The Prairie Astronomer

January 2024 Volume 65, Issue #1

IN THIS ISSUE: Jupiter's Volcanic Moon Io
View the Sun!

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

The next regular club meeting is January 30th at 7:30pm at Hyde Observatory

NEXT MEETING AND PROGRAM

The Prairie Astronomy Club will offer its annual free session: "How to Use Your Telescope" at Hyde Observatory, Tuesday evening January 30th at 7:30 p.m. Do you own a telescope and need help getting started using it? The Prairie Astronomy Club would like to help. Every year at our January meeting, we offer a session to give hands-on assistance.

UPCOMING PROGRAMS

February: A Comparison of Several Smart Telescopes - Jack Dunn

March (tentative): Beyond the Shadow: Exploring the Great North American Eclipse of 2024

CONTENTS

Cover: Bubble Nebula, by Leona Barratt. 200mm focal length, 50 mm aperture, 1.6° x 0.9° FOV - Vespera

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.

PAC Meeting
Tuesday, January 30th, 7:30pm at Hyde Observatory
Program: How to Use Your Telescope

PAC Meeting
Tuesday, February 27th, 7:30pm at Hyde Observatory
Program: "A Comparison of Smart Telescopes" - Jack Dunn

PAC Meeting
Tuesday, March 26th, 7:30pm at Hyde Observatory

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

Night Sky Network

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	9/26	**4**
November	11/22	**29**
December	20	**27**

Dates in BOLD are closest to the New Moon.

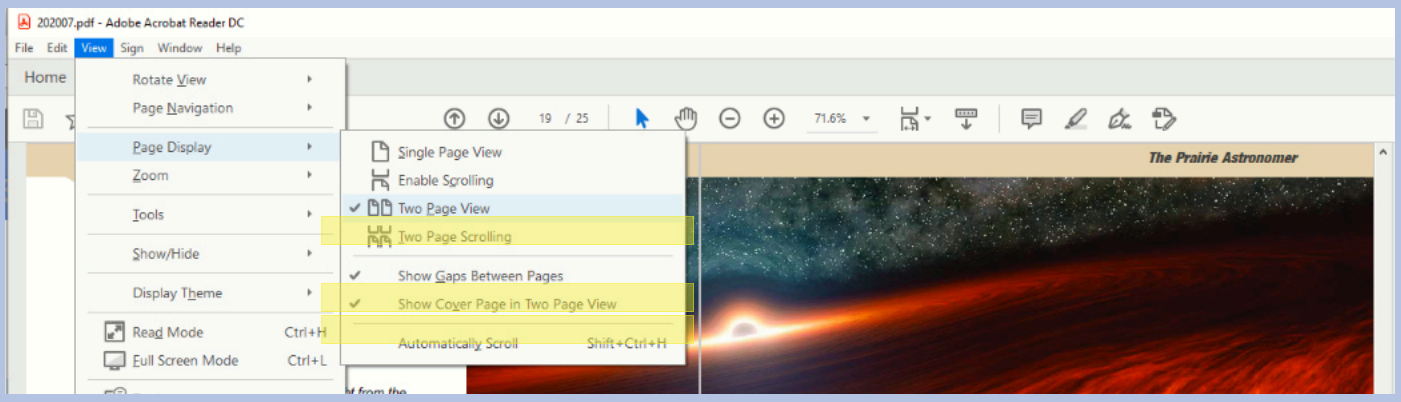
CLUB OFFICERS

President	**Jason O'Flaherty** **jflaher@gmail.com**
Vice President	**Brett Boller** **proboller86@yahoo.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	**Christine Parkyn** **cpparky@gmail.com**
Website and Newsletter Editor	**Mark Dahmke** **mark@dahmke.com**

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/pay-dues-online/

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,

I hope this message finds you well and ready for your astronomical pursuits in the new year. As we navigate through the winter months, I'd like to provide you with some updates and important information.

Our annual holiday dinner at Big Red Sports Bar saw a good turnout. The venue worked well, but please share your thoughts with me if you have any feedback or suggestions on improving our holiday dinner for next year.

I want to thank our Treasurer, John Reinert, for diligently updating the membership list over the past few weeks, renewing the Night Sky Network roster, and managing renewal notices. His commitment to these tasks ensures the smooth functioning of our club, and we are grateful for his efforts.

Speaking of effort, Mark Dahmke has given our club website a complete refresh. Looking back on the WayBack Machine, the last time it got a significant uplift was in July 2012. The new site looks modern and clean and has been responsive in my testing. The search feature works well, too. Mark's work is a great update to ensure we stay technologically current.

Our next meeting on January 30th will be dedicated to the annual "How To Use Your Telescope" Class. We won't have a Zoom call since this is a hands-on event. Please join in person and invite friends and family who might be interested. We welcome volunteers to help make our guests feel welcome. If you have questions about your own telescope or need advice, bring it along for collective learning and support. Also, please share our Facebook Event to help spread the word.

Given the anticipated cold temperatures (around 24 °F), please dress warmly. We aim to meet outside on the lawn, weather permitting, to ensure plenty of space for everyone.

Finally, if you are aware of any Eclipse presenters or are interested in presenting yourself, please get in touch with me. We've received several requests for Eclipse-related presentations, and your contributions would be valuable.

Thank you for your continued support of the Prairie Astronomy Club. Let's make 2024 a year filled with shared knowledge and appreciation for the cosmos.

Clear skies,

Jason O'Flaherty

ARP 63

The Mantrap Skies Image Catalog

Arp 63/NGC 2924 is a multiple galaxy in northwestern Leo about 320 million light-years from us. Arp puts it in his category for spiral galaxies with small, high surface brightness companions on its arm. It appears to have two, one at each end. Arp was silent as to which he meant but most sources say it is the western one, PGC 27534. Problem is there's no redshift data on this one while the one at the eastern end, PGC 1990710 has a redshift that does match that of the spiral galaxy. But is its connection only an illusion due to our line of sight or is it real? Are both true companions? To my eye, both show distortions that could indicate they are both interacting with the main galaxy. Many sources list this as a triple galaxy. NED and Seligman classifies the spiral as SB(s)c pec? while the NGC Project says is is Sc/SBc. Only Seligman classifies PGC 1990710 saying it is SB? pec.

The galaxy was discovered by Johann Palisa on March 27, 1886. Somehow he missed the

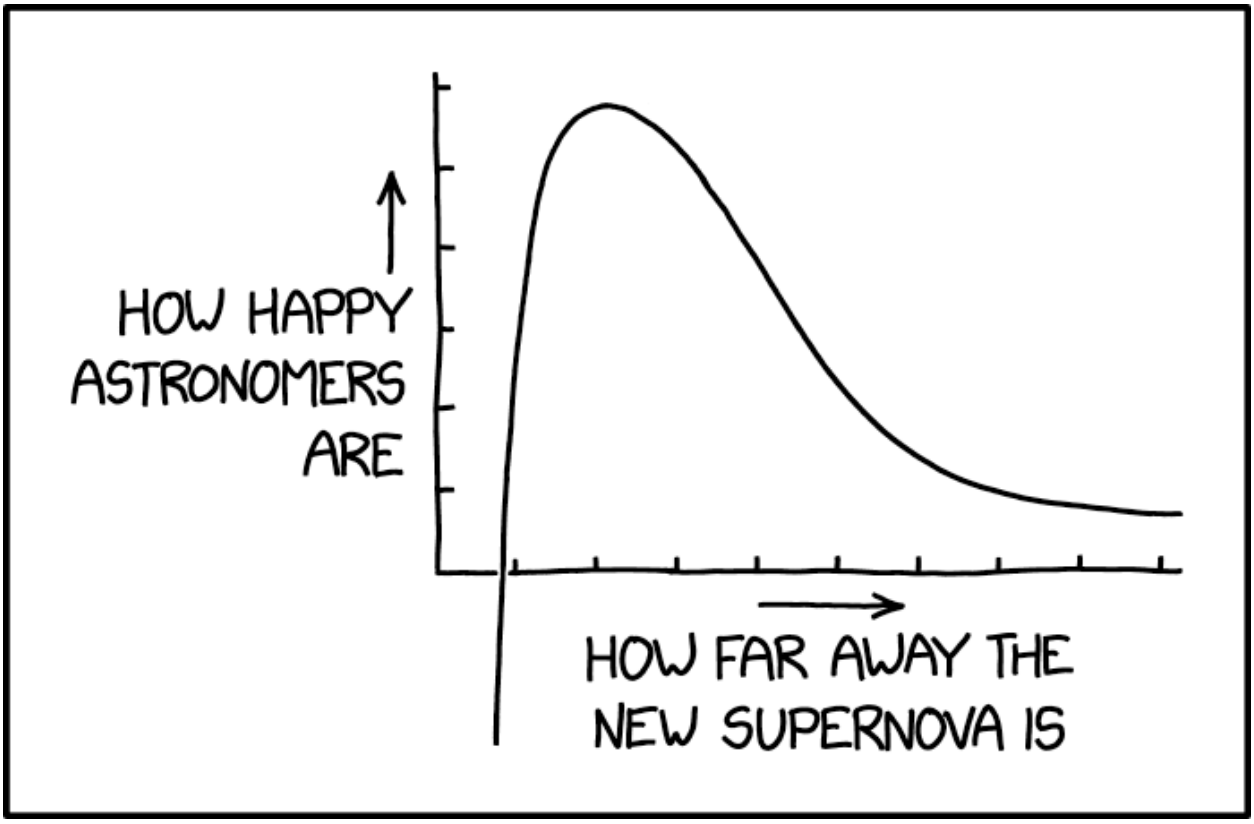
Rick Johnson

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.

ARP63, continued.

much brighter pair of galaxies that is Arp 129 just to the northeast. Since his position and description matches Arp 63 there's no question he meant Arp 63 rather than 129 as some sources claim.

While nearly all my full-size images (2004x1336 pixels) are displayed at 1" per pixel this one was taken half-frame at 0.5" per pixel and is displayed at that resolution even though the night didn't really support more than about my normal 1" resolution.



Xkcd.com

February Observing

Jim Kvasnicka

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

Planets

Venus: In the morning at magnitude -3.9.

Mars: Too low and dim to be seen in the morning.

Jupiter: In Aries at magnitude -2.4 with a disk 39.7" wide.

Saturn: Very low in the west in the evening, not visible by the end of the month.

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

Neptune: Lost in the evening twilight.

Mercury: Not visible

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

Urban Observing Program

The Urban Observing Program is designed to bring amateur astronomy back to the cities and suburbs, those areas impacted by heavy light pollution. Amateur astronomy used to be called "backyard astronomy". This was before light pollution became such a problem. It's not uncommon today for a person to travel 100 miles to enjoy the hobby of astronomy.

For the Urban Observing Program, the observer is required to observe the 100 objects on the Urban Program list from light polluted skies. Light polluted skies are defined as any area where you cannot see the Milky Way with the naked eye. You can use any telescope to observe the objects on the list, but a 6-inch aperture is recommended. Previous observations of any of the 100 objects from dark sky locations will not count. You can use any method to find the objects including GO-TO and PUSH-TO.

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

The list of 100 objects is divided into categories, one for deep sky objects and one for double and variable stars.

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

If you have any questions regarding the Urban Observing Program or any other observing program, or need help getting started please contact me and I will be glad to help.

Jupiter's Volcanic Moon Io on Dec. 30

The orbiter has performed 56 flybys of Jupiter and documented close encounters with three of the gas giant's four largest moons.

NASA's Juno spacecraft will on Saturday, Dec. 30, make the closest flyby of Jupiter's moon Io that any spacecraft has made in over 20 years. Coming within roughly 930 miles (1,500 kilometers) from the surface of the most volcanic world in our solar system, the pass is expected to allow Juno instruments to generate a firehose of data.

"By combining data from this flyby with our previous observations, the Juno science team is studying how Io's volcanoes vary," said Juno's principal investigator, Scott Bolton of the Southwest Research Institute in San Antonio, Texas. "We are looking for how often they erupt, how bright and hot they are, how the shape of the lava flow changes, and how Io's activity is connected to the flow of charged particles in Jupiter's magnetosphere."

This image revealing the north polar region of the Jovian moon Io was taken on October 15 by NASA's Juno. Three of the mountain peaks visible in the upper part of image, near the day-night dividing line, were observed here for the first time by the spacecraft's JunoCam.Credit: Image data: NASA/JPL-Caltech/SwRI/MSSS, Image processing by Ted Stryk

Io, continued.

A second ultra-close flyby of Io is scheduled for Feb. 3, 2024, in which Juno will again come within about 930 miles (1,500 kilometers) of the surface.

The spacecraft has been monitoring Io's volcanic activity from distances ranging from about 6,830 miles (11,000 kilometers) to over 62,100 miles (100,000 kilometers), and has provided the first views of the moon's north and south poles. The spacecraft has also performed close flybys of Jupiter's icy moons Ganymede and Europa.

"With our pair of close flybys in December and February, Juno will investigate the source of Io's massive volcanic activity, whether a magma ocean exists underneath its crust, and the importance of tidal forces from Jupiter, which are relentlessly squeezing this tortured moon," said Bolton.

Now in the third year of its extended mission to investigate the origin of Jupiter, the solar-powered spacecraft will also explore the ring system where some of the gas giant's inner moons reside.

Picture This

All three cameras aboard Juno will be active during the Io flyby. The Jovian Infrared Auroral Mapper (JIRAM), which takes images in infrared, will be collecting the heat signatures emitted by volcanoes and calderas covering the moon's surface. The mission's Stellar Reference Unit (a navigational star camera that has also provided valuable science) will obtain the highest-resolution image of the surface to date. And the JunoCam imager will take visible-light color images.

JunoCam was included on the spacecraft for the public's engagement and was designed to operate for up to eight flybys of Jupiter. The upcoming flyby of Io will be Juno's 57th orbit around Jupiter, where the spacecraft and cameras have endured one of the solar system's most punishing radiation environments.

"The cumulative effects of all that radiation has begun to show on JunoCam over the last few orbits," said Ed Hirst, project manager of Juno at NASA's Jet Propulsion Laboratory in Southern California. "Pictures from the last flyby show a reduction in the imager's dynamic range and the appearance of 'striping' noise. Our engineering team has been working on solutions to alleviate the radiation damage and to keep the imager going."

More Io, Please

After several months of study and assessment, the Juno team adjusted the spacecraft's planned future trajectory to add seven new distant Io flybys (for a total of 18) to the extended mission plan. After the close Io pass on Feb. 3, the spacecraft will fly by Io every other orbit, with each orbit growing progressively more distant: The first will be at an altitude of about 10,250 miles (16,500 kilometers) above Io, and the last will be at about 71,450 miles (115,000 kilometers).

The gravitational pull of Io on Juno during the Dec. 30 flyby will reduce the spacecraft's orbit around Jupiter from 38 days to 35 days. Juno's

Io, continued.

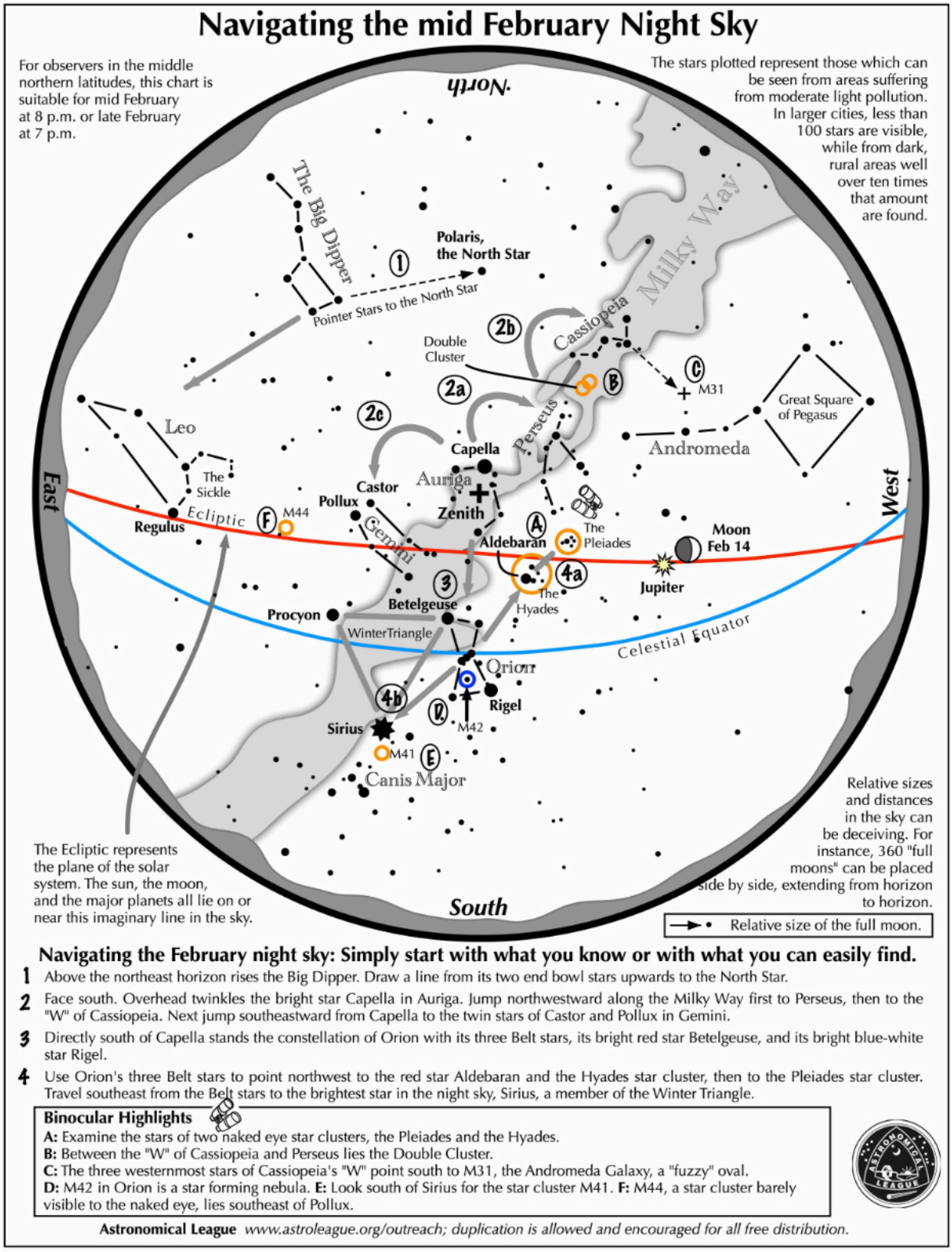
This image of Jupiter's moon Io was taken by the JunoCam visible-light imager as NASA's Juno spacecraft flew past the Jovian moon on October 15, 2023. A plume over the location of the volcano Prometheus can be seen just standing out from the darkness on the left side of the image, just below the terminator (the line dividing day and night).

More information about Juno is at https://www.nasa.gov/juno and http://missionjuno.swri.edu. For more about this finding and other science results, see https://www.missionjuno.swri.edu/science-findings.

A Spiral Amongst Thousands

A crowded field of galaxies throngs this Picture of the Month from the NASA/ESA/CSA James Webb Space Telescope, along with bright stars crowned with Webb's signature six-pointed diffraction spikes. The large spiral galaxy at the base of this image is accompanied by a profusion of smaller, more distant galaxies which range from fully-fledged spirals to mere bright smudges. Named LEDA 2046648, it is situated a little over a billion light-years from Earth, in the constellation Hercules.

Navigating the Mid-February Night Sky



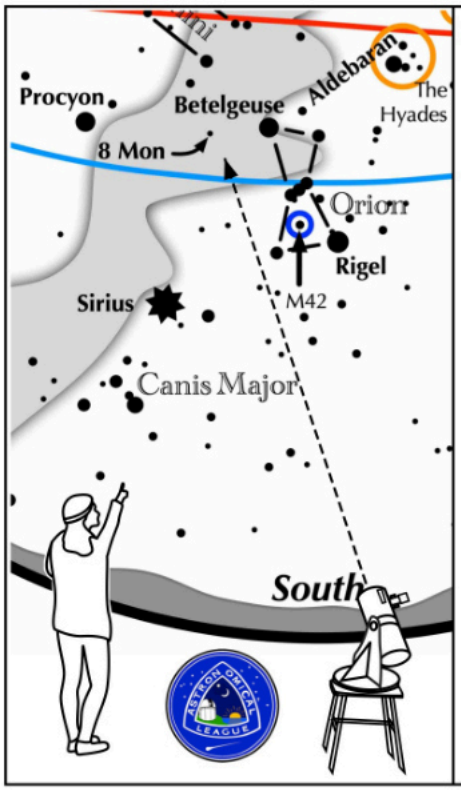
Navigating the February night sky: Simply start with what you know or with what you can easily find.

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's Double Star Activity



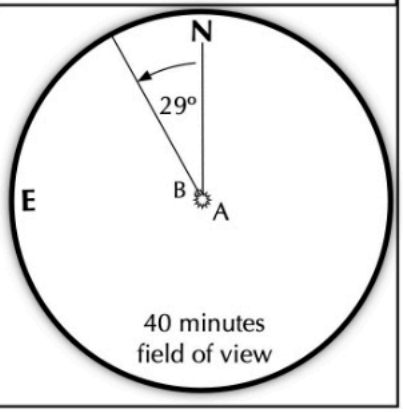
Other Suns: Epsilon (8) Monocerotis

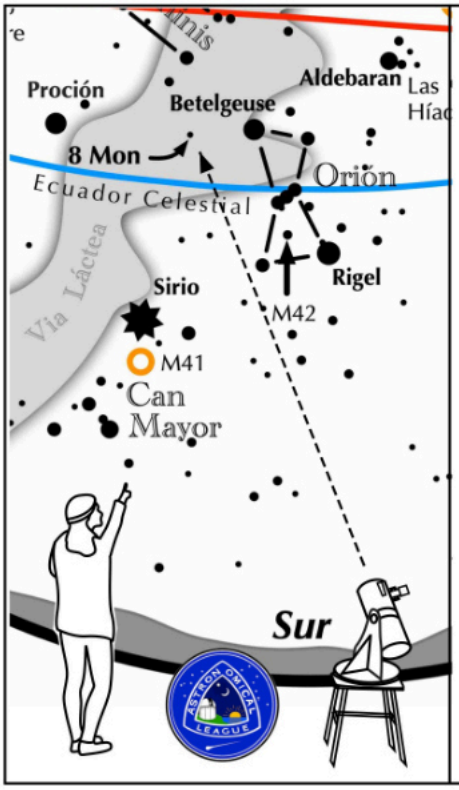
How to find Epsilon Monocerotis on a February evening

Face south. Look for the Winter Triangle stars of Betelgeuse and Procyon. Epsilon Monocerotis is about 1/3 between Betelgeuse and Procyon. It is a 4.3 magnitude star so dark skies are needed to spot it.

Suggested magnification: >20x
Suggested aperture: >3 inches

Epsilon (8) Mon
A-B separation: 12 sec
A magnitude: 4.4
B magnitude: 6.6
Position Angle: 29°
Colors:
white
lilac





Otros Soles: Epsilon (8) Monocerotis

Cómo encontrar a Epsilon Monocerotis en una tarde de Febrero

Mira hacia el sur. Busque las estrellas del Triángulo de Invierno de Betelgeuse y Proción. Es una estrella de magnitud 4,3 por lo que se necesitan cielos oscuros para detectarla.

Ampliación sugerida: >20x,
Apertura sugerida: >75 mm

Epsilon (8) Mon
A-B separación: 12 sec
A magnitud: 4.4
B magnitud: 6.6
PA: 29°
Colores:
blanca
lila

Astronomical League Outreach

The Astronomical League
www.astroleague.org/outreach

Our Moon
Apparent Diameter:
30 arc minutes = 1800 arc seconds
True Diameter: 2160 miles
Average distance from Earth:
240,000 miles

Langrenus: 82 miles in diameter,
and about the same apparent size as Jupiter!

Section of the waxing crescent moon when it is four days past new.

The Need for Telescopes

Our solar system is very large and the planets are very far away. So far that, even though some of them are much larger than Earth, their angular sizes are qite small. Consequently, they always appear star-like to the unaided eye. A telescope is required to magnify their pinpoint appearances, making them visible as small disks for study. Magnifications of greater than 100 power are often needed.

Compare the relative apparent sizes of the moon and the bright planets with this circle which represents a typical low-power field of view. In many low-power eyepieces, the moon is about the same size as the field of view.

Mercury *(greatest elongation)*

Venus (greatest brilliancy)

Mars *(closest)*

Mars *(farthest)*

Callisto

Jupiter
and its four large moons
Callisto, Ganymede, Io, and Europa

Ganymede

Io

Europa

Saturn
and its rings and its large moon Titan

We all know how large the moon appears in our sky. While Venus, the planet that approaches closest to Earth, has a true diameter of over three times that of our moon, it is always at least 108 times farther away. As a result, its small angular size in the sky is comparable to the apparent sizes of the larger lunar craters. The other planets appear even smaller.

	Apparent Diameter (arc sec)	Actual Diameter (miles)	Distance at closest approach (miles)
Mercury (closest)	10	3025	57 million
Venus (closest)	60	7500	26 million
Earth	---	7900	---
Moon	1800	2160	220,000
Mars (closest)	25	4200	35 million
Jupiter	47	88,000	390 million
Saturn (planet)	19	75,000	794 million
Saturn (rings)	40	155,000	794 million

PAC Holiday Gathering

From the Archives

January, 1989

View the Sun!

By Rick Johnson

Talking to club members I am surprised that no one seems to be watching the sun. Earlier this week (Jan 16, 1989) there were two sunspot groups large enough to be seen naked eye. Did anyone else see them? We are in the midst of the greatest solar activity I have seen in my 35 years of sun watching but no one is looking!

All you need is a pair of binoculars. You can easily project an image (two in fact) of the sun with any pair of binoculars. The farther you project the image the larger, and fainter, it will be. I find a 10 power pair of binoculars projected about 5 feet is sufficient to see most sunspot groups and the larger individual sunspots. Cover one lens and put cardboard around the binoculars so they cast a large shadow in which to project the image. Don't try to make the image much larger than 3 times the diameter of the front lens of the binoculars as the image will tend to be too dim.

Of course a small 2.4" telescope is ideal for sun watching. Most of the time in Nebraska the seeing by day isn't very good and a 2.4" will show about as much detail as you will ever see. On a good day you might find a 3" will show a bit more detail. I am working at 3-5” and only once in the last 18 months has the seeing reached the point where I saw all the aperture was capable of delivering.

Again eyepiece projection is the best bet. If you want to view direct the cheapest way is to get Solar Skreen material from Tuthill. A piece big enough for a telescope is only about $29 and can be held on with a rubber band. Those with 'scopes much larger than 3R should be wary of eyepiece projection unless the mirror is stopped down to about 3" as the heat buildup In the eyepiece can do damage. A telescope can project an image for a few minutes without harm but be sure to check for heat buildup in the eyepiece. Don't try to go more than 5 minutes without a cool down period or your eyepiece will slowly degrade as the balsam cement between the elements overheats. I ruined a good 16mm Orthoscopic eyepiece that way. A two element uncemented eyepiece will be less prone to heat damage. Lately I have been using a very inexpensive eyepiece for projection. For some reason you can't seem to hurt the cheap ones, but the expensive ones die a quick death! If you don't have a clock drive watch out that you don’t drift off of the sun. When you do the nearly focused light and tremendous heat will now be hitting the inside of your telescope. I use a 4” stop on my 10” telescope

Archives, continued.

when projecting the sun's image and one day forgot the drive was turned off as I went inside for a minute. When I came back out smoke was pouring from the tube assembly. I had nearly burned down my 'scope as the epoxy resins in the fiberglass tube had nearly reached the ignition point! The smoke did so coat my mirrors they had to be realuminized as the stop held in the smoke which settled on the cool mirrors! Solar Skreen prevents heat from ever entering your 'scope in the first place so it does have that advantage over projection methods.

Of course I do most of my viewing in H-alpha light with my T-Scanner filter from DayStar which I reported on last year. While white light activity is such that the sun shows a different face each day in H-alpha light it shows a different face every 5 minutes! On January 17, 1989, I tried to count the filaments I saw on the sun's disk but kept getting lost there were so many. There were over 70 of them and the total might have been as high as 100! Going through all the sun pictures I have and that we have at Hyde I could find no full disk picture of the sun with more than 15 filaments and I looked at nearly 100 such observatory photos supposedly taken at or near maximum solar activity! The following day Dave Knisely and I watched as three flares, two of which were larger than any I had ever seen, blew up all at the same time near the area where the filaments were most dense the day before. larger of the flares even made the national news (ABC radio, anyway) and so far is the only flare I have seen that was mentioned by WWV. This time signal station gives a solar activity broadcast at 18 minutes after the hour. Tune to 10 or 15 MHz by day and 2 or 5 Mhz by night on a shortwave radio to hear the station.

Filaments are dark, linear features seen against the sun's disk. They are really prominences seen against the chromosphere. When a filament goes up to the edge of the sun it then continues as a prominence over the limb as it is seen against the dark background of space. They come in two types, quiescent and active. As its name implies, the former just sits there and does nothing, changing little from day to day as the solar rotation carries it eastward. The active ones can come and go in a matter of minutes to hours. It turns out the "smokestacks" I mention in my T-Scanner article last year are a type of active filament known as an eruptive prominence. They are heavily blue shifted as the erupting hydrogen is rising very very rapidly from the surface of the sun. Gas then flows along the magnetic field lines as it thins out. The denser highly confined gas makes a jet black spot, the smokestack, while the thinning less dense gas flowing along the magnetic field lines are the smoke coming from the smokestack. These

Archives, continued.

gases, while moving rapidly are moving mostly parallel to the viewer, so are not blue shifted. This too makes them appear like smoke because the filter isn't tuned to their exact frequency. Anyway the "smokestack" mystery is now solved.

I have found I can do a fairly good job of photographing the flares and other disk activity in H-alpha and white light using a video camera. At least one that Jack Dunn loaned me for a couple days did catch a small flare from start to finish. I hope to have this at a meeting in the near future. Maybe then I'll start to get some of you interested in solar viewing. You can do it from your backyard any sunny day which means far more hours of viewing than you'll ever find time for at night.

You don't need a large telescope and finding the sun is rather easy even without a star chart. Just remember to cover up your finder 'scope so you don't burn out the crosshairs! Then watch the shadow of the 'scope. It will be the smallest possible and perfectly round (if you have a perfectly round tube assembly) when pointed at the sun. I view the sun around noon every clear day so anyone interested in seeing the sun in H-alpha light is welcome. It's a shame to watch something spectacular on the sun and know that everyone else is missing something unique that will never be seen again! This is the big excitement of solar viewing. Every time I look in the eyepiece I see something different and usually unexpected, even if I looked 5 minutes ago! Dave came up on the 18th and the sun wasn't doing much so we went inside to view the flare on tape. We were inside only a few minutes but when we went back out to the telescope the previously inactive sun had three spectacular flares all blowing up at the same instant! Will I ever see three flares at one time again? I doubt it as none of the pictures of the sun I have seen even show two going off at once let alone three! No other type of amateur astronomy can offer such sudden and unexpected excitement. But knowing that the maximum activity is yet to come does make the heart beat a bit faster for maybe next time I'll see FOUR flares at once!

Muddy Mounds

The northern lowlands of Mars in this location are stippled with mounds, such as those visible throughout this image. These lighter-toned circular mounds with bowl-shaped depressions are easy to spot against the darker-toned floor. Scientists think these landforms are similar to mud volcanoes that are also found here on Earth.

Mud volcanoes form as gas and liquid-rich sediment interacts underground. Over time, this slurry of mud is brought to the surface and forms a rounded mound. Scientists are interested in studying mud volcanoes on Mars because the material forming the mound has the potential to be organic in nature and would give insight into possible microbial life below the surface. The map is projected here at a scale of 50 centimeters (19.7 inches) per pixel. (The original image scale is 59.8 centimeters [23.5 inches] per pixel [with 2 x 2 binning]; objects on the order of 180 centimeters [70.9 inches] across are resolved.) North is up. The University of Arizona, in Tucson, operates HiRISE, which was built by Ball Aerospace & Technologies Corp., 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

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

info@prairieastronomyclub.org

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