The Prairie Astronomer

February 2022 Volume 63, Issue #2

Hubble Examines a Star-Forming Chamaeleon

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Night Sky Network

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

NEXT MEETING AND PROGRAM

February 22: Enhancing Your Views with Filters

There are many different types of filters and selecting the right one can dramatically improve the contrast ability to distinguish details of many objects. Dave has tested and reviewed filters for several publications and considered an expert in the field. You will not want to miss his program.

The meeting will be held at Branched Oak Observatory at 7:30pm.

FUTURE PROGRAMS

March: Emily Moravec (tentative)
June: Solar Observing Party
August: Review of NSP
October: Club Viewing Night

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Cover: Image Credit: NASA, ESA, K. Luhman and T. Esplin (Pennsylvania State University), et al., and ESO; Processing: Gladys Kober (NASA/Catholic University of America)

CALENDAR

PAC Meeting
February 22, 7:30pm at Branched Oak Observatory
Program: Filters, presented by Dave Knisely

PAC Meeting
March 29, 7:30pm

Astrophotography class at Hyde Observatory
April (TBA)

PAC Meeting
April 26, 7:30pm

PAC Meeting
May 31, 7:30pm

Nebraska Star Party
July 24-29, Merritt Reservoir, Valentine, NE

2022 STAR PARTY DATES

	Date	Date
January	**28**	2/5
February	25	**3/4**
March	25	**4/1**
April	22	**29**
May	20	**27**
June	17	**24**
July	22	**29**
NSP	**7/24**	**7/29**
August	19	**26**
September	**23**	30
October	21	**28**
November	18	**25**
December	16	**23**

Dates in BOLD are closest to the New Moon.

CLUB OFFICERS

President	Bob Kacvinsky kacvinskyb@yahoo.com
Vice President	Jason O'Flaherty jflaher@gmail.com
2nd VP (Program Chair)	Bill Lohrberg wmlohrberg89@gmail.com
Secretary	Jim White jrwhite2188@gmail.com
Treasurer	John Reinert jr6@aol.com
Club Observing Chair	Jim Kvasnicka jim.kvasnicka@yahoo.com
Outreach Coordinator	Mike Kearns mkearns@neb.rr.com
Website and Newsletter Editor	Mark Dahmke mark@dahmke.com

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Night Sky Network

www.prairieastronomyclub.org

Meeting Minutes

Jim White

PAC Meeting Minutes 1-25-2022 taken by Jim White.

Bob Kacvinsky started the meeting at 7:32 pm, the meeting was held via Zoom. Tonight's program is about Planetarium Innovations presented by Jack Dunn. At 7:35 Bob turned the meeting over to Jim Kvasnicka for his monthly observing report.

Jim announced that the club star parties are coming up this Friday, January 28th and next Friday, February 4th. Jim listed the planets that will be visible in the early morning and the evening during the month of February along with the nebula's, stars and deeps sky objects. A 7:40 Jim turned the meeting back over to Bob.

Bob began by announcing that Hyde is still closed due to the ongoing pandemic. If there is no snow and the ground is dry the next two Friday's we will hold the star parties at the farm and if the ground is wet, we will plan on meeting on the slab at Branched Oak Observatory. Jim will send out emails the night before or the day of about where we will plan on having the star parties if the weather cooperates. The February meeting is on the 22nd at 7:30 at the Branched Oak Observatory meeting room where Dave Knisely will put on a presentation about enhancing your views with filters.

Bob asked John Reinert for the treasurer's report. John reported 60 members to the Astronomical League and sent the dues notices out on the 9th. The club's larger CD is due this month so John will be looking at interest rates. John and Mark are also working on getting a Stripe Account setup so that members can make electronic dues payments as an alternative to making dues payments with a check or cash if so desired. Bob suggested to John that we may want to look at shorter CD terms due to the recent rise in interest rates. John turned the meeting back over to Bob.

Bob has a couple of items of new business to go over. The first item is dates that Bob has for state sponsored star parties and meetings around the Midwest including NSP which is scheduled for July 24th-29th at Merritt Reservoir. Bob and Jim are planning on attending the Rocky Mountain Star Stare which is scheduled for June 22nd -26th in Colorado at an elevation of approximately 7600 feet. Bob sent out emails for the PAC mentorship program which has been discussed for about 5 years and this year we are going to get it done. The purpose or objective is to support new members with a focus on their observation interests whether that is visual, solar or astrophotography or whatever it may be. The goal is to help eliminate the intimidation factor that may exist with new members and more experienced members. We want to help everyone feel welcome. We would like to try and focus on mentors and new members communicating at least once a quarter whether that be through meeting at a star party, phone, email or text. Bob has about 7 new members wanting mentors and a list of people volunteering to be mentors at the current time.

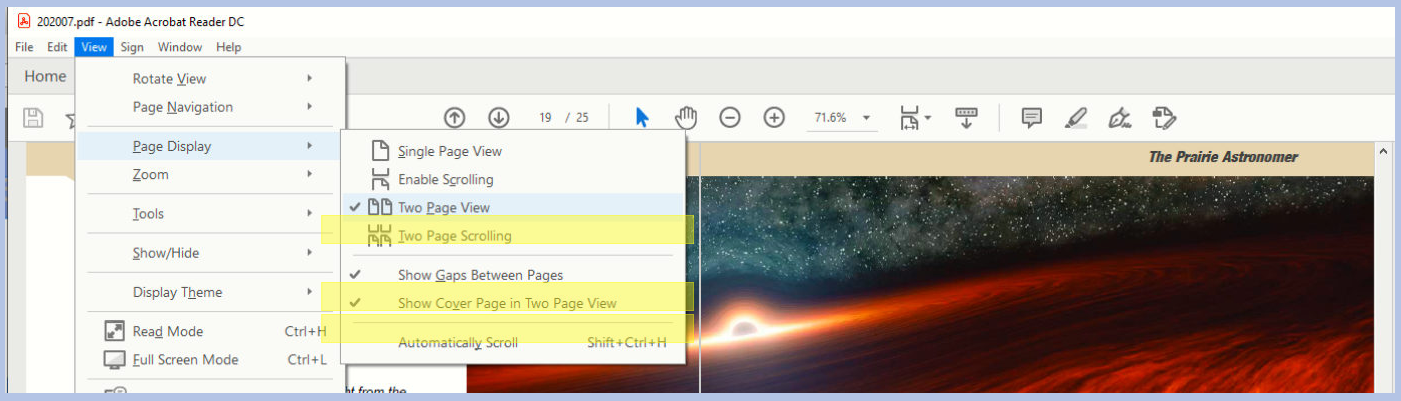
The next item that needs to be addressed, which the club has been dealing with for a number of years, is the storage of

Continued on page 6.

Notices

New Newsletter 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 now available online:

https://www.prairieastronomyclub.org/newsletters

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

Bob Kacvinsky

I don't want to jinx us, but it looks like the latest Covid surge is starting to abate and it's looking like we might be able to begin focusing on opening activities over the next few months. We have already received a couple of requests for public star parties albeit later this summer and fall. We will use the Night Sky Network to keep the membership informed as things move forward.

I'm excited that we have officially launched our new mentorship program. Six "new" members have requested participation and we have matched them with 6 veteran members. The primary objective is to offer members that are new to observational Astronomy the opportunity to connect with a more experienced member. When I was first introduced to PAC and attended the first star party, a veteran member Dave Churilla took me under his wing and helped me figure out how to use my telescope. The mentorship program is to assure that newer members have that same welcoming experience with PAC. If you have not signed up but would like to participate or just learn more about the program, please drop me or any board member a message.

Our next meeting will be held at Branched Oak Observatory meeting room on February 22nd at 7:30 PM. BOO is located at roughly 14450 NW 98th Street west on Raymond Rd off Hwy 79 north of Hwy 34. Program will be presented by Dave Knisely entitled "Enhancing Your Views with Filters." There are many different types of filters and selecting the right one can dramatically improve the contrast ability to distinguish details of many objects. Dave has tested and reviewed filters for several publications and considered an expert in the field. You will not want to miss his program.

With Covid restrictions starting to abate we hope to set a date for an Astro Photography class. Please keep an eye out for an announcement from PAC via the Night Sky Network email and more details at the upcoming February PAC meeting.

In January the membership voted to approve a PAC storage shed to get our telescope equipment and loaners out of Hyde public spaces and into a safe secured permanent site. The management of BOO has approved establishing the PAC shed within their field location. This has been an objective for PAC and Hyde for several years and it is exciting to finally have our own storage facility. Once the weather warms up, we will need to install a shelf and paint the building. Once completed we will move all our equipment. Thanks to the membership for approving this new facility.

VP Jason O'Flaherty (1st VP responsibilities) will be overseeing the building management and Rich Littrell has volunteered to coordinate our inventory management, loaner telescope program, and get our library at Hyde updated. Please look for further details on how you can check out a telescope from PAC or gain access

to materials within the library. Presently we have a 5” Newtonian telescope on an EQ mount, a 10” Dob, a 4” refractor on an EQ mount, and a 13” Dob. If you are contemplating purchasing a telescope, the loaner program is a great opportunity to “test drive” different types of telescopes and mounts to determine which style is best for your interests.

If you are looking for a good observing starting point, connect with Jim Kvasnicka, PAC Observing Chair, for suggestions. There are over 50 observing programs with several designed for getting started such as a simple Lunar Program or the common Messier List. Let’s work together to help enhance everyone’s ability to experience the wonders of the night sky.

Dark and Clear Skies to you, Bob Kacvinsky
PAC-President
kacvinskyb@yahoo.com
402-840-0084

Meeting Minutes, continued.

club equipment which is currently being stored at Hyde observatory. The Hyde board would like the club to reduce the clutter at the observatory which is property of the city along with access to the equipment and security. The PAC board decided that we as a club need to resolve the storage issue this year. Bob has done research on a couple of storage building options and Brett has gotten Bob in touch with Michael at Branched Oak Observatory to see if it would be possible for PAC to locate a building on their property and Michael said that the building could be located on their property without any charge or cost to the club. The building types that Bob has researched are a do-it-yourself option that would come with a base and walls and roof but would need to be assembled and painted or a prefab option that would be delivered assembled and ready for paint. The two buildings are an 8’ x 10’ footprint with the do-it-yourself option being $2,200.00 or the pre-assembled building being $2,500.00. The buildings are from Wright Brother’s which are by the Greenwood exit of the interstate 80. Bob asked for input/comments on the options. Dave Knisely made a motion to discuss the options Bob has presented and recommended the club consider the 2nd option which is for the pre-assembled building which would only require the club members to take care of final painting. The motion was seconded and the building topic was open for discussion. The do-it-yourself building has an 8’ ceiling height and the pre-assembled building has a 6.5’ ceiling height. Bob stated that he checked on the space needed for the club’s storage needs and an 8’ x 10’ building was adequate for the clubs needs and when you started getting larger than 8’ x 10’ the cost increased quickly. There was a motion to vote on option two for the pre-assembled building and the vote was passed almost unanimously. Bob will make contact with Wright Brother’s to get the building purchased, delivered and setup and will get the bill to John Reinert to get the building paid for. Bob asked if there was any other new business to be discussed and there wasn’t anything else brought up so the meeting was adjourned at 8:06 pm and turned over to Jack Dunn for his program.

ARP 40

Rick Johnson

Arp 40/IC 4271 is another from Arp's category for spiral galaxies with low surface brightness companions on their arms. It is located in Canes Venatici about 760 to 770 million light-years distant. I suppose the southern member is the "companion" but to me, they are of about equal surface brightness, neither being all that faint. I certainly don't see either as being on an arm of the other. To me, it appears the southern galaxy is in the foreground. It has a dusty disk larger than the optical disk. It is easily seen against the more distant northern galaxy as a dark band "separating" the two galaxies. It is seen in Arp's and Sloan images as well.

Are they interacting? Hard to say. Both are Seyfert 2 galaxies. At one time this was thought to be a pretty good sign that interaction was going on. Though now it appears such classification doesn't necessarily mean an interaction. Though with both being Seyfert 2 it might in this case. Still, I see no real sign of distortion to either (unless that dust disk qualifies). Other than these two overlapping I really don't see what Arp saw in this pair.

Stephane Javelle discovered IC 4271 on July 10, 1896. Did he see both as one, only the larger or both separated? Dreyer said of Javelle's discovery; "faint, small, round, gradually brighter middle, mottled but not resolved." The round comment would seem to indicate he saw only the top one but by my measurements, both are about equal in surface brightness so he should have seen both. Most catalogs consider IC 4271 to be both.

Far more interesting to me is a pair I had on my "Arp-like" list. I've managed two, and sometimes more Arp galaxies in one image but this is the first (time I also have one from the Arp-like

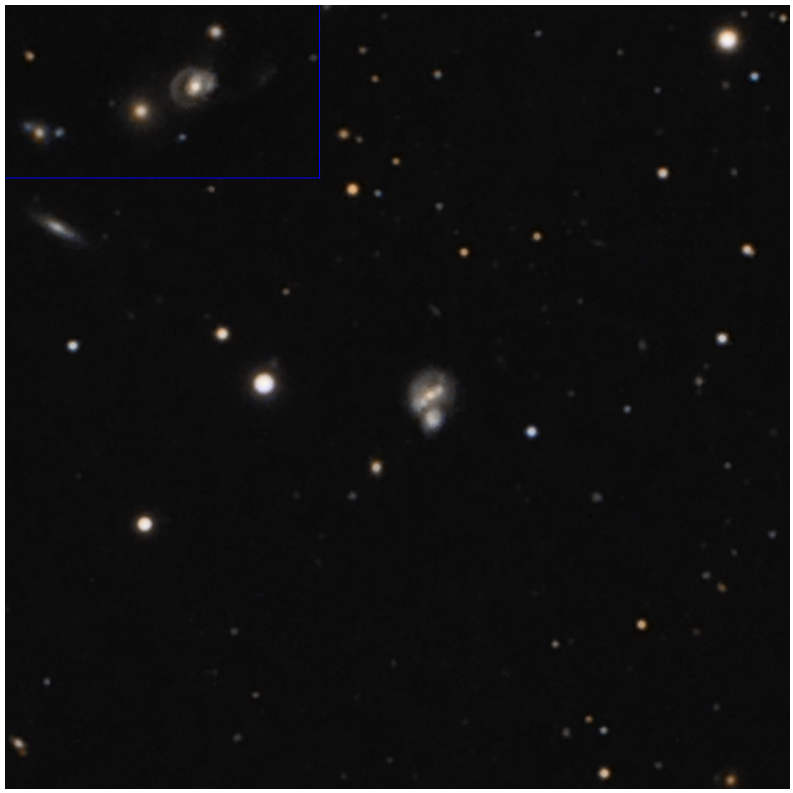
The Mantrap Skies Image Catalog

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.

list in the image. It is in the lower left corner and I didn't realize it was in the shot at the time. If I had I'd have framed the shot better. It is SDSS J132957.37+371744.8, a spiral galaxy at a distance of about 750 million light-years. It has a very weird structure. A wide arm that appears to have been drawn out with no corresponding arm on the other side. More interesting though is that from the bottom of the galaxy a faint "arm" comes out of nowhere and appears to lead west and a bit north to a faint galaxy, SDSS J132953.47+371750.6. Another galaxy appears connected to it a few seconds of arc to the northwest. That one is not listed in the Sloan survey or in NED. Is this a real connection? I see hints of it in the Sloan image and it appears quite real in my data. Note too how the big spiral seems to have a piece cut right off its north side! Sloan survey lists the western side of the galaxy as a separate entry, SDSS J132956.73+371747.9 with no distance noted. Could it really be a separate galaxy? The odd arm seems to come from its position, wind around and behind the main galaxy then come out the other side as the wide arm, almost as if it were a huge plume of a disintegrating galaxy. This could explain the cut off appearance. Or is my mind wandering afield at 2 a.m.? The main galaxy is also in the 2MASS IR catalog as 2MASX J13295738+3717447. So is the galaxy directly east, 2MASX J13300048+3717277 with a redshift distance of 760 million light-years. Could all three of these plus the 2 Arp 40 galaxies all be part of the same group? Probably. Just above the top of my image just a hair left of center is the center of the Abell 1749 galaxy cluster with a diameter of 40' of arc containing some 51 galaxies. Its distance is listed as 770 million light-years.

The galaxy north of Arp 40 is 2MASX J13295621+3718226, distance unknown. Toward the lower left corner is the galaxy pair (GP), NGP9 F270-0262533/PGC 2097470 at 1.9 billion light-years. This doesn't mean they are interacting but they could be. At that distance, my resolution is insufficient to say either way.

These galaxies may be too far away to be photogenic but they sure are interesting, just the same. My enlarged, cropped image includes both galaxy systems at 0.67" per pixel.



Hubble Examines a Star-Forming Chamaeleon

This NASA Hubble Space Telescope image captures one of three segments that comprise a 65-light-year wide star-forming region named the Chamaeleon Cloud Complex. The segment in this Hubble composite image, called Chamaeleon Cloud I (Cha I), reveals dusty-dark clouds where stars are forming, dazzling reflection nebulae glowing by the light of bright-blue young stars, and radiant knots called Herbig-Haro objects.

Herbig-Haro objects are bright clumps and arcs of interstellar gas shocked and energized by jets expelled from infant "protostars" in the process of forming. The white-orange cloud at the bottom of the image hosts one of these protostars at its center. Its brilliant white jets of hot gas are ejected in narrow torrents from the protostar's poles, creating the Herbig-Haro object HH 909A.

The cross-like spikes around bright stars in the image occur when light waves from a very bright point source (like a star) bend around Hubble's cross-shaped struts that support the telescope's secondary mirror. As the light waves pass these struts, they coalesce on the other side, creating the bright, spikey starburst effect we see.

Hubble studied Cha I as part of a search for extremely dim, low-mass brown dwarfs. These "failed stars" lie somewhere in size between a large planet and a small star (10 to 90 times the mass of Jupiter), and do not have enough mass to ignite and sustain nuclear fusion in their cores. Hubble's search found six new low-mass brown dwarf candidates that are helping astronomers better understand these objects.

This 315-million-pixel composite image is comprised of 23 observations made by Hubble's Advanced Camera for Surveys. Gaps between those observations were filled by 20 Wide Field and Planetary Camera 2 images. Any remaining gaps were filled with ground-based data from ESO's VISTA VIRCAM. To download the full high-resolution version of this image, visit Hubble Captures Chamaeleon Cloud I.

Image Credit: NASA, ESA, K. Luhman and T. Esplin (Pennsylvania State University), et al., and ESO; Processing: Gladys Kober (NASA/ Catholic University of America)

Focus on Constellations

Puppis

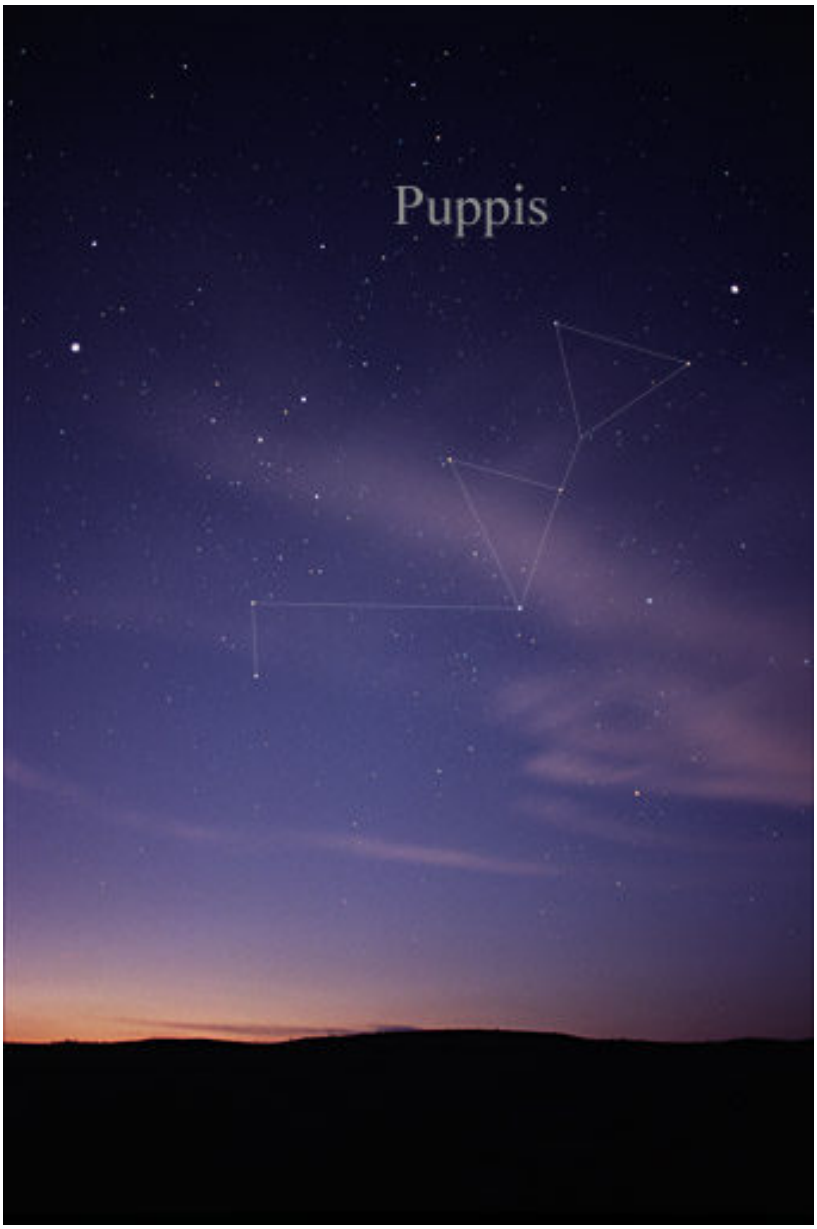
Jim Kvasnicka

Puppis, the Ship's Stern, was once part of the ancient Greek constellation Argo Navis, the Ship. Due to its size it was divided in the 1750's into Puppis, the Ship's Stern; Pyxis, the Compass; Vela, the Sails; and Carina, the Keel. Puppis alone still covers 673 square degrees. Puppis is east and southeast of Canis Major and it contains an exceptionally star-rich portion of the Milky Way. Because of this Puppis is rich in open clusters including three Messier objects in M46, M47, and M93. The open clusters in Puppis vary a great deal. Several are large and loose, some are large and rich and a number are faint and require a medium to large telescope to be seen. The constellation Puppis is best seen in March.

Showpiece Objects
Open Clusters: M46, M47, M93, NGC 2477, NGC 2539
Planetary Nebulae: NGC 2438, NGC 2440, NGC 2452

Mythology
In Greek mythology the ship Argo was the vessel commanded by Jason and his fifty Argonauts in search of the Golden Fleece. When they returned with the Fleece, Athens commemorated the event by placing the ship Argo in the heavens.

Number of Objects Magnitude 12.0 and Brighter
Galaxies: 7
Open Clusters: 46
Planetary Nebulae: 3
Globular Clusters: 1



By Till Credner - Own work: AlltheSky.com, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=20042019

March Observing

Jim Kvasnicka

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

Planets

Mars, Venus, Saturn, and Mercury: All four planets will be putting on a show in the morning before sunrise. On March 2nd Mercury and Saturn are separated by less than 1°. On March 15th Venus and Mars are separated by less than 4°.
Jupiter: In conjunction with the Sun on March 5th and not visible.
Neptune and Uranus: Neptune not visible, Uranus not visible the end of the month.

Messier List

M41: Open cluster in Canis Major.
M44: The Beehive Cluster in Cancer.
M46/M47: Open clusters in Puppis.
M48: Open cluster in Hydra.
M50: Open cluster in Monoceros.
M67: Open cluster in Cancer
M81/M82: Galaxy pair in Ursa Major.
M93: Open cluster in Puppis.

Last Month: M1, M35, M36, M37, M38, M42, M43, M45, M78, M79
Next Month: M40, M65, M66, M95, M96, M105, M106, M108, M109

NGC and other Deep Sky Objects

NGC 2438: Planetary nebula, foreground object in M46.
NGC 2440: Planetary nebula in Puppis.
NGC 2451: Open cluster in Puppis, bright and irregular.
NGC 2452: Planetary nebula in Puppis, just south of open cluster NGC 2452.
NGC 2477: Bright open cluster in Puppis.
NGC 2537: The Bear Paw Galaxy in Lynx.
NGC 2683: Edge on galaxy in Lynx.
NGC 2775: Galaxy in Cancer.

Double Star Program List

Epsilon Canis Majoris: White and light blue pair.
Delta Geminorum: Wasat, yellow and pale red stars.
Alpha Geminorum: Castor, white primary with a yellow secondary.
12 Lyncis: Close pair of yellow-white stars.
19 Lyncis: White stars.
38 Lyncis: White primary with a yellow secondary.
Zeta Cancri: Yellow and pale-yellow stars.
Iota Cancri: Yellow and pale blue pair.

Challenge Object

NGC 2562/2563/2560: Trio of dim galaxies, part of the Cancer I Galaxy Group.

NASA's Curiosity Rover Measures Intriguing Carbon Signature on Mars

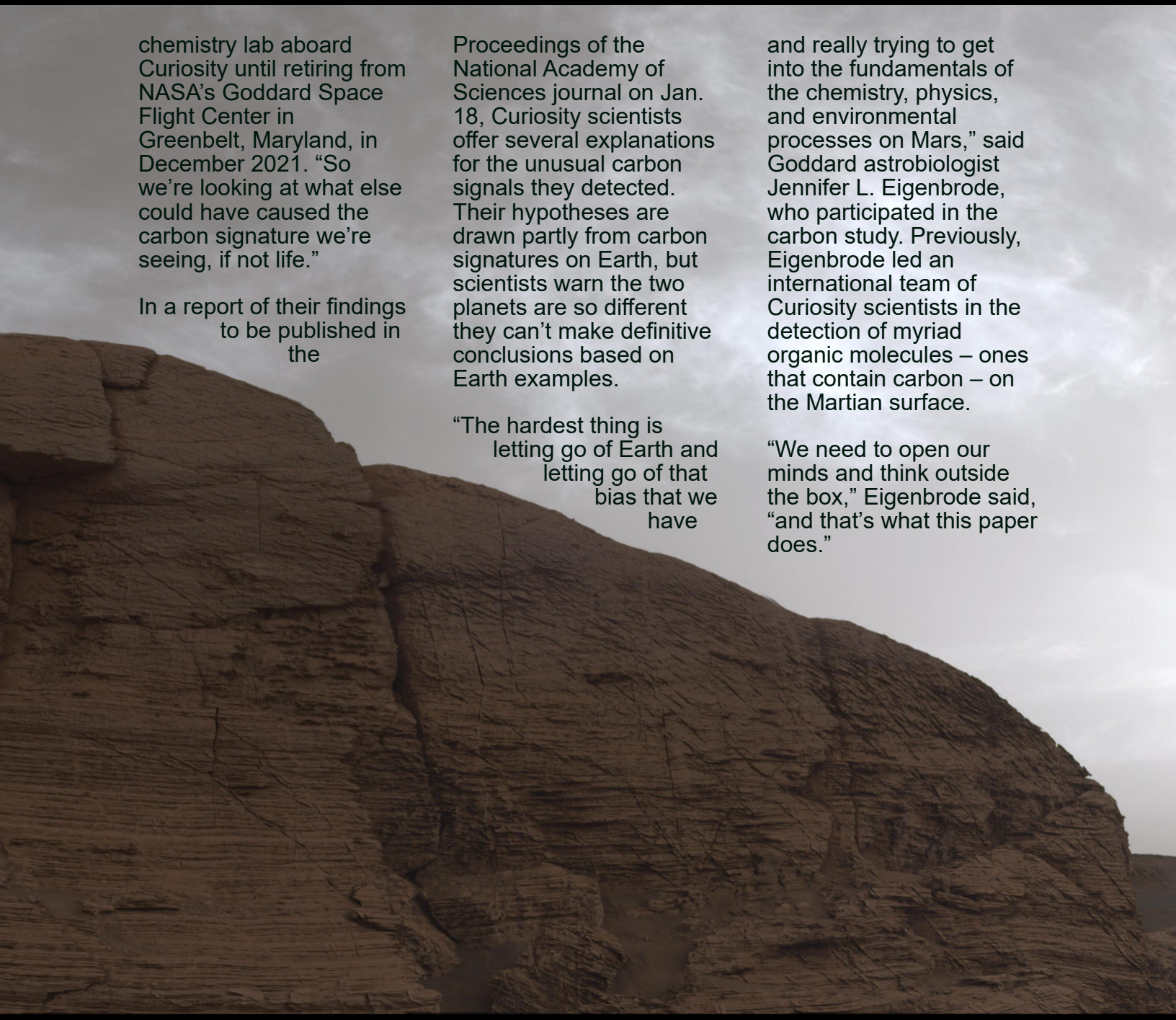
The type of carbon is associated with biological processes on Earth. Curiosity scientists offer several explanations for the unusual carbon signals.

After analyzing powdered rock samples collected from the surface of Mars by NASA's Curiosity rover, scientists have announced that several of the samples are rich in a type of carbon that on Earth is associated with biological processes.

While the finding is intriguing, it doesn't necessarily point to ancient life on Mars, as scientists have not yet found conclusive supporting evidence of ancient or current biology there, such as sedimentary rock formations produced by ancient bacteria, or a diversity of complex organic molecules formed by life.

"We're finding things on Mars that are tantalizingly interesting, but we would really need more evidence to say we've identified life," said Paul Mahaffy, who served as the principal investigator of the Sample Analysis at Mars (SAM)

NASA's Curiosity Mars rover captured these clouds just after sunset on March 19, 2021, the 3,063rd Martian day, or sol, of the rover's mission. The image is made up of 21 individual images stitched together and color-corrected so that the scene appears as it would to the human eye. Credit: NASA/JPL-Caltech/MSSS



chemistry lab aboard Curiosity until retiring from NASA's Goddard Space Flight Center in Greenbelt, Maryland, in December 2021. "So we're looking at what else could have caused the carbon signature we're seeing, if not life."

In a report of their findings to be published in the Proceedings of the National Academy of Sciences journal on Jan. 18, Curiosity scientists offer several explanations for the unusual carbon signals they detected. Their hypotheses are drawn partly from carbon signatures on Earth, but scientists warn the two planets are so different they can't make definitive conclusions based on Earth examples.

"The hardest thing is letting go of Earth and letting go of that bias that we have and really trying to get into the fundamentals of the chemistry, physics, and environmental processes on Mars," said Goddard astrobiologist Jennifer L. Eigenbrode, who participated in the carbon study. Previously, Eigenbrode led an international team of Curiosity scientists in the detection of myriad organic molecules – ones that contain carbon – on the Martian surface.

"We need to open our minds and think outside the box," Eigenbrode said, "and that's what this paper does."

Mars, continued.

The biological explanation Curiosity scientists present in their paper is inspired by Earth life. It involves ancient bacteria in the surface that would have produced a unique carbon signature as they released methane into the atmosphere where ultraviolet light would have converted that gas into larger, more complex molecules. These new molecules would have rained down to the surface and now could be preserved with their distinct carbon signature in Martian rocks.

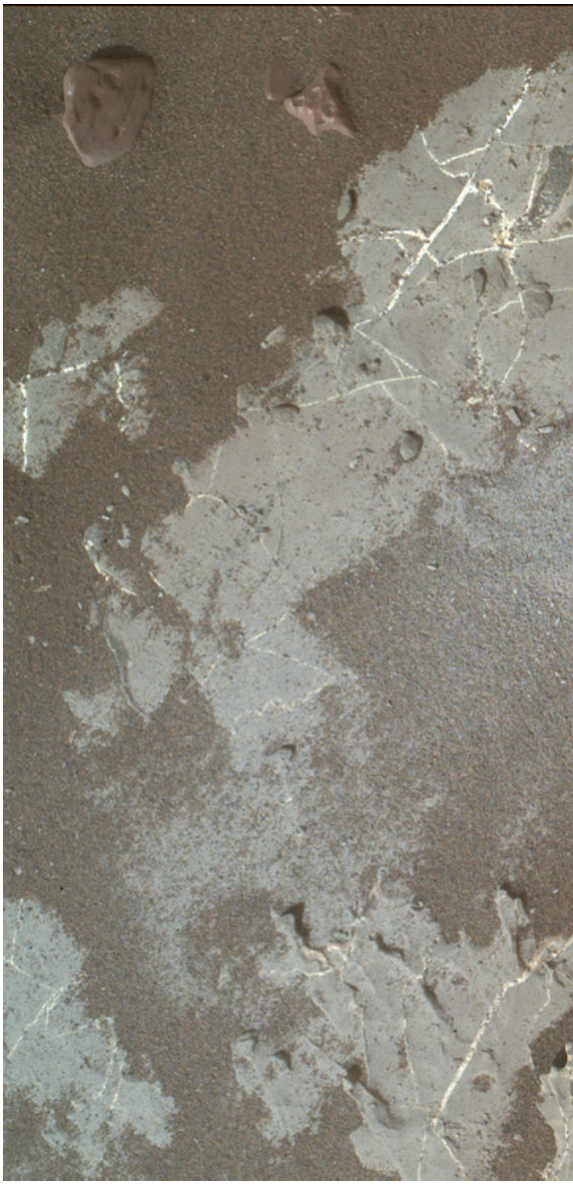
Two other hypotheses offer nonbiological explanations. One suggests the carbon signature could have resulted from the interaction of ultraviolet light with carbon dioxide gas in the Martian atmosphere, producing new carbon-containing molecules that would have settled to the surface. And the other speculates that the carbon could have been left behind from a rare event hundreds of millions of years ago when the solar system passed through a giant molecular cloud rich in the type of carbon detected.

"All three explanations fit the data," said Christopher House, a Curiosity scientist based at Pennsylvania State University who led the carbon study. "We simply need more data to rule them in or out."

To analyze carbon in the Martian surface, House's team used the Tunable Laser Spectrometer (TLS) instrument inside the SAM lab. SAM heated 24 samples from geologically diverse locations in the planet's Gale Crater to about 1,500 degrees Fahrenheit, or 850 degrees Celsius, to release the gases inside. Then the TLS measured the isotopes from some of the reduced carbon that was set free in the heating process. Isotopes are atoms of an element with different masses due to their distinct number of neutrons, and they are instrumental in understanding the chemical and biological evolution of planets.

Carbon is particularly important since this element is found in all life on Earth; it flows continuously through the air, water, and ground in a cycle that's well understood thanks to isotope measurements.

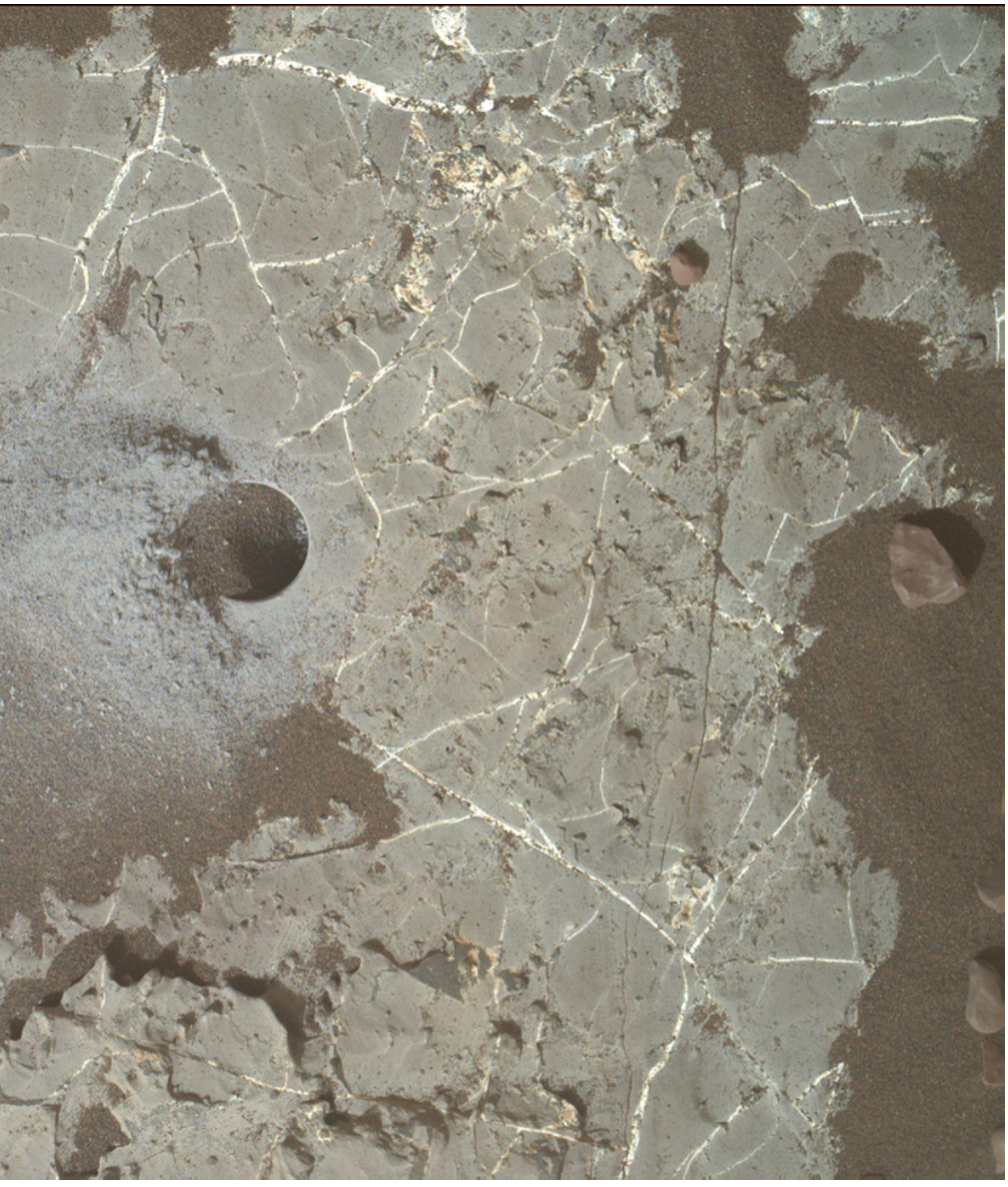
For instance, living creatures on Earth use the smaller, lighter carbon-12 atom to metabolize food or for



This image shows the Highfield drill hole made by NASA's Mars Curiosity rover as it was collecting a sample on "Vera Rubin Ridge" in Gale Crater. Credit: NASA/JPL-Caltech/MSSS

photosynthesis versus the heavier carbon-13 atom. Thus, significantly more carbon-12 than carbon-13 in ancient rocks, along with other evidence, suggests to scientists they're looking at signatures of life-related chemistry. Looking at the ratio of these two carbon isotopes helps Earth scientists tell what type of life they're looking at and the environment it lived in.

On Mars, Curiosity researchers found that nearly half of their samples had surprisingly large amounts of carbon-12 compared to what scientists have measured in the Martian atmosphere and meteorites. These samples came from five distinct locations in Gale Crater, the researchers report, which may be related in that all the locations have well-preserved, ancient surfaces.



"On Earth, processes that would produce the carbon signal we're detecting on Mars are biological," House said. "We have to understand whether the same explanation works for Mars, or if there are other explanations, because Mars is very different."

Mars is unique because it may have started off with a different mix of carbon isotopes than Earth 4.5 billion years ago. Mars is smaller, cooler, has weaker gravity, and different gases in its atmosphere. Additionally, the carbon on Mars could be cycling without any life involved.

"There's a huge chunk of the carbon cycle on Earth that involves life, and because of life, there is a chunk of the carbon cycle on Earth we can't understand, because everywhere we look there is life," said Andrew Steele, a Curiosity scientist based at the Carnegie Institution for Science in Washington, D.C.

Steele noted that scientists are in the early stages of understanding how carbon cycles on Mars and, thus, how to interpret isotopic ratios and the nonbiological activities that could lead to those ratios. Curiosity,

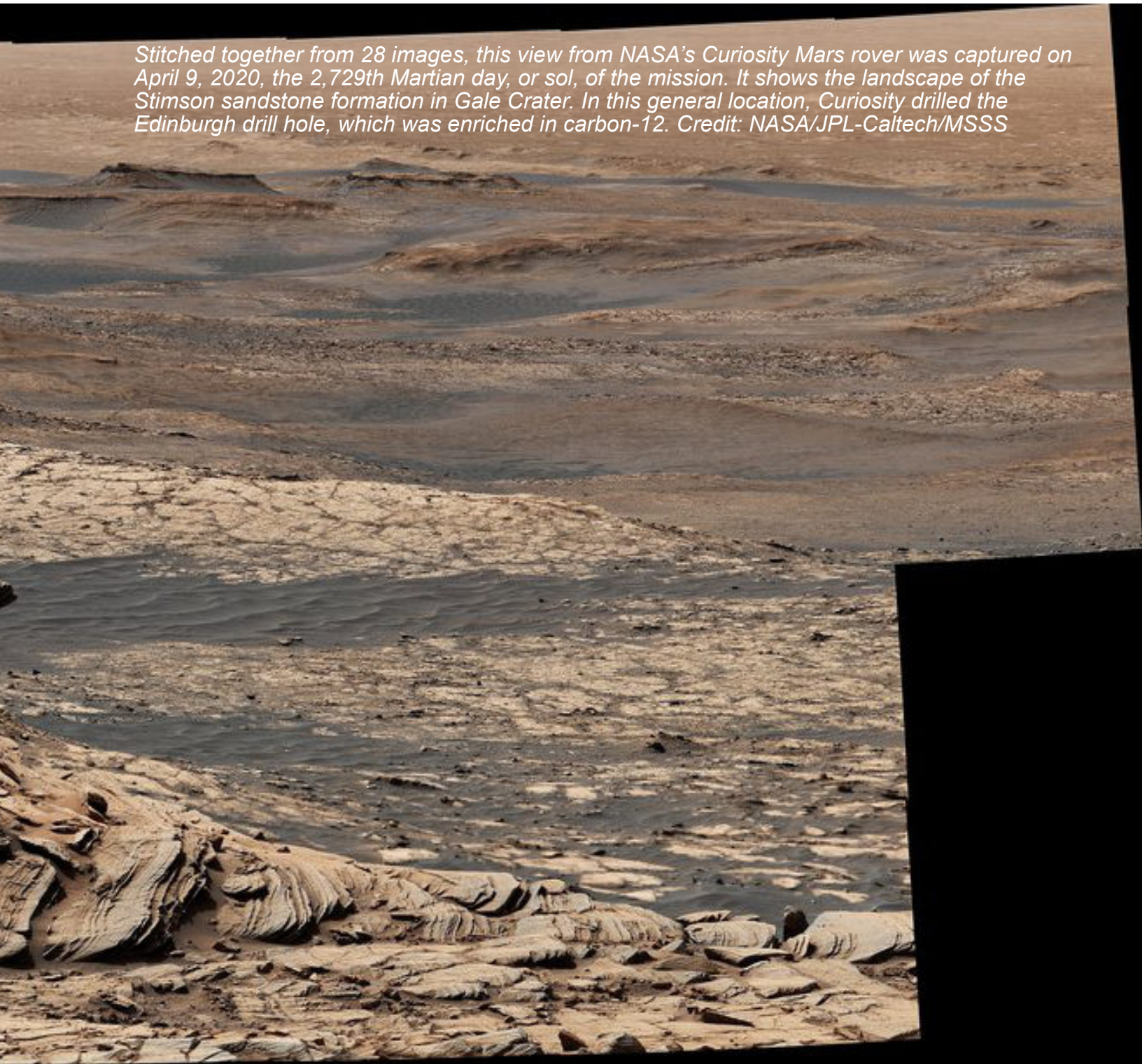
which arrived on the Red Planet in 2012, is the first rover with tools to study carbon isotopes in the surface. Other missions have collected information about isotopic signatures in the atmosphere, and scientists have measured ratios of Martian meteorites that have been collected on Earth.

"Defining the carbon cycle on Mars is absolutely key to trying to understand how life could fit into that cycle," Steele said. "We have done that really successfully on Earth, but we are just beginning to define that cycle for Mars."

Curiosity scientists will continue to measure carbon isotopes to see if they get a similar signature when the rover visits other sites suspected to have well-preserved ancient surfaces. To further test the biological hypothesis involving methane-producing microorganisms, the

Curiosity team would like to analyze the carbon content of a methane plume released from the surface. The rover unexpectedly encountered such a plume in 2019 but there's no way to predict whether that will happen again. Otherwise, researchers point out that this study provides guidance to the team behind NASA's Perseverance rover on the best types of samples to collect to confirm the carbon signature and determine definitively whether it's coming from life or not. Perseverance is collecting samples from the Martian surface for possible future return to Earth.

Curiosity's mission is led by NASA's Jet Propulsion Laboratory in Southern California; JPL is managed by Caltech.



Stitched together from 28 images, this view from NASA's Curiosity Mars rover was captured on April 9, 2020, the 2,729th Martian day, or sol, of the mission. It shows the landscape of the Stimson sandstone formation in Gale Crater. In this general location, Curiosity drilled the Edinburgh drill hole, which was enriched in carbon-12. Credit: NASA/JPL-Caltech/MSSS

29th Annual Nebraska Star Party

Join us this summer as families from all over the US and around the world gather in the sparsely populated sand hills of North Central Nebraska to spend a good week under a galaxy of stars.

July 24-29 at Merritt Reservoir, Valentine, Nebraska

Online Registration is now open

From the Archives

February, 1997

Two Thumbs Up for Hale-Bopp

Martin Gaskell:

Kevin Dowd & I went out to the east of town around 5:30 Monday morning, February 17, for a look at Comet Hale-Bopp. The transparency was poor, but through a break in the clouds we got a view. The comet is at least as bright as Altair (wow!).

In Kevin's 7X35 binoculars we could see 3 - 5 of tail fanning out. In TelPoke (my telescope) the nucleus looked elongated and perpendicular to the tail (probably due to jets?) and the bow shock was visible. Behind the nucleus was a very dark shadow-like area.

I took a few photos but missed the clear spell to take these so they probably weren't that great.

It's well worth getting up early to see the comet, whenever moonlight doesn't interfere with the view.

Erik Hubl:

For some time now I have been embarrassed to say I haven't seen the comet yet. You know how it goes… much of this and that and a new baby soon on the way. And mornings this time of the year are not that inviting to me. Well this morning at 5:15 I saw it.

As with yesterday's report by Martin and Kevin, it is a must see. I claim that it is '"almost" as bright as Altair, maybe a half magnitude off. I defocused my binoculars and did the comparison. The tail is VERY fan shaped, but the nucleus (as Martin indicated) is elongated and perpendicular to the tail...most curious. I was only using my 10 x 50 binoculars, but already this comet appears to offer as much, if not more than Hyakutake and I would have liked to get my 6" out, but its buried in the garage.

The star 27 Vulpecular was shrouded in the tail which pointed nearly straight up relative to the horizon. Hale-Bopp is halfway between Cygnus and Delphinus but the neat thing is the summer triangle looks so different with this "other bright object" between Deneb and Altair. Twilight began to be noticeable at 6:00 AM, but I could still it well. I all this from my backyard at 51st & J. I am highly anticipating March and April.

Bryan Schaaf:

Like Erik, I saw Hale-Bopp on February 19th, but at 6:15 AM from my home. It looked like a bright hairy star. At 6:40 AM I could still see the stellar nucleus even in the advancing twilight from the Kawasaki Motors parking lot, where I work.

Comet Hale-Bopp, by Mark Dahmke

Club Member Profile: Mark Dahmke

Mark has been a member of PAC since 1994

I grew up in Osceola, Nebraska and went to high school in David City. I then attended UNL (1976-1980) majoring in Computer Science. I was a Consulting Editor for BYTE Magazine in the early 80s and also started my own consulting business. I worked on projects for IBM, Nebraska Educational Television, The State of Nebraska, Lincoln Telephone, to name a few. In 1995 Ken Livingston and I started Information Analytics, offering software design, web design, web hosting and other IT services. At its peak we had 18 employees and built some large Intranet and embedded software applications. We sold the business in 2015. Since then, I still dabble a bit in the IT world but am now a photographer. In 2016 I took the FAA Part 107 certification test for commercial drone pilots and have been having a lot of fun doing aerial photo shoots of commercial real estate, mapping applications and tourism destinations.

I've been interested in astronomy since I was about 10 years old. It really started when I noticed that there were faint fuzzy objects in the sky in addition to stars. I went to the encyclopedia to learn about them, because there weren't any other local resources available. Then one day my Dad suggested that I should write a letter to Walt Behlen in Columbus, because he'd heard that Behlen was an amateur astronomer and had a large telescope. A few weeks later, a package arrived that contained about half a dozen copies of Sky & Telescope and Scientific American. In 1969 I got my first telescope – a Tasco 3" refractor. We tell people not to buy cheap department store telescopes, but that little scope was great. At low power it was an excellent scope, and I could finally explore the surface of the Moon and see the rings of Saturn. I didn't have much time for astronomy during college, but a friend of mine and I went to our first PAC meeting at Nebraska Wesleyan in March, 1976. Since I lived on campus I often went to planetarium shows, where I met Jack Dunn and I also met Dave Knisely at the computer room at Nebraska Hall while working on programming assignments.
Other than sporadic contact with PAC through Astronomy Day and other events, I was not active in the club until I bought a Meade LX200 in 1994. In 1995 I designed PAC's first website and in 1996 volunteered to help with the website for the Nebraska Star Party. I helped on the planning committee for about 10 years.

Since 1994 I've owned two models of the LX200, then downsized to a Meade LXD75 equatorial mount and two OTAs – a

Mark Dahmke, continued.

Celestron Onyx rich field refractor and an Astro Tech RC6. As you can probably guess, I enjoy astrophotography, but mostly I'm interested in a mix of terrestrial and astro. I like capturing images that combine the two. I like doing wide angle panoramas, time lapse and capturing ISS transits of the Moon and lunar eclipses.

Back to PAC, I was a Vice President for a few years starting in 2004 and have been the newsletter editor for most of the past twenty years. There's a story behind that. In 2001 I was doing a redesign of the website and wanted to start posting more articles from newsletter online. At the time everything was moving online including newspapers and newsletters, so it seemed to make sense for PAC to head in that direction as well. However even then a significant portion of the membership still wanted a printed newsletter and many did not yet have an email address. The former newsletter editor wanted (unbeknownst to me) to get out of the job, so when I asked him if he could send me the most recent newsletter to put online, he jumped at the opportunity to hand me not just the Word document but also THE JOB. With the exception of 2011-2013 I've been cranking out monthly newsletters. This is my 212th newsletter and I'm looking for someone with desktop publishing skills to take it over so I can retire.

Left: my 3" Tasco refractor in 1972.
Right: my 8" LX200 with a borrowed SBIG ST-6 at the Nebraska Star Party in 1996.

For Sale

I have for sale a 12” Meade Lightbridge Truss Mount (Dobsonian) Telescope. It comes with a 2” Dual Speed Crayford Focuser, 26 mm 2” eyepiece, 2, Black Shroud, TelRad Finder (and a Red Dot Finder that’s standard with the telescope). The scope is in like new condition. I’ve had it a few years but only used it about a half dozen times.

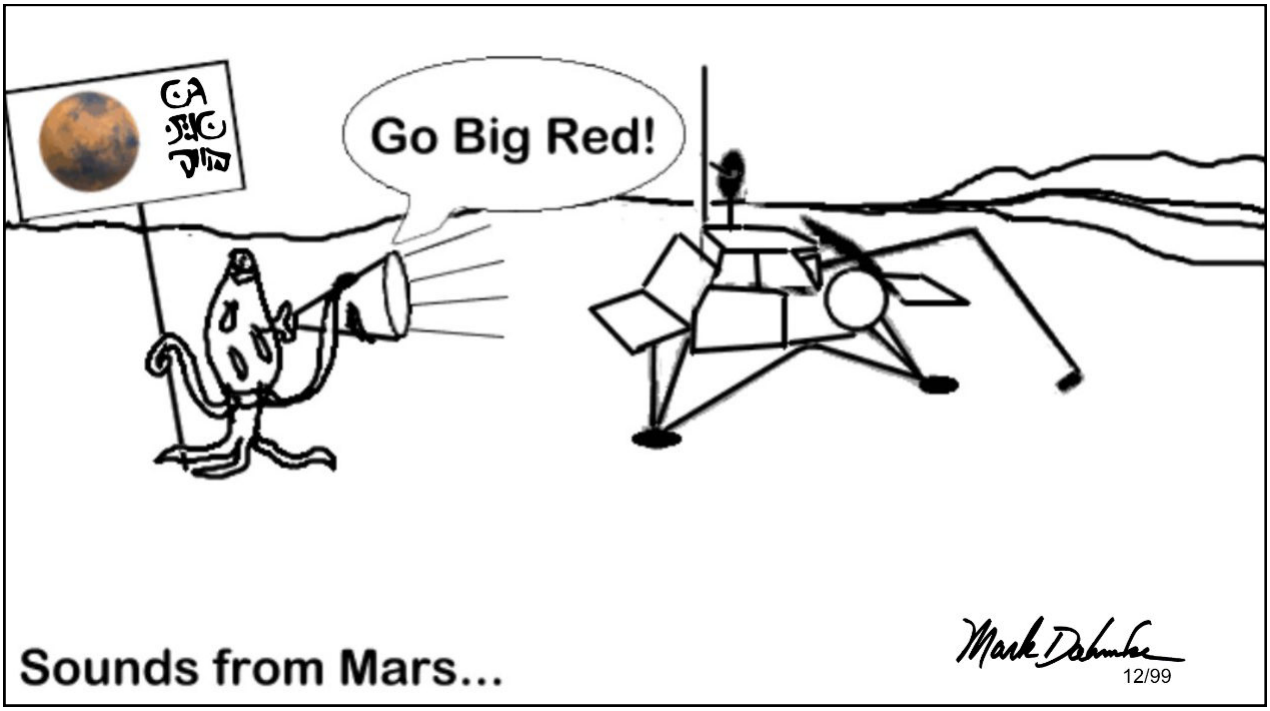
I’m asking $750 for the setup. For more information and pictures please contact me at DCHURILLA@NEB.RR.COM

SPECIFICATIONS

Assembled OTA Weight:	38 lbs.
Assembled Mount Weight:	27 lbs.
Total Weight:	65 lbs.
Aperture:	12”
Focal Length:	1524 mm (60”)

2” Crayford Style Dual Speed Focuser

Contact:
Dave Churilla
402-467-1514 (home)
402-430-1282 (Cell)
DCHURILLA@NEB.RR.COM



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.

ADDRESS

The Prairie Astronomer
c/o The Prairie Astronomy Club, Inc.
P.O. Box 5585
Lincoln, NE 68505-0585

info@prairieastronomyclub.org

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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.