The Prairie Astronomer

January 2025 Volume 66, Issue #1

IN THIS ISSUE:

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

The next club meeting is FRIDAY January 24th at 7:00pm - AT BRANCHED OAK OBSERVATORY

NEXT MEETING AND PROGRAM

January: How to Use Your Telescope

The Prairie Astronomy Club will offer its annual free session: "How to Use Your Telescope" Friday evening January 24th at 7:00 p.m at Branched Oak Observatory. Do you own a telescope and need help getting started using it? The Prairie Astronomy Club would like to help. If you own a telescope and need some hands-on assistance, or are just interested and want to learn more, stop by for this free session.

IMPORTANT NOTE: Due to the temporary closure of Hyde Observatory for renovation, the January and February meetings will be held at Branched Oak Observatory.

UPCOMING PROGRAMS

February: T Coronae Borealis (tentative)
March: Cosmos
April: Europa Clipper
June: Nearest Star Party

Cover: Mars Occultation by Brett Boller

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Background photo: Brett Boller

CALENDAR

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.

January PAC Meeting
Friday, January 24th, 7pm
Branched Oak Observatory
Program: How to Use Your Telescope

February PAC Meeting
Tuesday, February 25th, 7:30pm
Branched Oak Observatory

March PAC Meeting
Tuesday, March 25th, 7:30pm
Hyde Observatory

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

Night Sky Network

www.prairieastronomyclub.org

2025 STAR PARTY DATES

	Date	Date
January	24	**31**
February	21	**28**
March	21	**28**
April	3/18	**25**
May	16	**23**
June	20	**27**
July	18	**25**
NSP	7/20	7/25
August	15	**22**
September	**19**	26
October	17	**24**
November	14	**21**
December	12	**19**

Dates in BOLD are closest to the New Moon.

CLUB OFFICERS

President	Jason O'Flaherty jflaher@gmail.com
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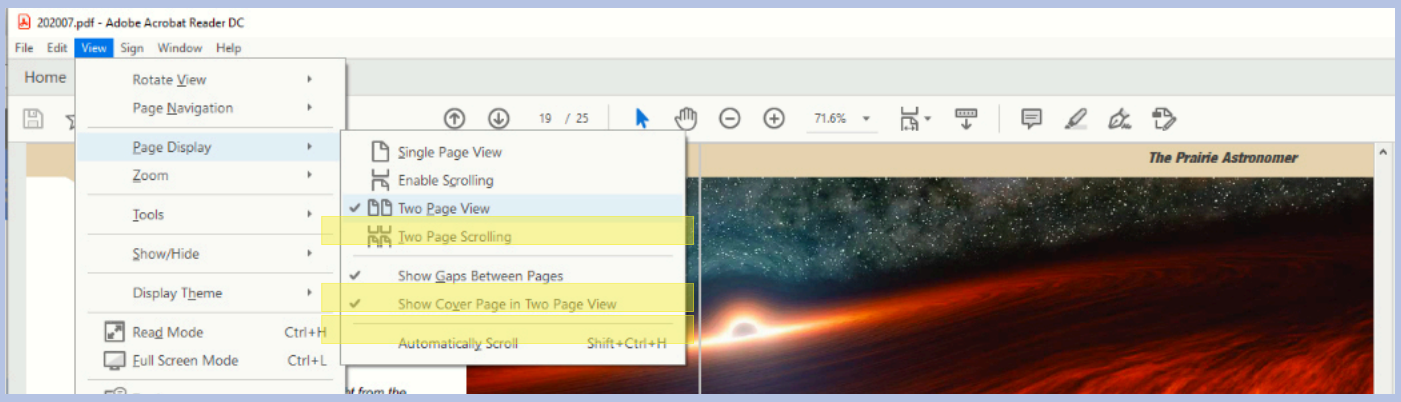
Notices

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,

Happy New Year! As we welcome 2025, I'm excited to share updates on upcoming PAC events and programs, as well as a full calendar of space events to look forward to this year.

PAC Updates and Meetings

Hyde Observatory will be under renovation in January and February, with hopes of reopening in March. For now, our next two club meetings will be held at Branched Oak Observatory.

January Meeting: Instead of our regular meeting, we'll host the public outreach event, "How to Use Your Telescope," on Friday, January 24th, with a backup date of January 31st. Keep an eye on your email and our Facebook page for updates. Volunteers are always appreciated to help guests set up their equipment. Feel free to bring your own telescope for personal use after the guests are situated or if you'd like assistance setting it up.

February Meeting: We're thrilled to welcome Michael Sibbernsen, Co-Founder and Director of Education at Branched Oak Observatory, as our February 25th presenter. Michael, a NASA/JPL Solar System Ambassador, will deliver a program titled "Blazing the Way: An Illuminating Examination of T CrB." This talk will explore T Coronae Borealis, or the "Blaze Star," a fascinating recurrent nova system. Don't miss this chance to learn about one of the sky's most captivating phenomena!

2025 Space Event Highlights

The year ahead is packed with incredible celestial events and mission milestones. Many of these highlights come from The Planetary Society's excellent compilation, so I want to acknowledge their efforts. While I've done my best to verify the information, please double-check specific events if you plan to observe or attend them.

January

Jan. 3: Quadrantid meteor shower peaks; minimal moonlight interference.

Jan. 16: Mars at opposition; best visibility and brightness for observation.

Sometime this month:

Lunar Trailblazer & Nova-C IM-2 mission: Intuitive Machines' IM-2, part of NASA's CLPS program, aims for a lunar landing carrying the Lunar Trailblazer orbiter.

Blue Ghost mission: Firefly Aerospace's lander will attempt a lunar landing with PlanetVac, a sampling instrument developed with support from The Planetary Society.

February

Feb. 16: Venus at greatest

The President's Message, continued

brightness, appearing more than twice as bright as its dimmest point in 2025.

Feb. 25: Astronauts Butch Wilmore and Sunni Williams return from an extended ISS mission delayed by Boeing's Starliner anomalies.

March

Mar. 1: Europa Clipper performs a Mars gravity assist, flying within 950 km (600 miles) to adjust course for its 2030 arrival at Europa.

Mar. 14: Total lunar eclipse visible across most of North America.

Mar. 20: Spring equinox.

Around Mar. 23: Saturn's' rings appear edge-on for the first time since 2009, a rare event occurring every 13-15 years. It will happen again in November and then not again until 2038.

Sometime this month: ESA's Hera spacecraft performs a Mars flyby, observing the Martian moon Deimos en route to the Didymos-Dimorphos asteroid system.

April

Apr. 20: NASA's Lucy mission flies by asteroid 52246 Donaldjohanson, the second of 11 targets in its mission.

Apr. 21: Mercury at greatest elongation; its farthest position from the Sun, making it the easiest time to see it in 2025.

Apr. 22: Lyrid meteor shower peaks; minimal moonlight interference expected.

May

May 6: Eta Aquariid meteor shower peaks; Earth passes through Halley's Comet debris. Best seen in the Southern Hemisphere but visible to the south in the Northern Hemisphere under ideal conditions.

Sometime this month: TSIS-2 launch to measure solar irradiance and its effects on Earth's climate.

June

Jun. 21: Summer solstice; marks the start of summer in the Northern Hemisphere.

Jun. 30: Asteroid Day commemorates the 1908 Tunguska Event, raising awareness of planetary defense against asteroid impacts.

July

Jul. 20-25: Nebraska Star Party.

August

Aug. 12-13: Perseid meteor shower peaks; one of the most reliable and anticipated meteor showers of the year.

September

Sept. 21: Saturn at opposition; brightest and most visible for the year.

Sept. 22: Fall equinox.

Sept. 23: Neptune at opposition; brightest and most visible, offering the best chance to observe with appropriate equipment.

Sometime this month:

Juno mission: Extended Mission may conclude by being deliberately crashed into Jupiter unless further extended.

EscaPADE Mars orbit insertion: NASA's mission enters Mars orbit to study the

The President's Message, continued

magnetosphere and solar wind interactions.

October

Oct. 4-10: World Space Week; annual celebration with the theme "Living in Space."

Oct. 7: First of three consecutive supermoons, appearing larger and brighter than usual.

Oct. 21: Orionid meteor shower peaks; excellent conditions due to the new moon.

November

Nov. 5: Second supermoon of the year.

Nov. 9: Sagan Day commemorates Carl Sagan's contributions to science and space exploration.

Nov. 17: Leonid meteor shower peaks; minimal moonlight interference expected.

Nov. 21: Uranus at opposition; ideal viewing conditions for the distant planet.

December

Dec. 4: Final supermoon of the year, completing the 2025 series.

Dec. 14: Geminid meteor shower peaks; some moonlight interference expected as the Moon will be one-third illuminated.

Dec. 21: Winter solstice; marks the start of winter in the Northern Hemisphere.

Dec. 22: Ursid meteor shower peaks with modest meteor activity.

Thank you all for your continued enthusiasm and participation in PAC. Here's to a year filled with exploration, learning, and shared wonder under the night sky.

Clear skies,

Jason O'Flaherty

New Members

Kevin Fraber
Welcome to the club!

ARP 75

The Mantrap Skies Image Catalog

Arp 75/NGC 702 is possibly an interacting pair of galaxies in central Cetus about 465 million light-years distant. Arp put it in his category for spirals with high surface brightness companions on the arms. As to what constitutes his companion, I'm not sure. At first, I thought he meant the very blue star cloud in the northern arm. But his comment reads: "Very faint extension to companion." That would rule out the blue object. About all that is left is the galaxy to the left, one and a half minutes left. A small oval galaxy. The rather blue extension is really a huge faint plume that envelops a much larger area than the bright parts of the galaxy. It would seem just happenstance that this other galaxy is within this large faint disk. NED shows the blue star cloud-like object well within the brighter portions of the galactic tangle as having virtually the same redshift as the main galaxy. So it is likely related. No redshift data is available for the one at the eastern edge of the faint star plume,

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.

ARP75, continued

APMUKS(BJ) B014853.58-041809.1. It likely lies far beyond or is a dwarf much closer. All speculation without redshift data. It appears this is an interacting system, just not the one Arp describes. The other galaxy may be the blue object or maybe the double core some sources mention. Maybe it's a triple system. It does seem to have an odd dark lane to the west (right) of the brightest core region and another parallel dust lane on the opposite side of the double core that is somewhat further from the core. The other "major" galaxy near Arp 75 is APMUKS(BJ) B014836.83-041711.8 to the west. Again, no redshift data but I doubt it is related.

A note to the MCG catalog entry a few years prior to Arp's Atlas describes this one rather colorfully as: "Remarkable interaction. The form is similar to the lower part of the body of a bending man, who has a sword between his legs (an elongated galaxy E). To the south is a short spiral arm." A note at NED from a year later says: "Bright complex lens with double nucleus. Faint outer whorls or (R): 1.75 arcmin x 1.55 arcmin. Probably an interacting system." NED and the NGC project classify it as SB(s)bc Pec.

The double core is very obvious in my image though burned in in Arp's image. There appears to be a third orange something above the two cores. Is it just a field star? A star knot? I have no idea. NGC 702 was discovered by William Herschel on September 20, 1784 but isn't in either Herschel 400 program.

There's not much data on the rest of the field. Only three other galaxies have redshift data. They are all above Arp 75. Right to left they are the flying saucer-like edge on with dust lane, MCG -01-05-040 at 233 million light-years; the small disk galaxy to its upper left, LEDA 144362 at 548 million light-years and LEDA 144374 further left, a bit left of center-line and just below an orange-white double star, is 623 million light-years away. Only MCG -01-05-040 has a classification. It is listed as SB(r)0+ Pec? I don't know what feature gives it the peculiar tag.

February Observing

Jim Kvasnicka

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

Planets

Venus: In the evening at magnitude -4.8.

Mars: In Gemini at magnitude -0.7 with a disk 12.3" wide.

Jupiter: In Taurus at magnitude -2.5 with a disk 43.4" wide.

Saturn: In Aquarius at magnitude +1.1 with a disk 16.0" wide.

Uranus: In Aries at magnitude +5.7 with a disk 3.6" wide.

Neptune: Too low to view after February 7th.

Mercury: Superior conjunction on February 9th.

Messier List

M1: The Crab Nebula in Taurus.

M35: Open cluster in Gemini.

M36/M37/M38: Open clusters in Auriga.

M42/M43: The Orion Nebula with M43 just to the north.

M45: The Pleiades.

M78: Emission nebula in Orion.

M79: Class V globular cluster in Lepus.

Last Month: M33, M34, M52, M74, M76, M77, M103

Next Month: M41, M44, M46, M47, M48, M50, M67, M81, M82, M93

NGC and other Deep Sky Objects

NGC 2244: Open cluster embedded in the Rosette Nebula in Monoceros.

NGC 2264: The Christmas Tree cluster in Monoceros.

NGC 2301: Open cluster in Monoceros.

NGC 2362: The Tau Canis Majoris Cluster.

NGC 2392: The Eskimo Nebula in Gemini.

NGC 2403: Galaxy in Camelopardalis.

Double Star Program List

32 Eridani: Yellow and white stars.

55 Eridani: Yellow and pale-yellow pair.

Gamma Leporis: Pair of yellow stars.

Epsilon Monocerotis: White primary with a pale-yellow secondary.

Beta Monocerotis: Three bluish white stars.

Kappa Puppis: Equal pair of white stars.

Alpha Ursa Minoris: Polaris, yellow-white and white stars.

N Hydrae: Equal yellow stars.

Challenge Object

NGC 2280: Dim elongated 2' x 1' galaxy in Canes Major.

Focus on Observing Programs

Jim Kvasnicka

Herschel II Observing Program

The Herschel II observing program was added in August 1997. It includes 400 of the 2,478 deep sky objects catalogued by William Herschel in the late 1700's, and it is the next level observing project after the Ancient City Astronomers' Herschel 400 program. The Herschel II Observing Program is an advanced level program focused on improving the observers' technical skills by taking thorough notes and developing accurate object descriptions.

The 400 objects in this program includes 323 galaxies, 41 open clusters, 21 nebulae, 9 planetary nebulae, 3 cluster-nebula, and 3 globular clusters. Most of the objects are between magnitude 11 and 13. About 80% of the objects on the list can be observed with telescopes between 8" and 13" aperture. A lot will depend on the seeing conditions and how dark your observing site is.

Many of the objects are in fields containing numerous other objects, identifying the correct object can be a challenge.

To qualify for the Astronomical League Herschel II Observing Program certificate and pin you need to:

1. Observe the 400 objects on the list and record your observations.

2. Develop observing logs that include the following:

a. Date and time

b. Site (Latitude and Longitude)

c. Seeing conditions

d. Telescope used

e. Eyepiece and magnification

f. Object description (sketch optional)

When finished complete an index of observations in NGC order showing the page number of your observation next to the NGC number.

When you complete the Herschel II 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 Herschel II Program chair for approval. The chair will mail to me your Herschel II certificate and pin which I will present to you at our monthly PAC meeting.

If you have any questions regarding the Herschel II Program or need help getting started please contact me and I will be glad to help.

Outreach Calendar

Don Hain
dhain00@gmail.com, 402 440 5318

As stated on the PAC website: The Prairie Astronomy Club will offer its annual free session: "How to Use Your Telescope" at Branched Oak Observatory, Friday evening January 24th at 7:00 p.m

Mentioned last month was that Hyde Observatory might be having some renovation work that could affect upcoming PAC meetings. You have hopefully seen that is the case. The PAC January and February meetings will be out at the Branched Oak Observatory site (with the January one being the "How to Use Your Telescope" gathering mentioned above). Additionally, for those who volunteer at Hyde, you should have already found that Hyde is not scheduled to be open to the public until mid-March. It will be exciting to see what the renovated classroom looks like when March gets here.

Scheduled events to be aware of:

PAC Annual "How to Use Your Telescope":

When: Friday January 24th, 7:30PM

Where: Branched Oak Observatory site

Sponsored by: Prairie Astronomy Club

Needs: let the club know via the Contact Us page at https://www.prairieastronomyclub.org/contact-us/

(or contact me directly at dhain00@gmail.com if you've not already made a board member aware you are coming)

All are definitely welcome though, whether or not you have had a chance to connect with someone. There is so much going on with telescope design. Camera functionality is becoming a bigger and bigger part of how getting more familiar with the night sky is coming to be understood. Chatting about these new advancements could be where some of the conversations go, depending on what the interests of those in attendance are.

Hyde Observatory: CLOSED January and February!

Hopefully open Saturday nights starting in March, then throughout the year (except for weekends of major holidays)

7:00pm to 10:00pm (March 14)

Sundown to 11:00PM (March 15 - August 31)

Where: Hyde Memorial Observatory

Sponsored by: City of Lincoln (Parks and Recreation) and Hyde Observatory volunteers

Needs: visit https://www.hydeobservatory.info/volunteer/ to become a volunteer

In Disney's 'Moana,' the characters navigate using the stars, just like real Polynesian explorers — an astronomer explains how these methods work

Christopher Palma
Teaching Professor, Dept of Astronomy & Astrophysics, Penn State

THE CONVERSATION

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If you have visited an island like one of the Hawaiian Islands, Tahiti or Easter Island, also known as Rapa Nui, you may have noticed how small these land masses appear against the vast Pacific Ocean. If you're on Hawaii, the nearest island to you is more than 1,000 miles (1,600 kilometers) away, and the coast of the continental United States is more than 2,000 miles (3,200 kilometers) away. To say these islands are secluded is an understatement.

For me, watching the movie "Moana" in 2016 was eye-opening. I knew that Polynesian people traveled between a number of Pacific islands, but seeing Moana set sail on a canoe made me realize exactly how small those boats are compared with what must have seemed like an endless ocean. Yet

Islands in Polynesia can be thousands of miles apart. NASA

Moana, continued

our fictional hero went on this journey anyway, like the countless real-life Polynesian voyagers upon which she is based.

As an astronomer, I have been teaching college students and visitors to our planetarium how to find stars in our sky for more than 20 years. As part of teaching appreciation for the beauty of the sky and the stars, I want to help people understand that if you know the stars well, you can never get lost.

U.S. Navy veterans learned the stars in their navigation courses, and European cultures used the stars to navigate, but the techniques of Polynesian wayfinding shown in Moana brought these ideas to a very wide audience.

The movie Moana gave me a new hook – pun not intended – for my planetarium shows and lessons on how to locate objects in the night sky. With "Moana 2" out now, I am excited to see even more astronomy on the big screen and to figure out how I can build new lessons using the ideas in the movie.

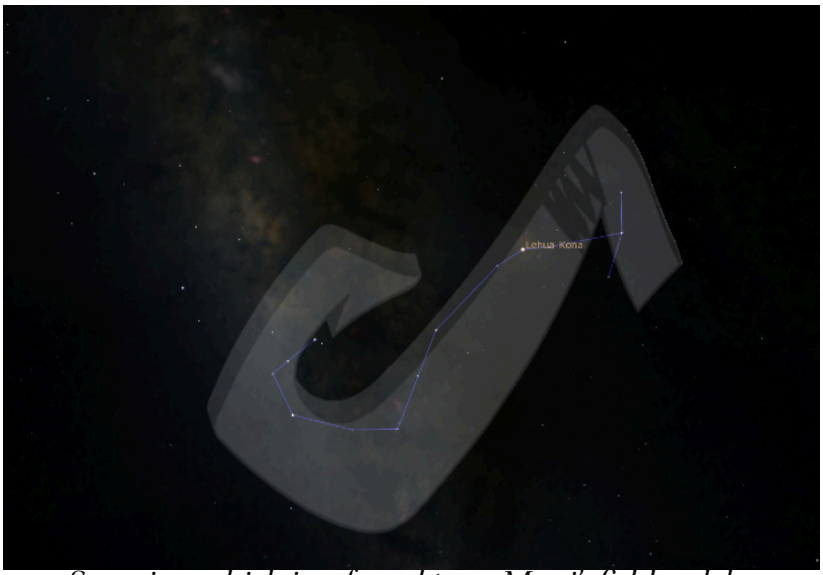
The North Star

Have you ever found the North Star, Polaris, in your sky? I try to spot it every time I am out observing, and I teach visitors at my shows to use the "pointer stars" in the bowl of the Big Dipper to find it. These two stars in the Big Dipper point you directly to Polaris.

If you are facing Polaris, then you know you are facing north. Polaris is special because it is almost directly above Earth's North Pole, and so everyone north of the equator can see it year-round in exactly the same spot in their sky.

It's a key star for navigation because if you measure its height above your horizon, that tells you how far you are north of Earth's equator. For the large number of people who live near 40 degrees north of the equator, you will see Polaris about 40 degrees above your horizon.

If you live in northern Canada, Polaris will appear higher in your sky, and if you live closer to the equator, Polaris will appear closer to the horizon. The other stars



Scorpius, which is referred to as Maui's fishhook by Hawaiians

Moana, continued

and constellations come and go with the seasons, though, so what you see opposite Polaris in the sky will change every month.

You can use all of the stars to navigate, but to do that you need to know where to find them on every night of the year and at every hour of the night. So, navigating with stars other than Polaris is more complicated to learn.

Maui's fishhook

At the end of June, around 11 p.m., a bright red star might catch your eye if you look directly opposite from Polaris. This is the star Antares, and it is the brightest star in the constellation Scorpius, the Scorpion.

If you are a "Moana" fan like me and the others in my family, though, you may know this group of stars by a different name – Maui's fishhook.

If you are in the Northern Hemisphere, Scorpius may not fully appear above your horizon, but if you are on a Polynesian island, you should see all of the constellation rising in the southeast, hitting its highest point in the sky when it is due south, and setting in the southwest.

Astronomers and navigators can measure latitude using the height of the stars, which Maui and Moana did in the movie using their hands as measuring tools.

The easiest way to do this is to figure out how high Polaris is above your horizon. If you can't see it at all, you must be south of the equator, but if you see Polaris 5 degrees (the width of three fingers at arm's length) or 10 degrees above your horizon (the width of your full fist held at arm's length), then you are 5 degrees or 10 degrees north of the equator.

The other stars, like those in Maui's fishhook, will appear to rise, set and hit their highest point at different locations in the sky depending on where you are on the Earth.

Polynesian navigators memorized where these stars would appear in the sky from the different islands they sailed between, and so by looking for those stars in the sky at night, they could determine which direction to sail and for how long to travel across the ocean.

Today, most people just pull out their phones and use the built-in GPS as a guide. Ever since "Moana" was in theaters, I see a completely different reaction to my planetarium talks about using the stars for navigation. By accurately showing how Polynesian navigators used the stars to sail across the ocean, Moana helps even those of us who have never sailed at night to understand the methods of celestial navigation.

The first "Moana" movie came out when my son was 3 years old, and he took an instant liking to the songs, the story and the scenery. There are many jokes about parents who dread having to watch a child's favorite over and over again, but in my case, I fell in love with the movie too.

Since then, I have wanted to thank the storytellers who made this movie for being so careful to show the astronomy of navigation correctly. I also appreciated that they showed how Polynesian voyagers used the stars and other clues, such as ocean currents, to sail across the huge Pacific Ocean and land safely on a very small island thousands of miles from their home.

NASA's Webb Finds Planet-Forming Disks Lived Longer in Early Universe

NASA's James Webb Space Telescope just solved a conundrum by proving a controversial finding made with the agency's Hubble Space Telescope more than 20 years ago.

In 2003, Hubble provided evidence of a massive planet around a very old star, almost as old as the universe. Such stars possess only small amounts of heavier elements that are the building blocks of planets. This implied that some planet formation happened when our universe was very young, and those planets had time to form and grow big inside their primordial disks, even bigger than Jupiter. But how? This was puzzling.

To answer this question, researchers used Webb to study stars in a nearby galaxy that, much like the early universe, lacks large amounts of heavy elements. They found that not only do some stars there have planet-forming disks, but that those disks are longer-lived than those seen around young stars in our Milky Way galaxy.

"With Webb, we have a really strong confirmation of what we saw with Hubble, and we must rethink how we model planet formation and early evolution in the young universe," said study leader Guido De Marchi of the European Space Research and Technology Centre in Noordwijk, Netherlands.

A Different Environment in Early Times

In the early universe, stars formed from mostly hydrogen and helium, and very few heavier elements such as carbon and iron, which came later through supernova explosions.

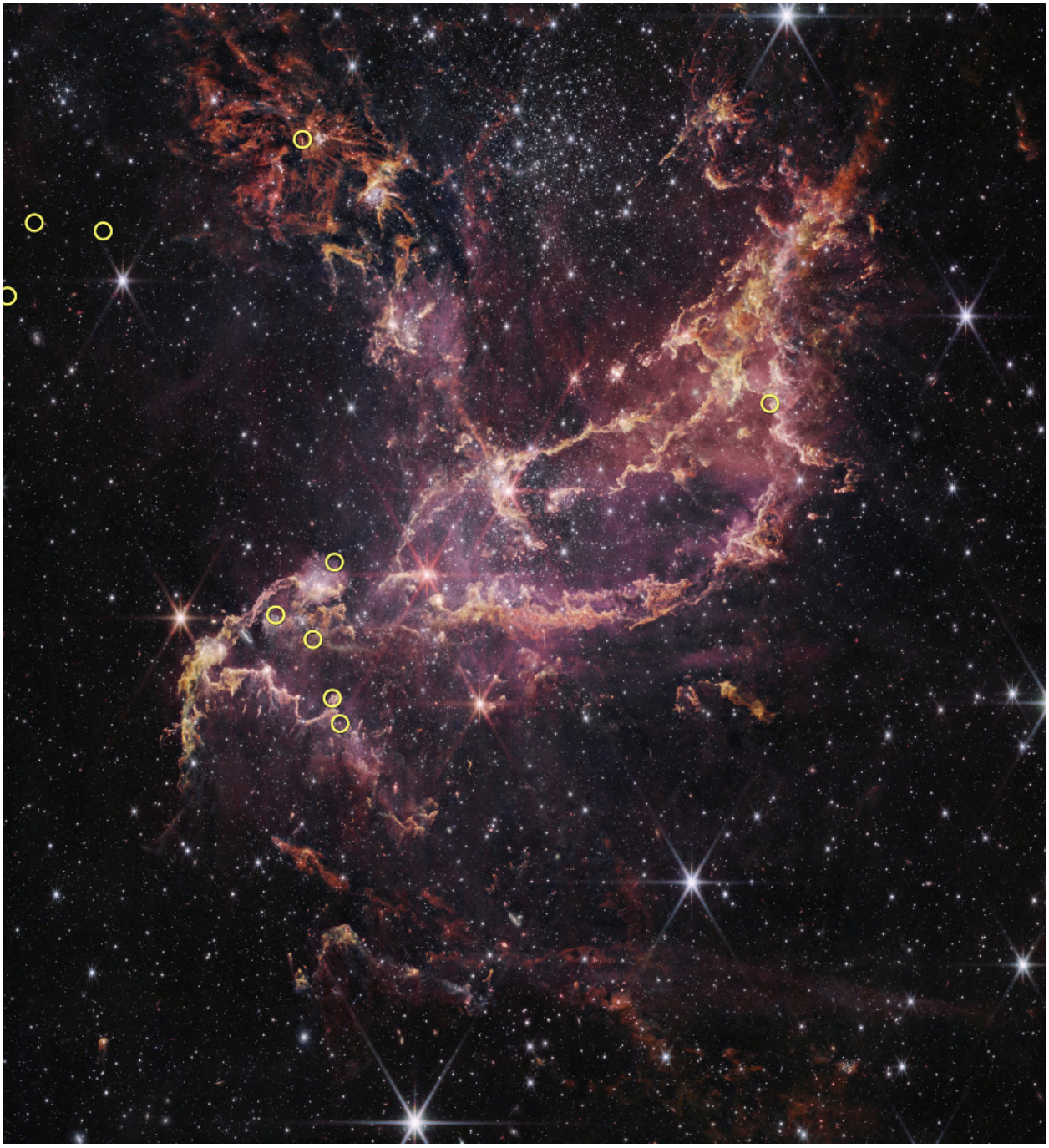
"Current models predict that with so few heavier elements, the disks around stars have a short lifetime, so short in fact that planets cannot grow big," said the Webb study's co-investigator Elena Sabbi, chief scientist for Gemini Observatory at the National Science Foundation's NOIRLab in Tucson. "But Hubble did see those planets, so what if the models were not correct and disks could live longer?"

To test this idea, scientists trained Webb on the Small Magellanic Cloud, a dwarf galaxy that is one of the Milky Way's nearest neighbors. In particular, they examined the massive, star-forming cluster NGC 346, which also has a relative lack of heavier elements. The cluster served as a nearby proxy for studying stellar environments with similar conditions in the early, distant universe.

Hubble observations of NGC 346 from the mid 2000s revealed many stars about 20 to 30 million years old that seemed to still have planet-forming disks around them. This went against the conventional belief that such disks would dissipate after 2 or 3 million years.

"The Hubble findings were controversial, going against not only empirical evidence in our galaxy but also against the current models," said De Marchi. "This was intriguing, but without a way to obtain

Planet-Forming Disks, continued



This is a James Webb Space Telescope image of NGC 346, a massive star cluster in the Small Magellanic Cloud, a dwarf galaxy that is one of the Milky Way's nearest neighbors. With its relative lack of elements heavier than hydrogen and helium, the NGC 346 cluster serves as a nearby proxy for studying stellar environments with similar conditions in the early, distant universe. Ten, small, yellow circles overlaid on the image indicate the positions of the ten stars surveyed in this study. NASA, ESA, CSA, STScI, Olivia C. Jones (UK ATC), Guido De Marchi (ESTEC), Margaret Meixner (USRA)

Planet-Forming Disks, continued

spectra of those stars, we could not really establish whether we were witnessing genuine accretion and the presence of disks, or just some artificial effects."

Now, thanks to Webb's sensitivity and resolution, scientists have the first-ever spectra of forming, Sun-like stars and their immediate environments in a nearby galaxy.

"We see that these stars are indeed surrounded by disks and are still in the process of gobbling material, even at the relatively old age of 20 or 30 million years," said De Marchi. "This also implies that planets have more time to form and grow around these stars than in nearby star-forming regions in our own galaxy."

A New Way of Thinking

This finding refutes previous theoretical predictions that when there are very few heavier elements in the gas around the disk, the star would very quickly blow away the disk. So the disk's life would be very short, even less than a million years. But if a disk doesn't stay around the star long enough for the dust grains to stick together and pebbles to form and become the core of a planet, how can planets form?

The researchers explained that there could be two distinct mechanisms, or even a combination, for planet-forming disks to persist in environments scarce in heavier elements.

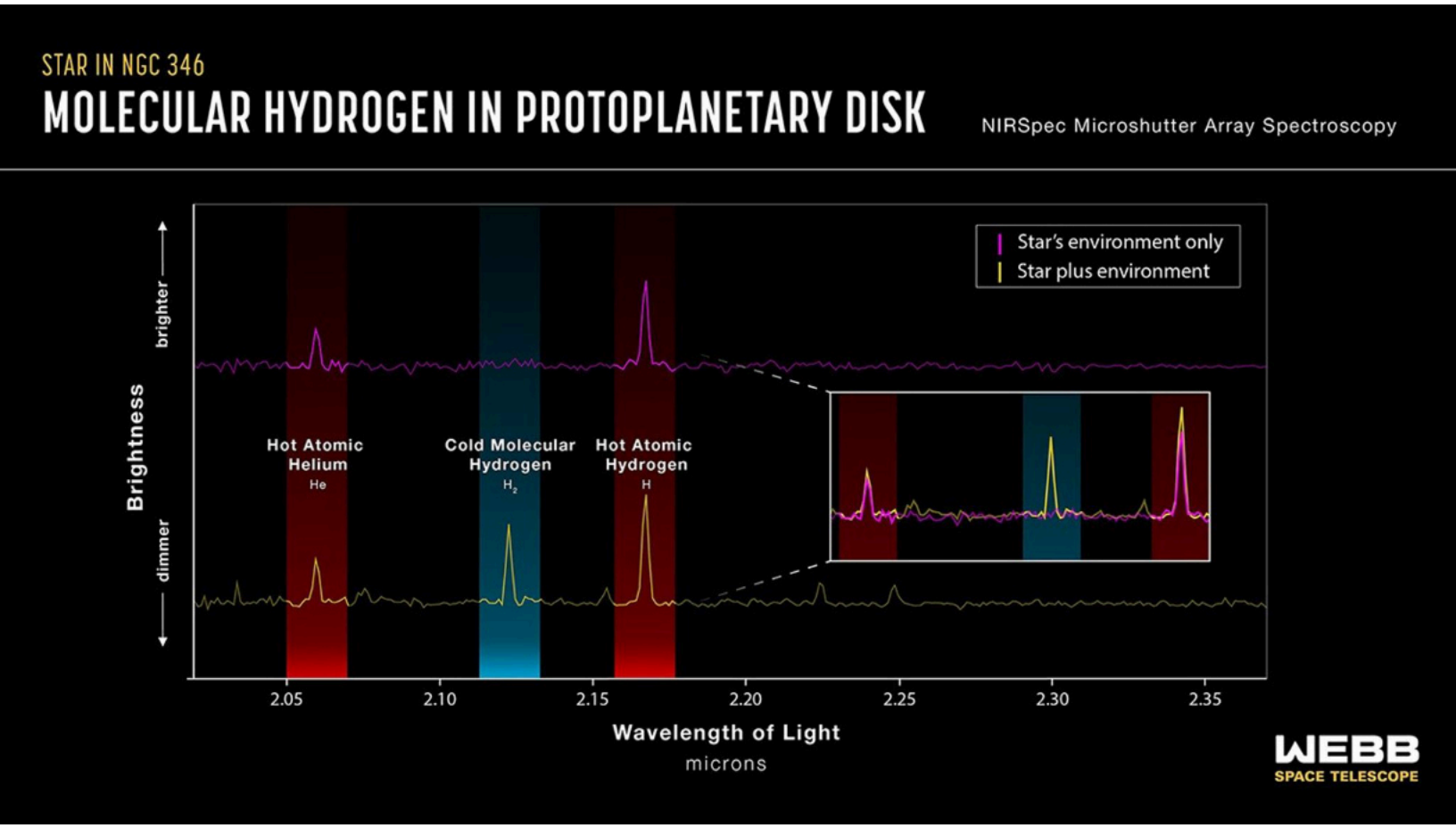
First, to be able to blow away the disk, the star applies radiation pressure. For this pressure to be effective, elements heavier than hydrogen and helium would have to reside in the gas. But the massive star cluster NGC 346 only has about ten percent of the heavier elements that are present in the chemical composition of our Sun. Perhaps it simply takes longer for a star in this cluster to disperse its disk.

The second possibility is that, for a Sun-like star to form when there are few heavier elements, it would have to start from a larger cloud of gas. A bigger gas cloud will produce a bigger disk. So there is more mass in the disk and therefore it would take longer to blow the disk away, even if the radiation pressure were working in the same way.

"With more matter around the stars, the accretion lasts for a longer time," said Sabbi. "The disks take ten times longer to disappear. This has implications for how you form a planet, and the type of system architecture that you can have in these different environments. This is so exciting."

The science team's paper appears in the Dec. 16 issue of The Astrophysical Journal.

Planet-Forming Disks, continued

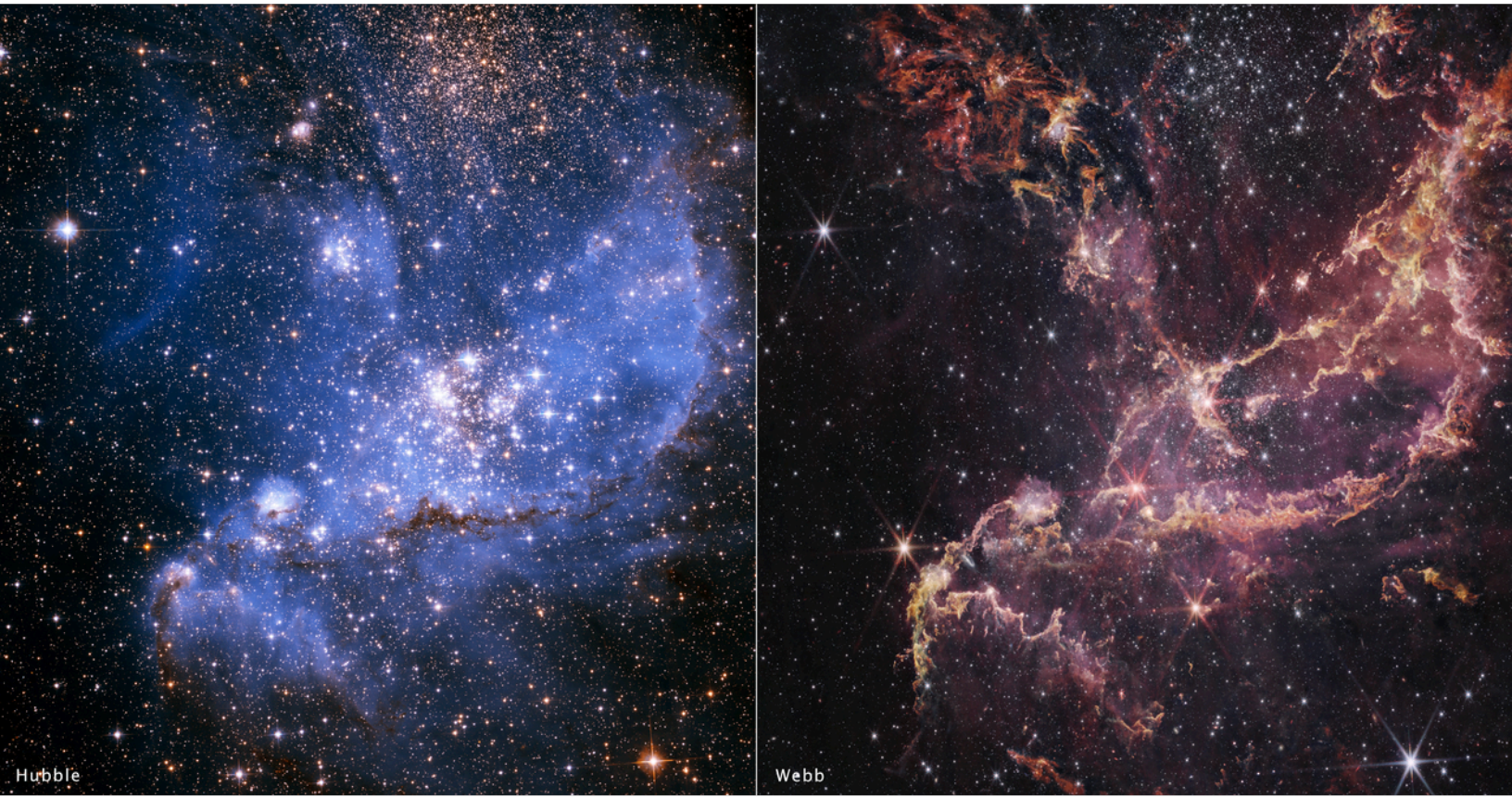


This graph shows, on the bottom left in yellow, a spectrum of one of the 10 target stars in this study (as well as accompanying light from the immediate background environment). Spectral fingerprints of hot atomic helium, cold molecular hydrogen, and hot atomic hydrogen are highlighted. On the top left in magenta is a spectrum slightly offset from the star that includes only light from the background environment. This second spectrum lacks a spectral line of cold molecular hydrogen.

On the right is the comparison of the top and bottom lines. This comparison shows a large peak in the cold molecular hydrogen coming from the star but not its nebular environment. Also, atomic hydrogen shows a larger peak from the star. This indicates the presence of a protoplanetary disk immediately surrounding the star. The data was taken with the microshutter array on the James Webb Space Telescope's NIRSpec (Near-Infrared Spectrometer) instrument.

Illustration: NASA, ESA, CSA, Joseph Olmsted (STScI)

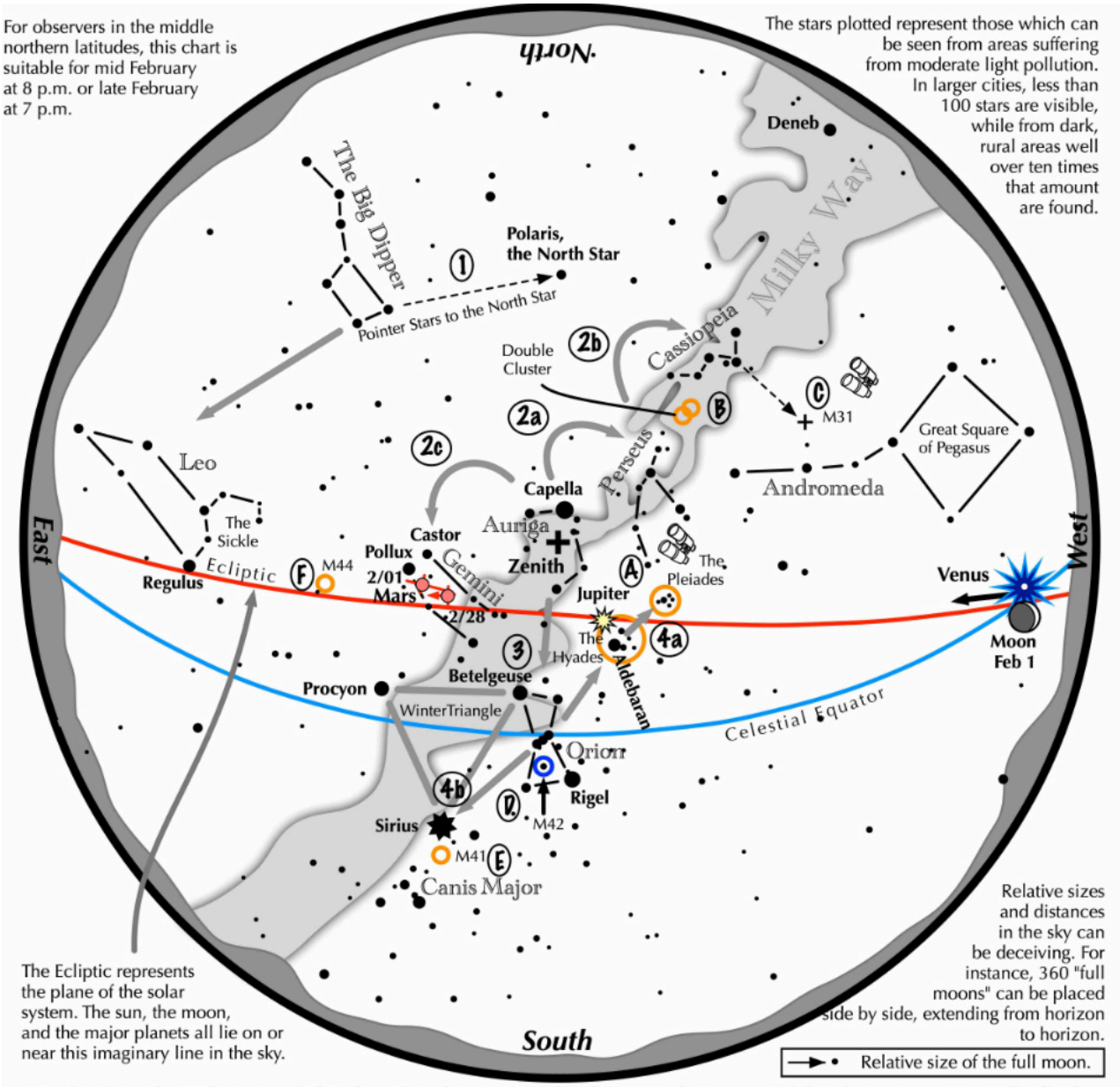
Planet-Forming Disks, continued



This side-by-side comparison shows a Hubble image of the massive star cluster NGC 346 (left) versus a Webb image of the same cluster (right). While the Hubble image shows more nebulosity, the Webb image pierces through those clouds to reveal more of the cluster's structure. NGC 346 has a relative lack of elements heavier than helium and hydrogen, making it a good proxy for stellar environments in the early, distant universe.

Credits: NASA, ESA, CSA, STScI, Olivia C. Jones (UK ATC), Guido De Marchi (ESTEC), Margaret Meixner (USRA), Antonella Nota (ESA)

Navigating the mid February Night Sky



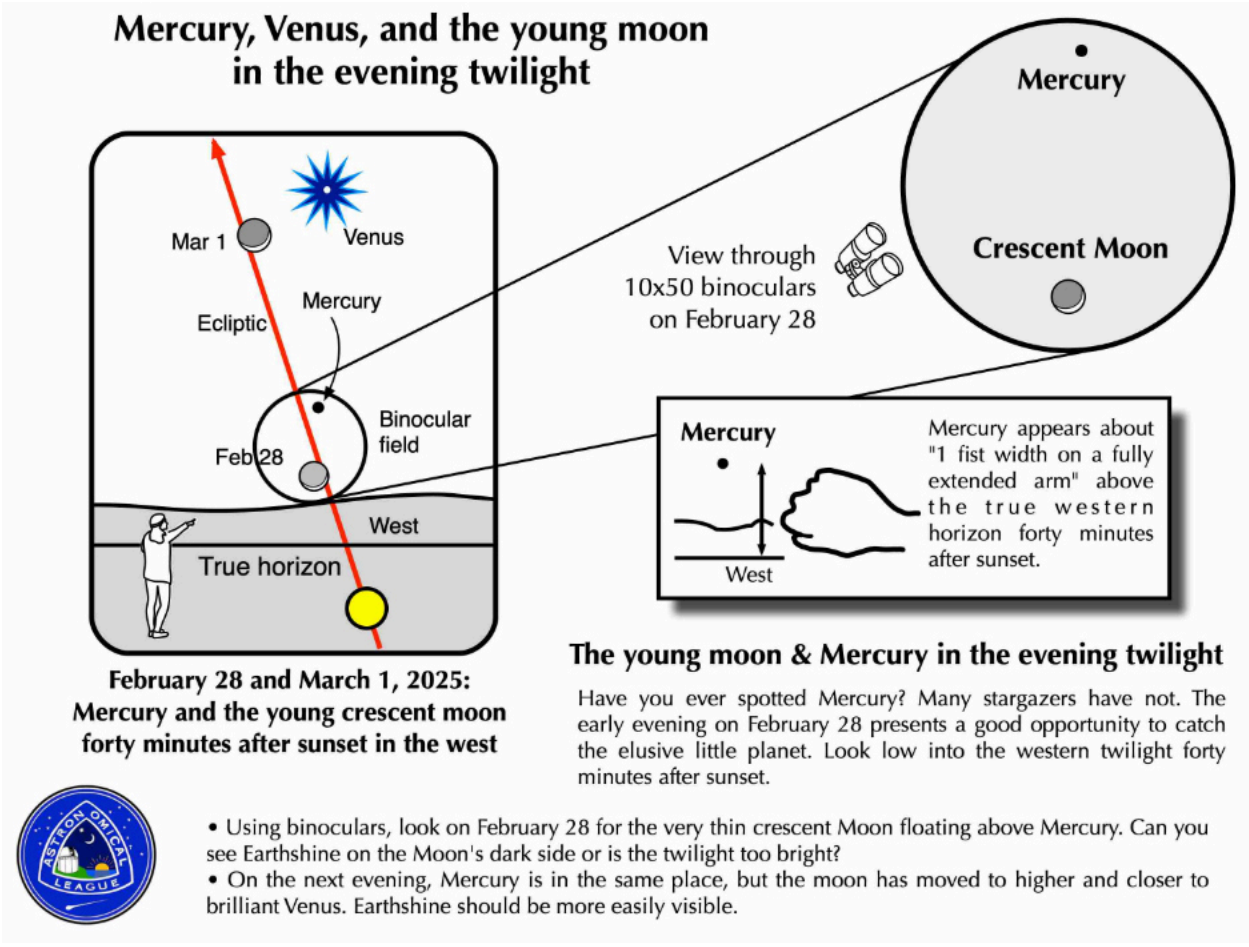
Navigating the February night sky: Simply start with what you know or with what you can easily find.

1. Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
2. Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next jump southeastward from Capella to the twin stars of Castor and Pollux in Gemini.
3. Directly south of Capella stands the constellation of Orion with its three Belt stars, its bright red star Betelgeuse, and its bright blue-white star Rigel.
4. Use Orion's three Belt stars to point northwest to the red star Aldebaran and the Hyades star cluster, then to the Pleiades star cluster. Travel southeast from the Belt stars to the brightest star in the night sky, Sirius, a member of the Winter Triangle.

Binocular Highlights

A: Examine the stars of two naked eye star clusters, the Pleiades and the Hyades.
B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.
C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
D: M42 in Orion is a star forming nebula. **E:** Look south of Sirius for the star cluster M41. **F:** M44, a star cluster barely visible to the naked eye, lies southeast of Pollux.

Astronomical League Observing Project



February 28 and March 1, 2025: Mercury and the young crescent moon forty minutes after sunset in the west

The young moon & Mercury in the evening twilight

Have you ever spotted Mercury? Many stargazers have not. The early evening on February 28 presents a good opportunity to catch the elusive little planet. Look low into the western twilight forty minutes after sunset.

- Using binoculars, look on February 28 for the very thin crescent Moon floating above Mercury. Can you see Earthshine on the Moon's dark side or is the twilight too bright?
- On the next evening, Mercury is in the same place, but the moon has moved to higher and closer to brilliant Venus. Earthshine should be more easily visible.

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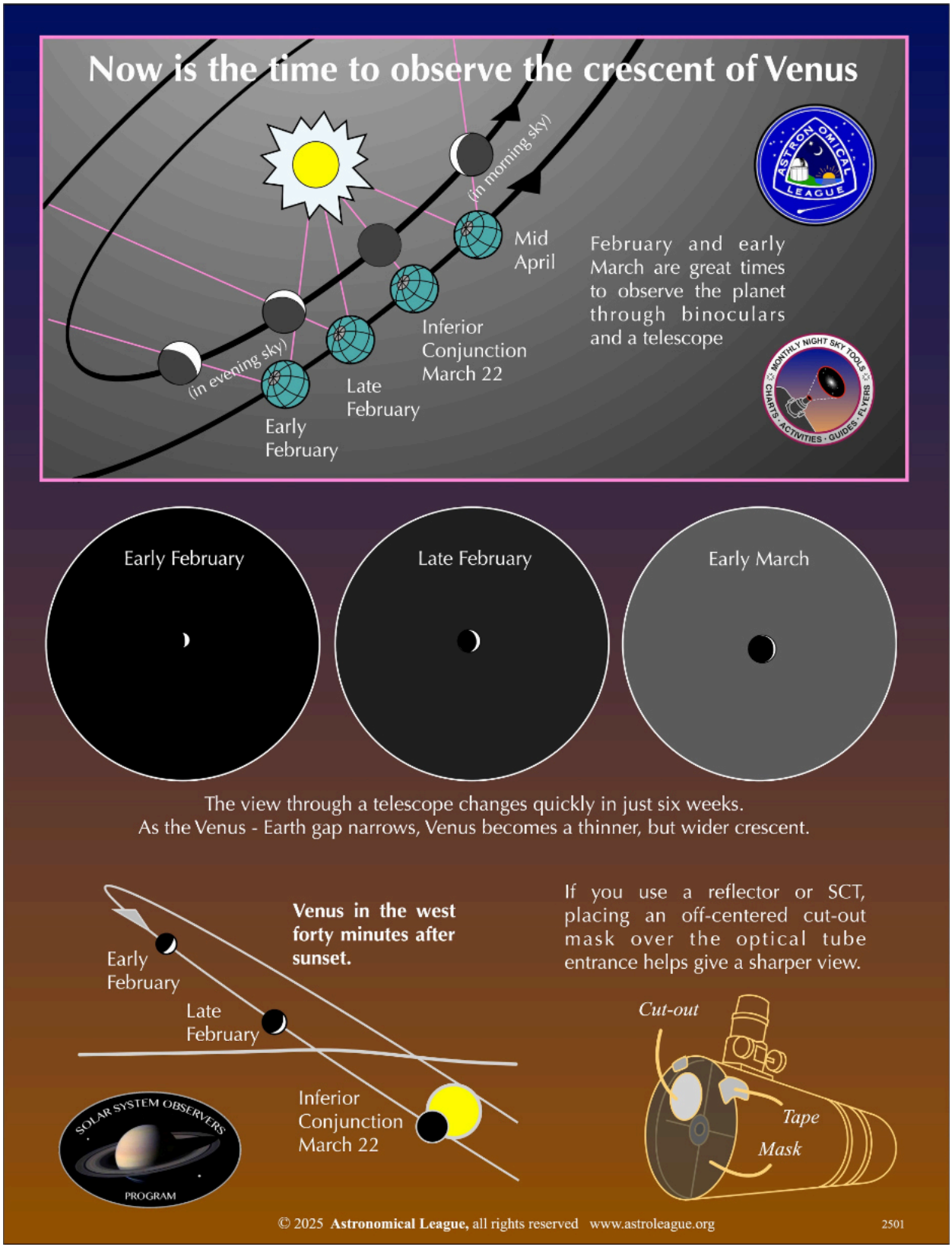
Astronomical League Outreach



Astronomical League Outreach

This Old Observatory

Episode 1: Are the Bones Still Good?

It seemed appropriate to borrow from "This Old House" since Hyde Observatory is now 47 years old. And with old buildings, sometimes there are surprises when you open up the walls.

The first major renovation of Hyde Observatory is now underway and is expected to be completed by mid-March. This phase of the renovation includes a refresh of the classroom area, updates to the exterior doors, the addition of another exit in the classroom to meet code requirements, and some HVAC and electrical work.

During the demolition phase, water damage was discovered in the ceiling due to the original solar heating system installed in 1977, so they had to take down the entire ceiling. Also there was termite damage and wood rot in the NE corner wall of the

Hyde Observatory Renovation, continued

deck. While the walls and ceiling are open, the A/V and network wiring was cleaned up and upgraded.

The project is managed by the Parks & Recreation Facilities, Construction & Maintenance Department and Engineering work was done by Architectural Design Associates.

The updated classroom will have carpeting, new lighting and speakers, a large screen TV media player and framed posters on the west wall.

The upgrade is funded in part by the Hyde Observatory Fund from donations and partly by Lincoln Parks & Recreation.

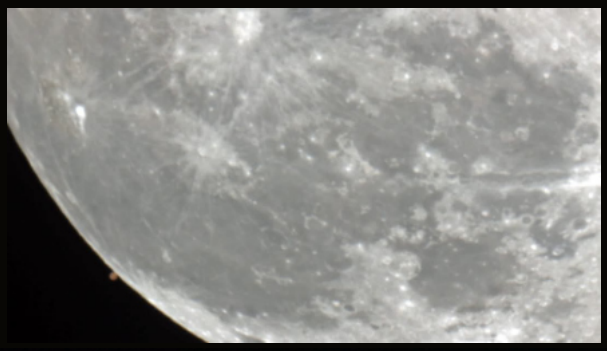
Last view of the classroom before demolition work began on January 6th. The classroom was cleared on January 3rd and all fixtures removed (the mural was covered to protect it).

Hyde Observatory Renovation, continued

Astrophotography

Mars Occultation, January 13, 2025 by Brett Boller.

Left: stacked image of Mars from stills.



From the Archives

January, 1995

The 2nd Annual NSP is really starting to take shape. Tom Miller is doing a great job as Chairman. In December, over 3000 NSP brochures were sent out to nearly all of the clubs in the surrounding states (and then some). We are already staring to get some responses. John Bruce has agreed to handle all of the finances for the star party, and will be setting up an NSP checking account to keep NSP separate from the club's finances.

We have invited prominent individuals to be this year's guest speakers, including Dave Kriege from Obsession Telescopes, John Hudak from Galaxy Optics, Barbara Wilson from Houston, Emil Bonanno of Mega-Star fame, and Dr. Wakefield Dort, originator of the famous Merna Meteor theory. We are still awaiting their confirmations and have several prospective backup speakers in mind should these decline. If you want to give a presentation, contact me as soon as possible so I can start planning the Program Schedule.

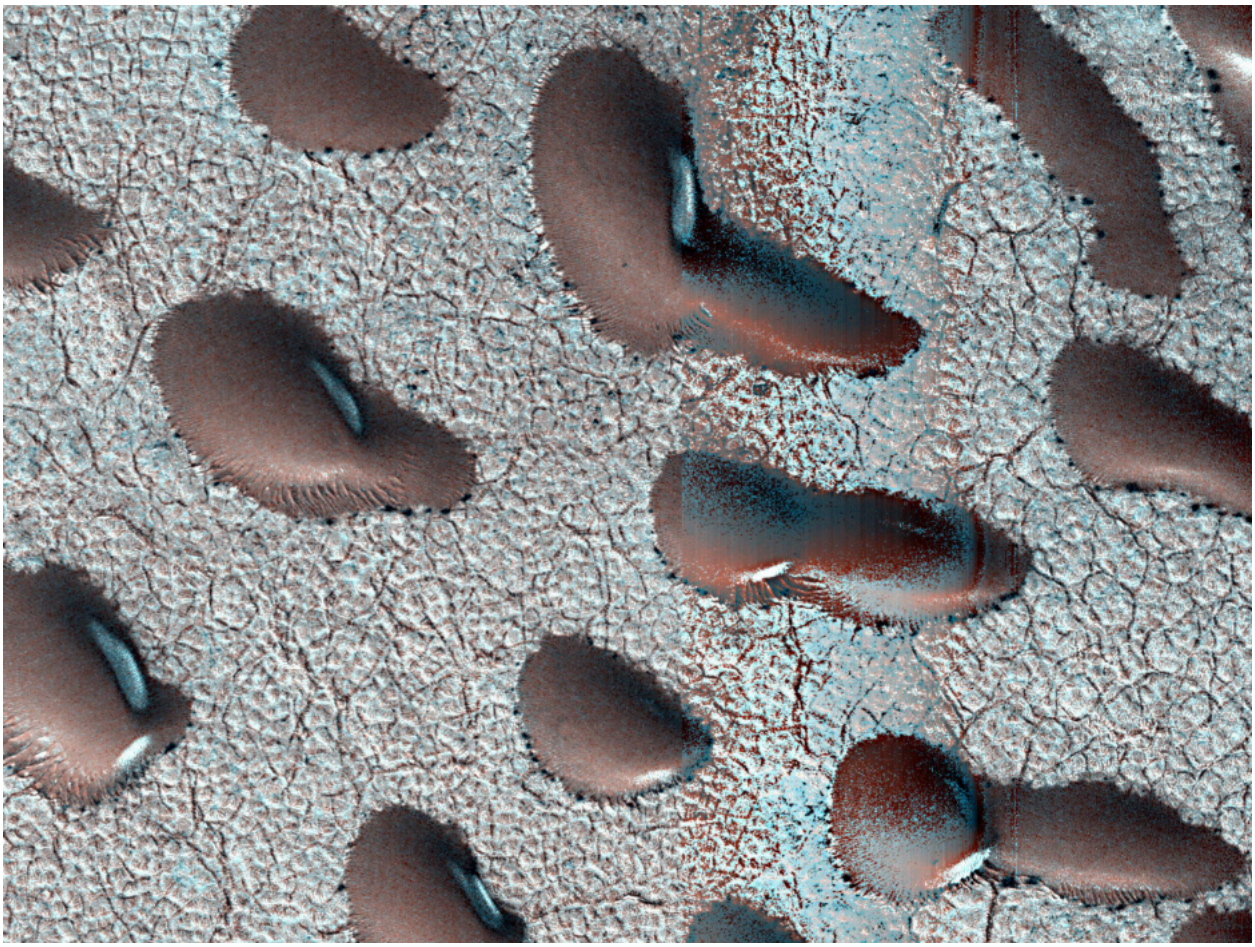
Requests door prizes have been sent to vendors across the country. To date, we've received four door prizes, including gift certificates from Lumicon and Spectra Astro-systems, a Sky-Glow filter from Orion, and Solar-Screen from Tuthill. Letters to several other vendors will be sent out in the next couple of weeks. One vendor, Bob Nederman from Astronomical Innovations, has confirmed he is planning on attending and displaying products.

I recently received a call from Nancy Hendrickson, editor of Clear Skies, and she confirmed she will attend and plans to mention NSP in the winter issue of Clear Skies.

We should also receive great publicity in the upcoming issue of Amateur Astronomy, where Jason Stahl's article on NSP is scheduled to appear. Also, look for a mention of NSP in upcoming issues of Sky & Telescope, Astronomy, and The Reflector. Thanks to Erik Hubl and Doug Bell for submitting to these publications. Plus, we have placed NSP information on America-Online, Compuserve, Genie & Internet.

The January 12th NSP planning meeting was a big success. The committee focused on preparing the registration packet which will be sent to all who respond to the brochures. Erik Hubl & Doug Bell will be compiling the packet. There was not exactly a huge response to the request for tee-shirt designs, however the committee reviewed the two designs that were submitted and chose one. The printers are currently working on the artwork and we should have a proof by the January meeting. Also, we have been discussing contests and awards. Awards will be given in several categories, including astro-photography, telescope making, "Name-That-Object," and the "Great NSP Deep-Sky Challenge." If you're planning on attending NSP, be sure to REGISTER AS SOON AS POSSIBLE. If you're not planning on attending, change your plans immediately! The 1st Annual NSP was great... The 2nd will be even better. Remember, cabins are available on a first come-first served basis, so get them while they last. If you wish to get involved, please call the NSP HOTLINE at (402) 466-4170 or show up at the next NSP planning meeting, which will be held on February 2nd at 7:30 pm at Miller Seed Co, 1600 Comhusker Hwy.

MRO's HiRISE Views Frosty Martian Dunes



These Martian dunes in Mars' northern hemisphere were captured from above by NASA's Mars Reconnaissance Orbiter using its High-Resolution Imaging Science Experiment (HiRISE) camera on Sept. 8, 2022. Scientists use such images to track the amount of frost that settles on the landforms and then disappears as the weather warms in spring.

Martian dunes migrate just like dunes on Earth, with wind blowing away sand on one side of the dune and building up on another. Recent research has shown that winter frost stops the movement of sand grains, locking the dunes in place until the spring thaw.

The University of Arizona, in Tucson, operates HiRISE, which was built by BAE Systems in Boulder, Colorado. NASA's Jet Propulsion Laboratory, a division of Caltech in Pasadena, California, manages the Mars Reconnaissance Orbiter Project for NASA's Science Mission Directorate, Washington.

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.

ADDRESS

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