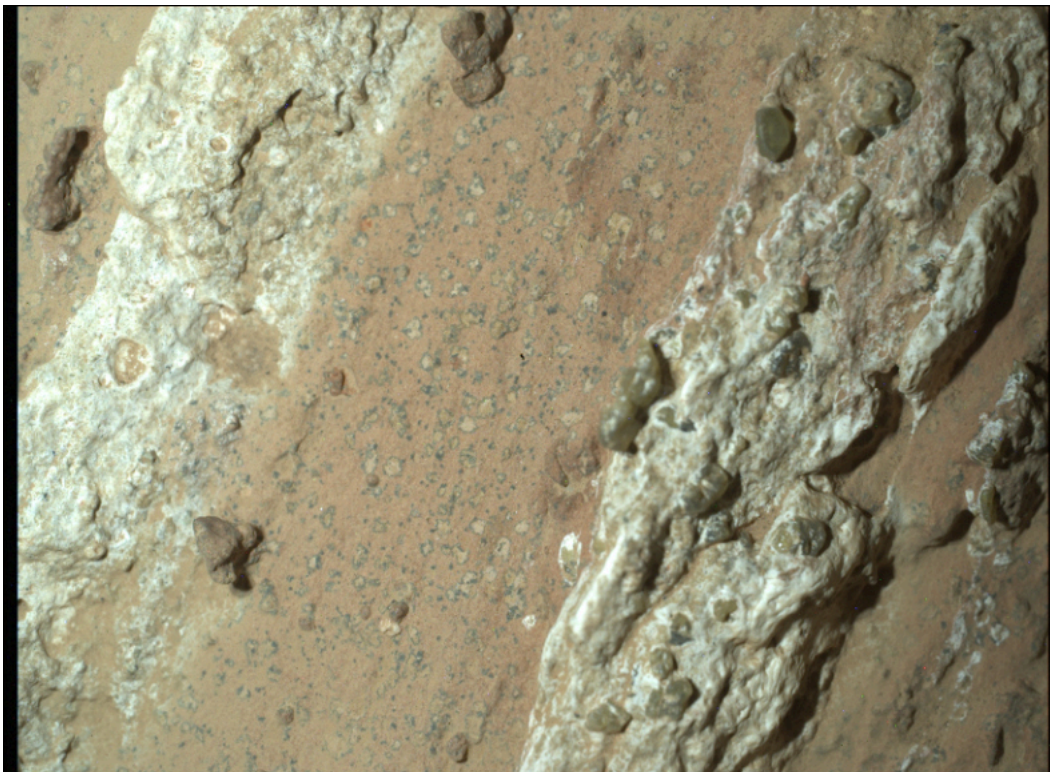
The six-wheeled geologist found a fascinating rock that has some indications it may have hosted microbial life billions of years ago, but further research is needed.

A vein-filled rock is catching the eye of the science team of NASA's Perseverance rover. Nicknamed "Cheyava Falls" by the team, the arrowhead-shaped rock contains fascinating traits that may bear on the question of whether Mars was home to microscopic life in the distant past.

Analysis by instruments aboard the rover indicates the rock possesses qualities that fit the definition of a possible indicator of ancient life. The rock exhibits chemical signatures and structures that could possibly have been formed by life billions of years ago when the area being explored by the rover

contained running water. Other explanations for the observed features are being considered by the science team, and future research steps will be required to determine whether ancient life is a valid explanation.

The rock — the rover's 22nd rock core sample — was collected on July 21, as the rover explored the



NASA's Perseverance rover discovered "leopard spots" on a reddish rock nicknamed "Cheyava Falls" in Mars' Jezero Crater in July 2024. Scientists think the spots may indicate that, billions of years ago, the chemical reactions in this rock could have s... Credit: NASA/JPL-Caltech/MSSS

Mars, continued.

northern edge of Neretva Vallis, an ancient river valley measuring a quarter-mile (400 meters) wide that was carved by water rushing into Jezero Crater long ago.

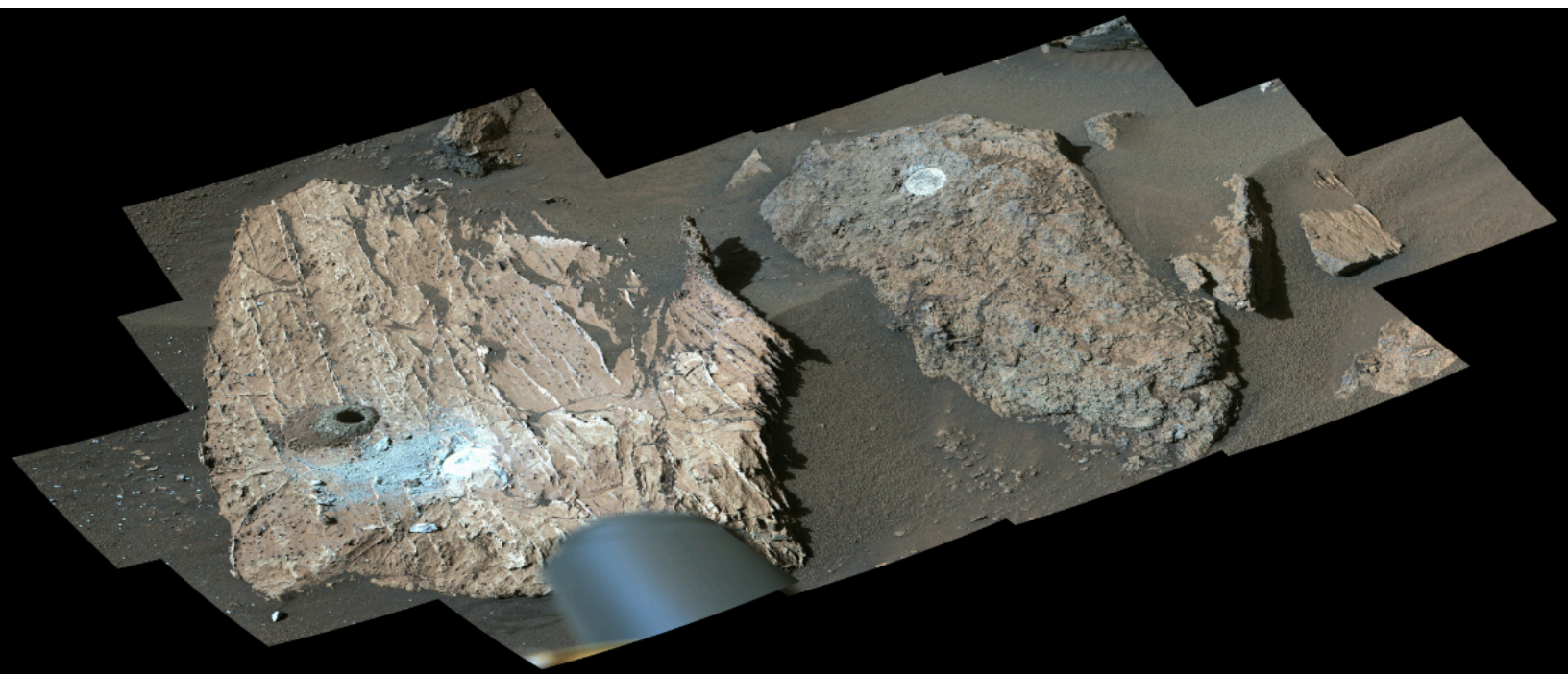
“We have designed the route for Perseverance to ensure that it goes to areas with the potential for interesting scientific samples,” said Nicola Fox, associate administrator, Science

Mission Directorate at NASA Headquarters in Washington. “This trip through the Neretva Vallis riverbed paid off as we found something we’ve never seen before, which will give our scientists so much to study.”

Multiple scans of Cheyava Falls by the rover’s SHERLOC (Scanning Habitable Environments with Raman & Luminescence

for Organics & Chemicals) instrument indicate it contains organic compounds. While such carbon-based molecules are considered the building blocks of life, they also can be formed by non-biological processes.

“Cheyava Falls is the most puzzling, complex, and potentially important rock yet investigated by



“Cheyava Falls” (left) shows the dark hole where NASA’s Perseverance took a core sample; the white patch is where the rover abraded the rock to investigate its composition. A rock nicknamed “Steamboat Mountain” (right) also shows an abrasion patch. Th... Credit: NASA/JPL-Caltech/ASU/MSSS

Mars, continued.

Perseverance,” said Ken Farley, Perseverance project scientist of Caltech in Pasadena. “On the one hand, we have our first compelling detection of organic material, distinctive colorful spots indicative of chemical reactions that microbial life could use as an energy source, and clear evidence that water — necessary for life — once passed through the rock. On the other hand, we have been unable to determine exactly how the rock formed and to what extent nearby rocks may have heated Cheyava Falls and contributed to these

features.”

Other details about the rock, which measures 3.2 feet by 2 feet (1 meter by 0.6 meters) and was named after a Grand Canyon waterfall, have intrigued the team, as well.

How Rocks Get Their Spots

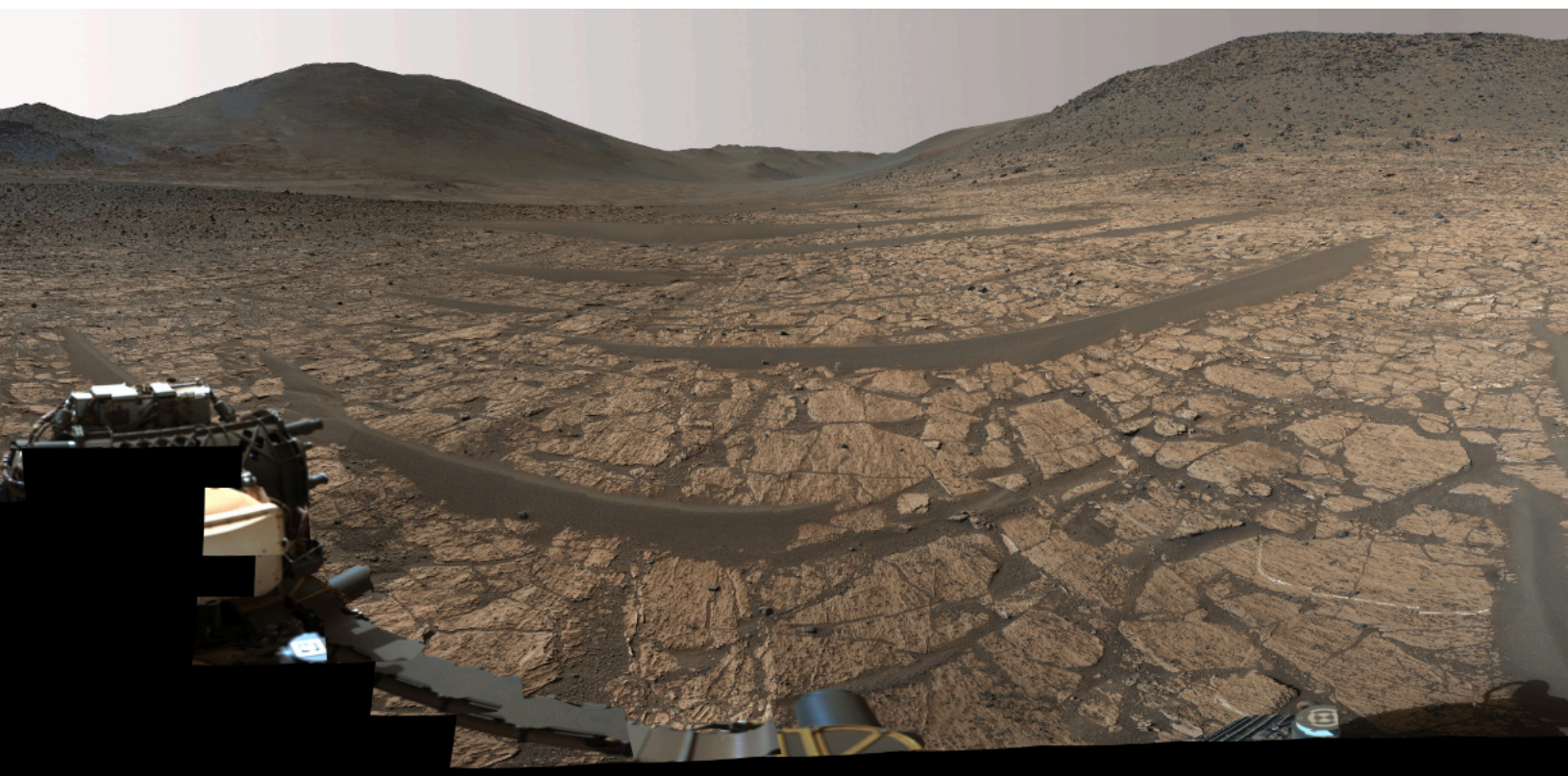
In its search for signs of ancient microbial life, the Perseverance mission has focused on rocks that may have been created or modified long ago by the presence of water. That’s why the team homed in on Cheyava Falls.

“This is the kind of key

observation that SHERLOC was built for — to seek organic matter as it is an essential component of a search for past life,” said SHERLOC’s principal investigator Kevin Hand of NASA’s Jet Propulsion Laboratory in Southern California, which manages the mission.

Running the length of the rock are large white calcium sulfate veins. Between those veins are bands of material whose reddish color suggests the presence of hematite, one of the minerals that gives Mars its distinctive rusty hue.

When Perseverance took



Mars, continued.

a closer look at these red regions, it found dozens of irregularly shaped, millimeter-size off-white splotches, each ringed with black material, akin to leopard spots. Perseverance's PIXL (Planetary Instrument for X-ray Lithochemistry) instrument has determined these black halos contain both iron and phosphate.

"These spots are a big surprise," said David

Flannery, an astrobiologist and member of the Perseverance science team from the Queensland University of Technology in Australia. "On Earth, these types of features in rocks are often associated with the fossilized record of microbes living in the subsurface."

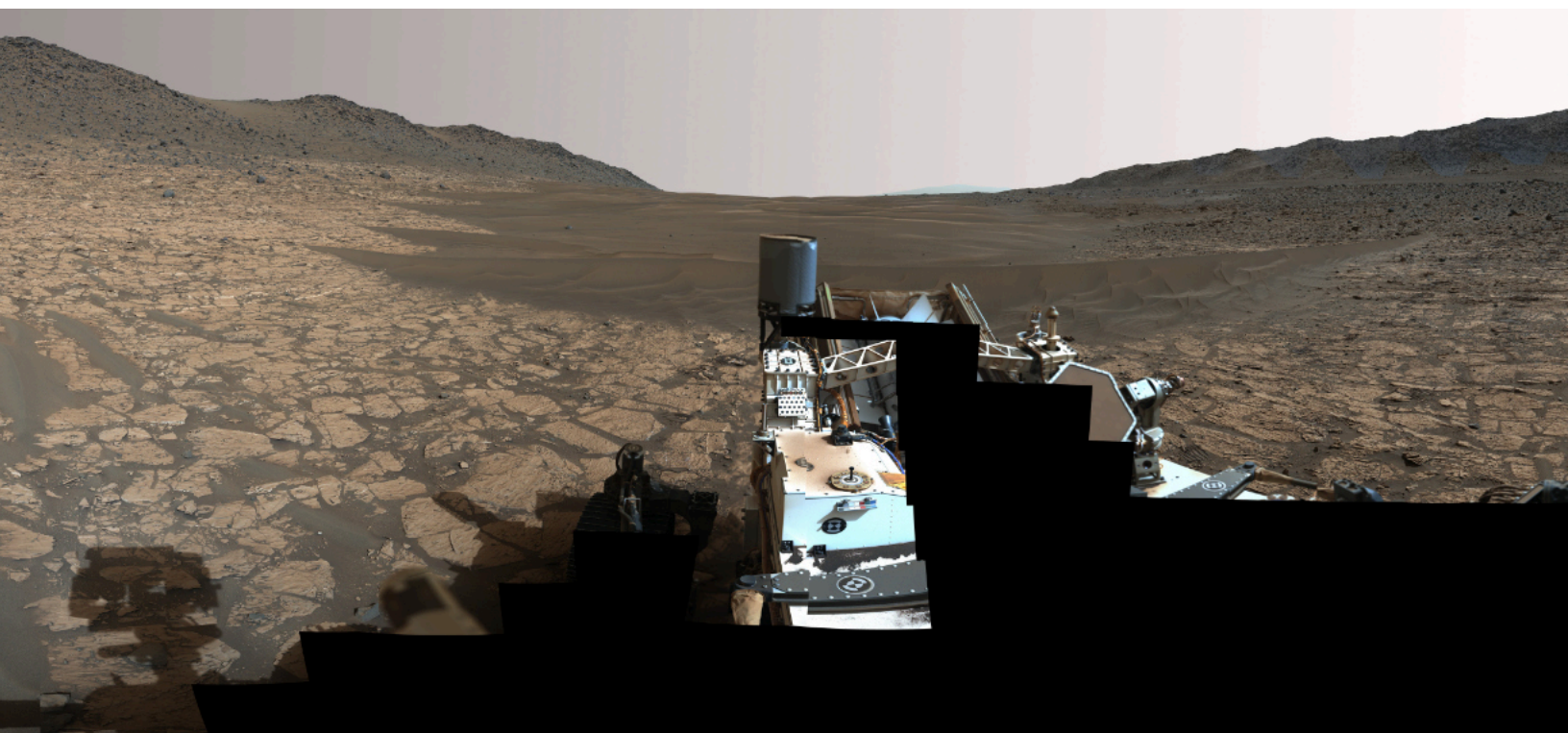
Spotting of this type on sedimentary terrestrial rocks can occur when

chemical reactions involving hematite turn the rock from red to white. Those reactions can also release iron and phosphate, possibly causing the black halos to form. Reactions of this type can be an energy source for microbes, explaining the association between such features and microbes in a terrestrial setting.

In one scenario the Perseverance science

NASA's Perseverance rover used its Mastcam-Z instrument to capture this 360-degree panorama of a region on Mars called "Bright Angel," where an ancient river flowed billions of years ago. "Cheyava Falls" was discovered in the area slightly right of ce...

Credit: NASA/JPL-Caltech/ASU/MSSS



Mars, continued.

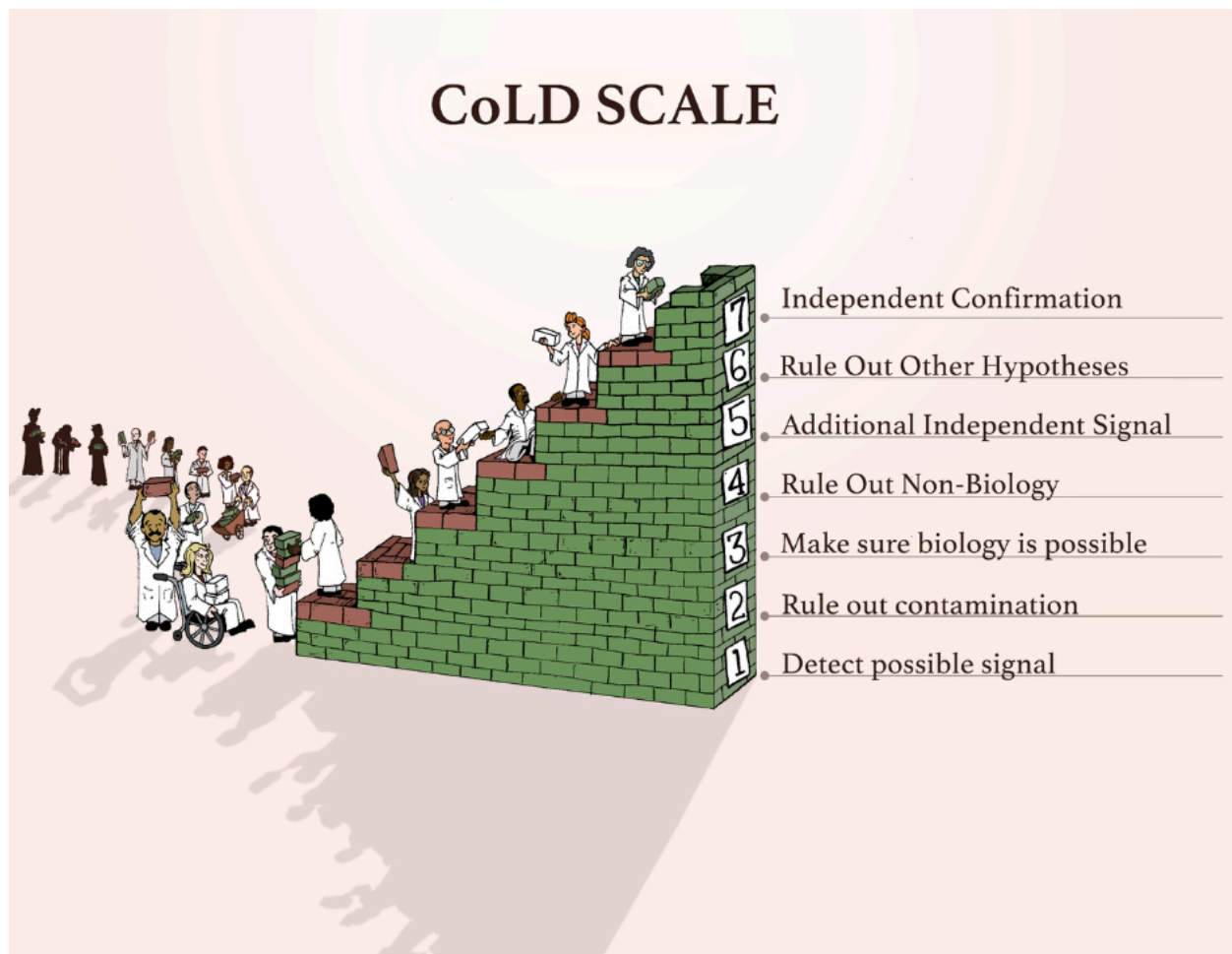
team is considering, Cheyava Falls was initially deposited as mud with organic compounds mixed in that eventually cemented into rock. Later, a second episode of fluid flow penetrated fissures in the rock, enabling mineral deposits that created the large white calcium

sulfate veins seen today and resulting in the spots.

Another Puzzle Piece

While both the organic matter and the leopard spots are of great interest, they aren't the only aspects of the Cheyava Falls rock confounding the science

team. They were surprised to find that these veins are filled with millimeter-size crystals of olivine, a mineral that forms from magma. The olivine might be related to rocks that were formed farther up the rim of the river valley and that may have been produced by



As shown in this graphic, astrobiologists catalog a seven-step scale, called the CoLD (Confidence of Life Detection) scale, to research whether a sample could indicate life. This “Cheyava Falls” sample is an example of Step One: “Detect possible signal.” Much additional research must be conducted to learn more.

Mars, continued.

crystallization of magma.

If so, the team has another question to answer: Could the olivine and sulfate have been introduced to the rock at uninhabitably high temperatures, creating an abiotic chemical reaction that resulted in the leopard spots?

“We have zapped that rock with lasers and X-rays and imaged it literally day and night from just about every angle imaginable,” said Farley. “Scientifically, Perseverance has nothing more to give. To fully understand what really happened in that Martian river valley at Jezero Crater billions of years ago, we’d want to

bring the Cheyava Falls sample back to Earth, so it can be studied with the powerful instruments available in laboratories.”

More Mission Information

A key objective of Perseverance’s mission on Mars is astrobiology, including caching samples that may contain signs of ancient microbial life. The rover will characterize the planet’s geology and past climate, to help pave the way for human exploration of the Red Planet and as the first mission to collect and cache Martian rock and regolith.

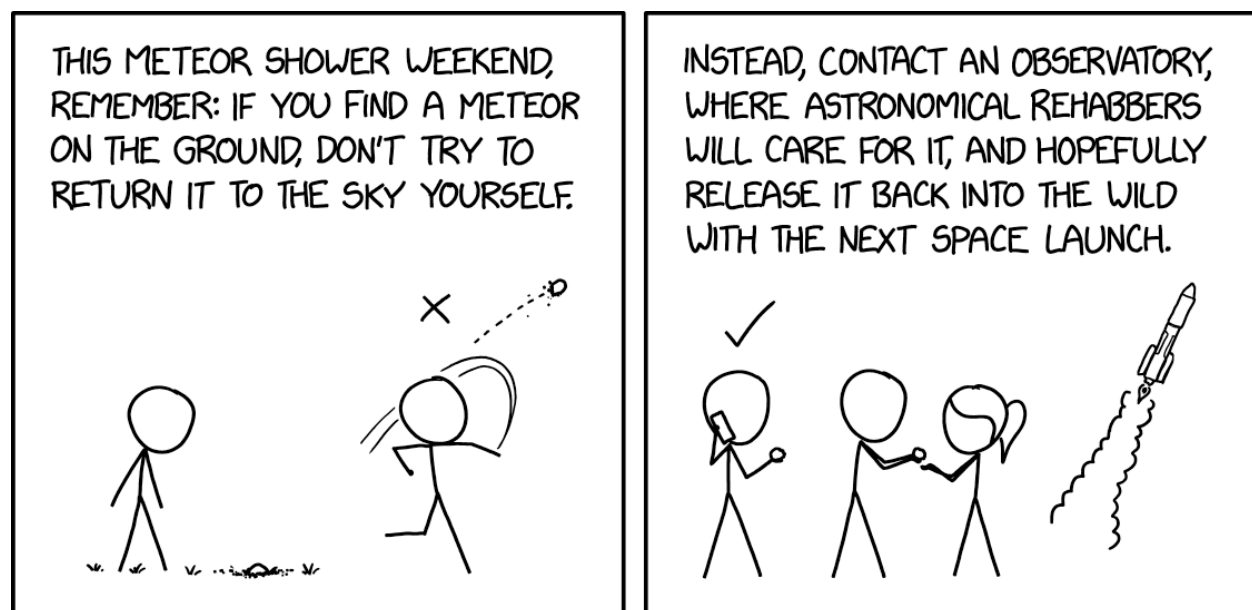
NASA’s Mars Sample Return Program, in

cooperation with ESA (European Space Agency), is designed to send spacecraft to Mars to collect these sealed samples from the surface and return them to Earth for in-depth analysis.

The Mars 2020 Perseverance mission is part of NASA’s Moon to Mars exploration approach, which includes Artemis missions to the Moon that will help prepare for human exploration of the Red Planet.

NASA’s Jet Propulsion Laboratory, which is managed for the agency by Caltech, built and manages operations of the Perseverance rover.

Xkcd.com



Nebraska Star Party Photos

John Reinert



Smoke on the horizon (in front of the thunderhead)

NSP, continued.



David provides the lesson at the Beginner's Sky School



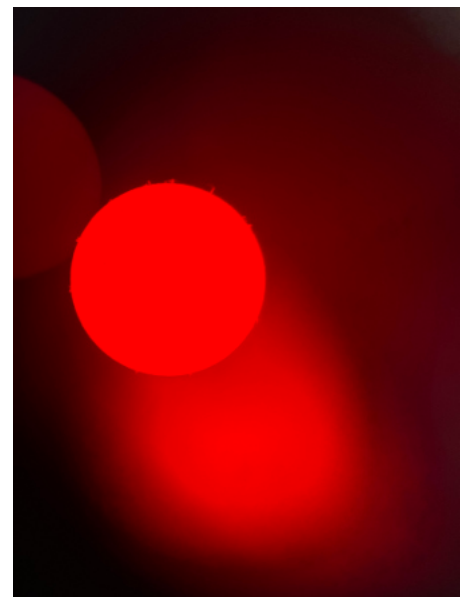
Erik Hubl wears the first NSP T-shirt



Sunworshippers



Vendors attract the faithful



Navigating the mid September Night Sky

Navigating the mid September Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Sept. at 10:00 p.m. and late Sept. at 9:00 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.

The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

Navigating the mid September night sky: Simply start with what you know or with what you can easily find.

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
- 5 The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

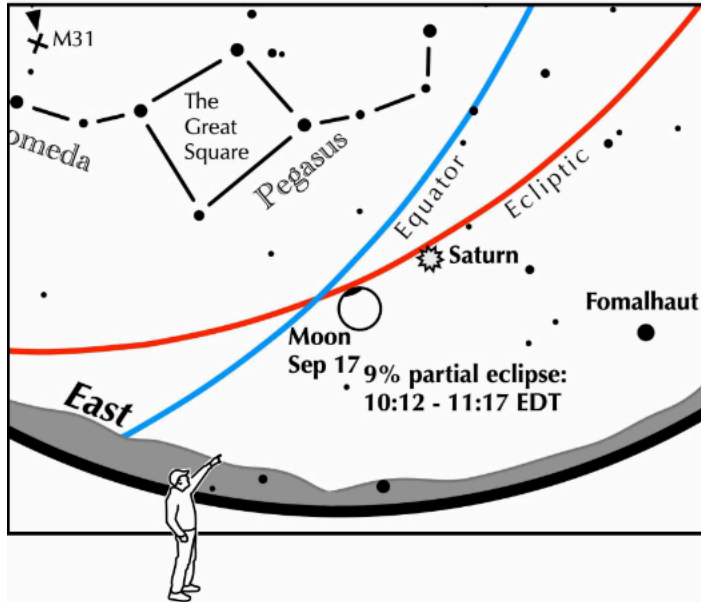
Binocular Highlights

- A: On the western side of the Keystone glows the Great Hercules Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
- E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

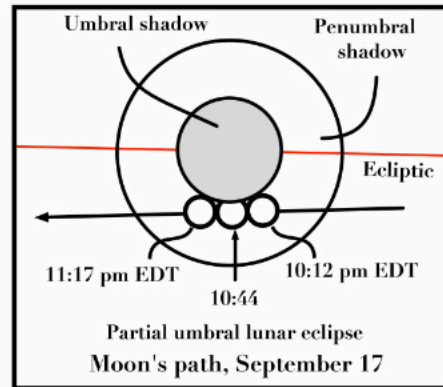
Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.

Astronomical League Outreach

A partial lunar eclipse that is a nibble, not a bite!



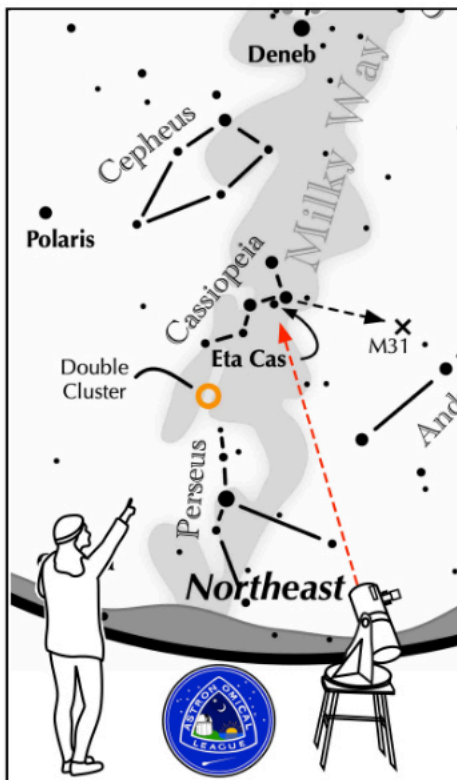
View to the southeast on September 17
from 10:12 through 11:17 pm EDT.
Mid eclipse lands at 10:44 pm



The Moon slides through a partial umbral eclipse

A very partial umbral lunar eclipse occurs on the night of September 17. Bring out the binoculars for a better look at Earth's shadow taking a nibble out of the moon. Only about 9% of the surface will be in umbral shadow. The event will be slight enough that the casual observer might not notice it.

Mid eclipse and the best view occurs at 10:44 pm EDT. West Coast observers will find it low above the southeastern horizon.



Other Suns: Eta Cassiopeiae

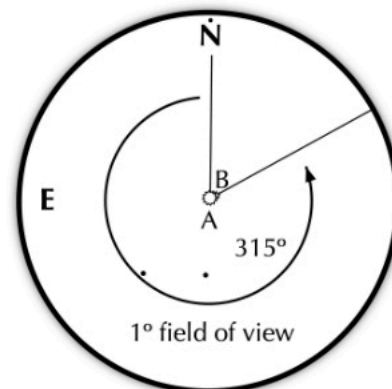
How to find Eta Cassiopeiae on a September evening

High in the northeast are the five moderately bright stars forming the "W" of Cassiopeia. The second star moving east along the W is Alpha Cassiopeiae. Eta is the dimmer star immediately to Alpha's northeast.

Suggested magnification: >30x
Suggested aperture: >2 inches

Beta Cassiopeiae

A-B separation: 13 sec
A magnitude: 3.5
B magnitude: 7.4
Position Angle: 319°
A & B colors:
yellow, purple?



Hyde Observatory Needs You!



Volunteer at Hyde

Our crew of unpaid volunteers share an interest in Astronomy and they enjoy passing on that interest to the public.



You don't need to be an expert in astronomy or telescopes. **We'll teach you what you need to know.**



Volunteers start as telescope operators on the observing deck, which involves keeping one of the three telescopes focused on the sky objects we are showing and explaining them to our visitors. Experienced volunteers can become Deck Leaders who determine what objects to train the telescopes on, and answer the really difficult questions.

For more information, [visit our website](#)

Astrophotography



M20 - The Trifid Nebula, by David Dickinson

Taken with the new Celestron Origin telescope, using the Celestron "Nebula Filter" (they really don't say what it is other than a "light pollution filter"). Exposure of 15 seconds with a total Exposure Time of 10 minutes and ISO 200. No photo editing was applied.

Astrophotography



*The Eagle Nebula (with the Pillars of Creation), by David Dickinson
Taken with the new Celestron Origin telescope, using the Celestron "Nebula Filter" (they really don't say what it is other than a "light pollution filter"). Exposure of 15 seconds with a total Exposure Time of 10 minutes and ISO 200. No photo editing was applied.*

Astrophotography



M20, The Trifid Nebula taken at NSP by Jim White

*75 - 1 Minute exposures, 25 Darks, 25 Flats, 25 Dark flats, Telescope - 925 EdgeHD,
Schmidt-Cassegrain, Focal length - 2350mm, Mount - Celestron CGX GEM*

Camera - ZWO ASI2400MC Pro full frame OSC (one shot color), Gain - 140, Offset - 10

Processing software - PixInsight

Astrophotography



*M8 Lagoon Nebula 20 seconds ISO 51200 by John Reinert
Unmodified D780 .jpeg images: no stacking, no noise reduction, no dark frame
subtract no sharpening, and no color correction.*

Astrophotography



*M17 Omega Nebula 20 seconds ISO 20000 by John Reinert
Unmodified D780 .jpeg images: no stacking, no noise reduction, no dark frame
subtract no sharpening, and no color correction.*

NASA Citizen Scientists Spot Object Moving 1 Million Miles Per Hour

Most familiar stars peacefully orbit the center of the Milky Way. But citizen scientists working on NASA's Backyard Worlds: Planet 9 project have helped discover an object moving so fast that it will escape the Milky Way's gravity and shoot into intergalactic space. This hypervelocity object is the first such object found with the mass similar to or less than that of a small star.

Backyard Worlds uses images from NASA's WISE, or Wide-field Infrared Explorer, mission, which mapped the sky in infrared light from 2009 to 2011. It was re-activated as NEOWISE (Near-Earth Object Wide-field Infrared Survey Explorer) in 2013 and retired on Aug. 8, 2024.

A few years ago, longtime Backyard Worlds citizen scientists Martin Kabatnik, Thomas P. Bickle, and Dan Caselden spotted a

faint, fast-moving object called CWISE J124909.08+362116.0, marching across their screens in the WISE images. Follow-up observations with several ground-based telescopes helped scientists confirm the discovery and characterize the object. These citizen scientists are now co-authors on the team's study about this discovery published in the *Astrophysical Journal Letters* (a pre-print version is available here).

"I can't describe the level

of excitement," said Kabatnik, a citizen scientist from Nuremberg, Germany. "When I first saw how fast it was moving, I was convinced it must have been reported already."

CWISE J1249 is zooming out of the Milky Way at about 1 million miles per hour. But it also stands out for its low mass, which makes it difficult to classify as a celestial object. It could be a low-mass star, or if it doesn't steadily fuse hydrogen in its core, it would be considered a brown dwarf, putting it



This artist's concept shows a hypothetical white dwarf, left, that has exploded as a supernova. The object at right is CWISE J1249, a star or brown dwarf ejected from this system as a result of the explosion. This scenario is one explanation for where CWISE J1249 came from. W.M. Keck Observatory/Adam Makarenko

NASA Citizen Scientists, continued.

somewhere between a gas giant planet and a star.

Ordinary brown dwarfs are not that rare.

Backyard Worlds: Planet 9 volunteers have discovered more than 4,000 of them! But none of the others are known to be on their way out of the galaxy.

This new object has yet another unique property. Data obtained with the W. M. Keck Observatory in Maunakea, Hawaii, show that it has much less iron and other metals than other stars and brown dwarfs. This unusual composition suggests that CWISE J1249 is quite old, likely from one of the first generations of stars in our galaxy.

Why does this object move at such high speed? One hypothesis is that CWISE J1249 originally came from a binary system with a white dwarf, which exploded as a supernova when it pulled off too much material from its companion. Another possibility is that it came from a tightly bound

cluster of stars called a globular cluster, and a chance meeting with a pair of black holes sent it soaring away.

“When a star encounters a black hole binary, the complex dynamics of this three-body interaction can toss that star right out of the globular cluster,” says Kyle Kremer, incoming assistant professor in UC San Diego’s Department of Astronomy and Astrophysics.

Scientists will look more closely at the elemental composition of CWISE J1249 for clues about which of these scenarios is more likely.

This discovery has been a team effort on multiple levels—a collaboration involving volunteers, professionals, and students. Kabatnik credits other citizen scientists with helping him search, including Melina Thévenot, who “blew my mind with her personal blog about doing searches using Astronomical Data Query Language,” he said. Software written by citizen scientist Frank

Kiwy was also instrumental in this finding, he said.

The study is led by Backyard Worlds: Planet 9 science team member Adam Burgasser, a professor at the University of California, San Diego, and includes co-authors Hunter Brooks and Austin Rothermich, astronomy students who both began their astronomy careers as citizen scientists.

Become a citizen scientist

Want to help discover the next extraordinary space object? Join the Backyard Worlds: Planet 9 now — participation is open to anyone in any country worldwide.

From the Archives

August, 1977

About Six Weeks Away from a Solar-Heated Hyde Observatory!

It appears that the Hyde Memorial Observatory will be completed by the first week in October, if things continue as they have according to Observatory Committee Chairman Carroll Moore. The big news is that the contract with was signed on August 23, providing for the solar heating system. Bid price for the system minus the heat storage pit which was funded as a part of the observatory, was approximately \$14,000. With any kind of luck, the solar collector panels should be delivered during the first week in September. More good news: The Garden Club of Lincoln has agreed to do the landscaping around the observatory. The result should be a much more pleasing surrounding for the building than might have

been possible if landscaping were limited to the remaining budget and what it might have bought in commercial services. Carroll reports that the drywall is in, septic tank in, wiring completed, and the outside of the building is now painted. One project which members of the Prairie Astronomy Club might want to participate in still remains. You may recall, the hillside next to the observatory made an especially inviting place for terracing. These terraces, which are spaced and sized to make for pleasant seating, will be oriented parallel to the building's east wall, which can be used for slide shows, or the entire area for lectures under the evening skies. The committee will need

some help—perhaps five or six able-bodied types to help on a Saturday in placing the rocks for the terraces.

One or two civic clubs are also scheduled to participate. Volunteers at the August PAC meeting will be appreciated.

We are now aiming for a dedication of the building during the first or second week in October, and a grand opening public demonstration night (hopefully) during the first quarter moon, around the 19th of October. We may be hindered by unexpected construction delays, but one thing is certain: Hyde Observatory is very close to becoming a reality, and one we can be very proud of.

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.

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

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