

# ***The Prairie Astronomer***

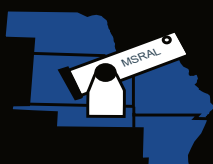
**November 2024 Volume 65, Issue #11**



*Joseph O. Flaherty*  
PHOTOGRAPHY

## **IN THIS ISSUE:**

Calamus Star Party  
Astrophotography  
Voyager 2 Data Solves Several Uranus Mysteries  
Spot the King of Planets



**Night Sky Network**



The Newsletter of the Prairie Astronomy Club



# *The Prairie Astronomer*



The next club meeting is November 26th at 7:30pm at Hyde Observatory

## NEXT MEETING AND PROGRAM

The program for the November meeting will be “How to Buy a Telescope.” Every holiday season people ponder buying telescopes as gifts, for their children, for their family or for friends. The few designs found in most department stores offer little information and clerks are rarely knowledgeable. Buying on the Internet or home shopping channels without any help doesn’t inspire confidence. What if you had a chance to have help in making that purchase?

The Prairie Astronomy Club offers this assistance this month at its regular meeting at 7:30pm at Hyde Observatory on Tuesday, November 26th with a session on “how to buy a telescope.” Experienced amateurs will provide examples of both the good and bad purchases and lots of helpful hints.

## UPCOMING PROGRAMS

January: How to Use Your Telescope

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*Cover: M33 - Triangulum Galaxy - by Jason O’Flaherty*

*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.

*November PAC Meeting  
Tuesday, November 26<sup>th</sup>, 7:30pm at Hyde Observatory  
Program: How to Buy a Telescope*

*December: Holiday Gathering, date to be announced*

*January PAC Meeting  
Tuesday, January 28<sup>th</sup>, 7:30pm at Hyde Observatory*

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

**Night Sky Network**



[www.prairieastronomyclub.org](http://www.prairieastronomyclub.org)

## 2025 STAR PARTY DATES

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

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

## CLUB OFFICERS

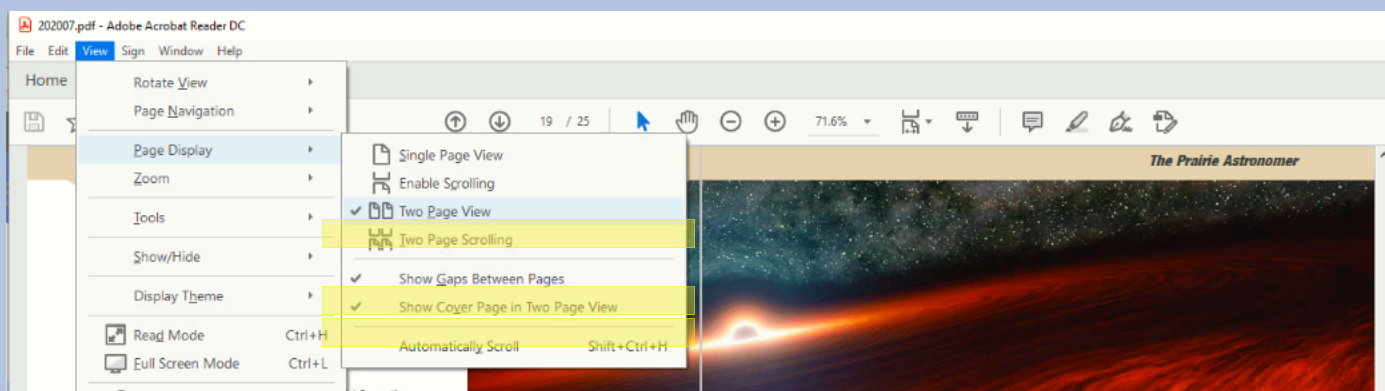
President	Jason O'Flaherty jflaher@gmail.com
Vice President	Brett Boller proboller86@yahoo.com
2nd VP (Program Chair)	Lee Taylor otaylor88@gmail.com
Secretary	Jim White jrwhite2188@gmail.com
Treasurer	John Reinert jr6@aol.com
Club Observing Chair	Jim Kvasnicka jim.kvasnicka@yahoo.com
Outreach Coordinator	Don Hain dhain00@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/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](mailto:pac-list@googlegroups.com)



# The President's Message

*Jason O'Flaherty*

Dear PAC Members,

As the year comes to a close, the club's activities are winding down, but we still have a few key updates and events to share.

On Tuesday, November 26th, in place of our usual meeting, we'll host our annual "How to Buy a Telescope" class. This free class is perfect for anyone considering purchasing a telescope. We've created a Facebook event to help spread the word, so please share it with anyone interested. Due to the class, our club meeting will include only the Observing Report and essential information. It should be less than five minutes long, allowing late arrivals a small buffer before we start the class. There won't be a Zoom option for this class—it will be in-person only. Even if you're already familiar with the content, I encourage you to attend to support our presenters and help answer questions from

the public. Your participation is always appreciated.

Looking ahead, instead of a December meeting at Hyde, we're planning to hold our annual Holiday Party at a local restaurant. I'm tentatively targeting Tuesday, December 17th, but watch your email for an official date and time. In January, weather permitting, we'll replace our meeting with the "How to Use Your Telescope" class on the lawn at Hyde. This is a great opportunity to help members of the public learn to use their telescopes. You're also welcome to bring your own telescope and enjoy some stargazing. We'll return to our regular meeting schedule in February.

On a different note, I want to thank everyone who has been submitting astrophotography images for the newsletter. The increase in photo submissions has been fantastic to see, and it's clear we have a



lot of talented photographers in our club. To ensure that everyone gets a chance to be featured and to keep the newsletter manageable, our editor, Mark, may need to limit the number of photos published per person each month. With this in mind, please consider submitting just a couple of your favorite images or stagger them across several months if you had an exceptionally productive month. If you're submitting an article, you're welcome to include more photos to support your story.

When submitting standalone photos, please include details about how you captured and processed the image. For example, sharing information such as the number of stacked frames, exposure time, equipment, software used, or edits applied can help others learn

## The President's Message, continued

from your experience.

Finally, the newsletter aims to be factually accurate, so submitted photos should reflect real astronomical events or objects. Artistic edits such as adjusting hue, saturation, contrast, stacking, or cropping are always welcome.

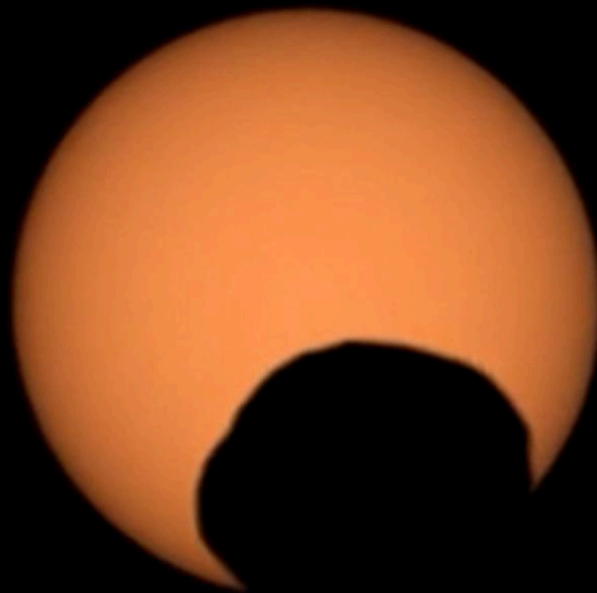
However, significant alterations—like moving the moon to a different location or replacing the sky—may not be included to ensure the newsletter remains a reliable resource for future reference.

Thank you for your ongoing newsletter

contributions and for supporting the club's activities. I look forward to seeing you at the upcoming events and wrapping up another great year for PAC.

Clear skies,

Jason O'Flaherty



*Perseverance Captures Transit of Phobos. NASA's Perseverance rover captured the silhouette of the Martian moon Phobos as it passed in front of the Sun on Sept. 30, 2024.*

*Credit: NASA/JPL-Caltech/ASU/MSSS*



# Hyde Observatory Needs You!



## Volunteer at Hyde

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



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



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

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

# Meeting Minutes

*Jim White*

October 29, 2024

Jason O'Flaherty started the meeting at 7:32 pm. There were no guests or new members at tonight's meeting.

Jason turned the meeting over to Jim Kvasnicka, PAC's Observing Chair, for his monthly observing report at 7:34 pm. Star parties for this month will be held at the Clatonia Recreation Area and are scheduled for 11/1/2024, 11/22/2024 and 11/29/2024. The planets for November, Mercury is an evening planet but it is not placed very well for viewing, Venus is an evening planet at magnitude -4.1, Mars will be in Cancer at -0.2 with a disc that is 10 arc seconds wide, Jupiter is in Taurus at magnitude -2.7 and its disc is 47.25 arc seconds wide, Saturn is in Aquarius at magnitude +0.9 and its disc is 18 arc seconds wide, Uranus can be found in Taurus and Neptune can be found in Pisces. The Leonid's Meteor Shower is in November and peaks the nights of the 17th and 18th but the full moon

will be up and interfere with viewing. Comet Tsuchinshan-Atlas is still visible and you should be able to see it with a telescope until mid-December. Jim's complete viewing report can be found in this newsletter.

Jim has a few observing rewards to present tonight to Brett Boller.

Jim presented Brett with

-Hydrogen Alpha Solar Observing Program Award

-2023 Solar Eclipse Special Observing Award

-2024 Solar Eclipse Special Observing Award  
Congratulations Brett!

Jim completed his presentation at 7:39 pm and turned the meeting over to John Reinert for his treasurer's report.

John reported that the clubs' balances are as follows;

Checking \$4,925.79

CD1 \$27,395.12

CD2 \$5,313.13

PayPal \$99.23

Total \$37,733.27

Our balances are \$701.27 higher than last month, approximately half of that was from interest and the rest was due to new members that have joined the club. John got the Astronomical League Roster updated and there have been some issues with the Night Sky Network Database. John said that there is a way to have The Reflector mailed to you or have it sent to you electronically so if you would like to change your settings, please see John. You can also go to the Astronomical League website and look at current and past issues of The Reflector. The topic was brought up about whether or not any decision has been made on annualizing the dues to a particular time of the year instead of at the members anniversary date. John wants to hear from members about what they think about this so that he has some input when the board meets. Jason said that we do have some information that we have accumulated through some surveys that have



been sent out so we do have some information to work with when the board meets. At 7:43 pm John finished his report and turned the meeting back over to Jason.

Club business for tonight is election of officers. Jason asked the membership if there were anymore nominations for officers, after a brief pause and no new nominations Jason asked if he good get a motion to close nominations which was given and seconded.

With nominations closed we proceeded directly to elections.

Jason O'Flaherty was the only nominee for President and Jason was re-elected as President by unanimous vote.

Brett Boller was the only nominee for First Vice President and Brett was re-elected as First Vice President by unanimous vote.

Lee Taylor was the only nominee for Second Vice President and Lee was elected as Second Vice President by unanimous vote.

Jim White was the only nominee for Secretary and was re-elected as Secretary by unanimous vote.

John Reinert was the only nominee for Treasurer and was re-elected as Treasurer by unanimous vote.

It was announced that past member Delmar Motycka passed on 10/4/2024 at the age of 95 and is survived by his wife of 68 years, Darlene and daughters, a son, a grandson and great grandsons. His obituary can be seen at Delmar Motycka Obituary (1929 - 2024) - Lincoln, NE - Lincoln Journal Star.

November's meeting will be held at Hyde Observatory and will be our annual "How to Buy a Telescope" meeting meant for anyone who may be in the market to buy a telescope during the upcoming Holiday season and is in need of some advice and to see some examples of what you can buy in today's market.

There will be no December club meeting

due to the upcoming Holidays but we will be planning on having a get together for dinner at sometime during the month, more news on this to follow at a later time.

Starting on November 1st and running through the 30th of November will be an art show by club member and newsletter editor Mark Dahmke and Steven DeLair called "Convergence Exhibition, works by Mark Dahmke and Steven DeLair" presented by WallSpace-Lnk Fine Arts Gallery and Salon located at 1624 S 17th Street, Suite 300 Lincoln, NE 68502. Dates and hours vary so please see [www.Lincoln.org](http://www.Lincoln.org) for more information.

Tonight's meeting ended at 7:54.

Tonight's program is by Frank O'Brien, titled "Flying to the Moon, The Apollo Guidance Computer". Frank is a NASA Solar System Ambassador.

# Calamus Star Party, October 31 - November 3

Bob Kacvinsky

During the last new moon cycle, 5 PAC members – Brett Boller, Jim Kvasnicka, Jim White, Jason O’Flaherty, Bob Kacvinsky – and special guest John Spack (Chicago) spent 4 nights together on the north shores of Calamus Reservoir near Burwell. This was our 4th fall/spring visit to this dark sky site over the last 3



years.

Jim K and Bob K were working with their 16” Dobs on several projects but mostly focusing on beginning the Open Cluster AL program.

John S was enjoying views in his 18” Obsession Dob. Brett, Jim W, and Jason were working on Astro Photography projects.

Recap. Thursday night (31st) was a good night with mid-tier seeing and transparency. The high winds and drought conditions had deteriorated our skies in Nebraska all summer, and Burwell was no exemption. By 1:30 am we hit the dew points, and our skies faded so most of us were shut down by 2:30 am. Friday night was a much better night with above average conditions. We were able to observe until frost hit us around 2:30 pm. Saturday night was a rainout and Sunday looked that way, but we had good skies until around 10 pm when clouds appeared. We had the proverbial “cherry hole” in the large cloud cover.

Bob K while working on the OC Program was running the SeeStar continuing to test the range and ability of the small telescope. Open clusters prove to be a

trade off between enough light to gain highlights and too much light that washes out the image. Galaxies vary from excellent views to being too dim or too bright to bring in details. This is similar to issues with OCs. Nebulas continue to provide the most impressive images from the SeeStar. The uniformity of brightness across many nebula allow the enhancing of details without “washing out” from brighter sections.

Jason provided tutorial help with editing of the SeeStar images. There is a learning curve as with all Astro Photo work, but tweaking the image information can help draw out details. Attached are some





## Calamus Star Party, continued



examples of simple edited photos. On Sunday night, John S and Bob K spent most of the football game in comfort jumping between objects on their SeeStars positioned out in the yard. Being able to observe “remotely” and instantly sharing (John was sending new photos while capturing the next object) is much of the appeal of the new small EV scopes. EV scopes can not replace the awe of visual observing, but they do provide the ability to share the experience with others.

Jim and Bob were

focusing on the AL’s Open Cluster Program. This listing has not been completed by previous PAC members. The challenge is many of the OCs in the list are in remote areas or are dim small clusters buried within the milky way’s star density or overwhelmed by brighter OC in the vicinity. This is a great program for those looking for a challenging program.

Star parties are great opportunities to get together to further friendships around common interests. It is not just about observing together, but as an

example the Calamus trip included 6 to 9 disc golf games, dice games, sports viewing, and extensive shared learning from each other. There are numerous star parties throughout the Midwest for members to get more involved with our great hobby. Maybe it is time for you to step out and gain the great experiences star parties offer. You will not be disappointed. If you would like some suggestions on where to go, please just ask. The universe awaits.



# ARP 73

## *The Mantrap Skies Image Catalog*

Arp 73 is a pair of galaxies in Northern Hercules at about 415 million light-years. It falls under Arp's class "Spiral Galaxies with Companions on Arms: Small, high surface brightness companions." Their general catalog names are IC 1222 and SDSS J163514.15+461232.6 right to left. IC 1222 is classed by NED as SAB(s)c. Arp's comment: "Arm leads toward, but not up to companion." In my image it looks like the arm does pass by the companion and overlaps the tidal arm toward IC 1222. That seems in conflict with Arp's comment unless he was talking only about the core of the companion. I find no classification of the companion. It reminds me of M110 and its tidal arms due to M31 though the arms of M110 are fainter. NGC 1222 was discovered by Lewis Swift on July 10, 1890 as was IC 1221 discussed below.

When taking this image I knew IC 1221 was at the very top but thought I'd left enough room for it. But





## 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](http://www.mantrapskies.com).*



## ARP73, continued

after seeing the full 10 minute subs the next day I realized it had a faint arm that stuck out from the others that came off the eastern side and went nearly straight north out of frame before curving west. I tried retaking the data the following night but seeing was a good 1" worse so after two frames I quit the effort. Somehow I forgot about it until starting to process it some 8 months later.

Thus I missed the interesting part of IC 1221. It is unrelated to Arp 73 being only 250 million light-years away. NED shows it as an Sd spiral. To the northeast of Arp 73 is a small galaxy that appears to be a neighbor as it has a distance of 425 million light-years. Then to the west-northwest of Arp 73 is SDSS

J163357.26+461701.6 at 415 million light-years, the same distance as Arp 73. Directly below it is another member of the group, SDSS J163353.82+460932.2 at 412 million light-years.

I've attached an annotated image with the distance to Galaxies and Quasars listed. Just

southeast of Arp 73 is a quasar candidate so I used QC to identify it. Seems that it isn't a point source and is elongated from the southeast to the northwest. My software reports it has a FWHM diameter of 2.89" while the stars in the area average about 2.1" with the largest being 2.25". Well under this object. So I am seeing a galaxy here that might contain a weak quasar or AGN of some type at least. Then toward the east-northeast edge of the image is yet another quasar candidate with a FWHM of 2.7" while all the stars around it are about 2.1". This would again indicate something that is not a point source as you'd expect a quasar to be. This one is 3 billion light-years distant.

Also marked on the annotated image is a candidate galaxy cluster listed as NSC

J163438+462142 at 1.8 billion light-years.

Unfortunately no size or galaxy count is given. I've noted the position of the center of the cluster (just south of NGC 1221) but there's nothing right there. Most galaxies in the area have no red shift

data. Of those that do, one south of the location is at 1.7 billion light-years and likely a member. What about those around it? The only other ones with red shift data are far beyond the cluster's distance. I wish I had more information. A far better galaxy cluster with information is found in the lower left corner of the image, ZwCl 1635.0+4613 at 3.1 billion light-years. I've noted what is said to be the center of the cluster. Many galaxy clusters have a one or two large elliptical galaxies that anchor the cluster. Those appear just south of the center. They likely get to be the big gorillas of the cluster by feeding on smaller members. The cluster contains some 196 members in a 15 minute radius of the center. I found no red shift data on individual galaxies in the cluster.

As usual, I have a blue, low surface brightness galaxy that the SDSS has either missed or NED isn't including. It is in the northeastern quadrant and identified by a question mark. Note that right on its north edge is a star-like object. That is



## ARP73, continued

at the exact location (to 0.05" of arc by my plate solve) of the position of SDSS

J163631.38+461934.7 a 22nd magnitude galaxy.

There must be a systematic reason why these galaxies are missed but I don't know what it is. Yet another of these is at the top edge on the left. Again marked by a question mark. The galaxy below the question mark, almost

providing the dot is 16h35m55.7s +46d23m02s a 20.5 magnitude galaxy.

SDSS image of Arp 73

<http://astronomerica.awardspace.com/SDSS-5/IC1222.php>

SDSS image of IC 1221 showing the arm I cut off

<http://astronomerica.awardspace.com/SDSS-5/IC1221.php>

Arp's image, very different than mine. At first I thought I'd imaged the wrong galaxy until I looked more closely. His is under exposed compared to mine.

[http://ned.ipac.caltech.edu/level5/Arp/Figures/big\\_arp73.jpeg](http://ned.ipac.caltech.edu/level5/Arp/Figures/big_arp73.jpeg)



# December Observing

*Jim Kvasnicka*

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

## Planets

Venus: Bright evening planet at magnitude -3.9. Sets four hours after sunset.

Mercury: Inferior conjunction on December 6. Becomes a morning planet at the end of the month.

Mars: In Cancer at magnitude 0.0 with a disc 9.6" wide.

Jupiter: In Taurus at magnitude -2.6 with a disc 46.7" wide.

Saturn: In Aquarius at magnitude +0.9 with a disc 18.2" wide.

Uranus and Neptune: In Taurus and Pisces.

## Meteor Showers

Geminids: Peaks the night of December 13-14, the almost full Moon will interfere.

## Messier List

M2: Class II globular cluster in Aquarius.

M15: Class IV globular cluster in Pegasus.

M29: Open cluster in Cygnus.

M31: The Andromeda Galaxy.

M32/M110: Companion galaxies to M31.

M39: Open cluster in Cygnus.

Last Month: M27, M30, M56, M57,

M71, M72,  
M73

Next Month:

M33, M34,  
M52, M74, M76, M77, M103



## NGC and other Deep Sky Objects

NGC 578: Elongated galaxy in Cetus.

NGC 779: Elongated galaxy in Cetus.

NGC 869/884: The Double Cluster in Perseus.

NGC 972: Galaxy in Aries.

NGC 1187: Galaxy in Eridanus.

## Double Star Program List

Eta Cassiopeiae: Yellow primary with a rose-colored secondary.

Sigma Cassiopeiae: Yellow and light blue stars.

Theta Aurigae: Bright white and pale blue pair.

1 Camelopardalis: White and pale blue stars.

32 Camelopardalis: Equal white pair.

Gamma Ceti: White primary with a pale-yellow secondary.

Chi Tauri: White primary with a pale blue secondary.

118 Tauri: White and yellow stars.

## Challenge Object

NGC 697 Galaxy Group: Group of six galaxies in Aries that include NGC 678, NGC 680, NGC 691, NGC 694, NGC 695, and NGC 697.

# Focus on Observing Programs

*Jim Kvasnicka*

## *Lunar II Observing Program*

Many avid lunar observers have voiced their desire for a second, more challenging program to follow the popular Lunar Observing Program. In response the Astronomical League created a program for experienced lunar observers called the Lunar II Observing Program. The new program will require you to make at least 100 observations of the Moon. It is designed to improve your observing skills and expand your knowledge of the visible lunar surface. Prominent features will be revisited, observing them in greater detail and in varied sunlight. Some new lunar targets have been added. Some of the observations will be easy and some will be challenging and require greater observing skill. Participants will also be required to create a small, basic map of the visible face of the Moon.

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

1. Previously completed all of the Lunar Observing Program requirements.
2. Complete 100 or more of the observing tasks from the Lunar II target list.

Go to the Astronomical League website and go to Observing Programs, once you are there find the Lunar Program and you can print out the observing log that has all 100 features for you to observe. The observing log is easy to use, just check off when you observe a feature and list the date and time.

It helps to have a good lunar map to use when doing the Lunar Program. There are some good maps you can purchase or you can find some on line to download.

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

If you have any questions regarding the Lunar 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

*"You know Orion always comes up sideways.  
Throwing a leg up over our fence of mountains,  
And rising on his hands, he looks in on me  
Busy outdoors by lantern-light with something  
I should have done by daylight, and indeed,  
After the ground is frozen, I should have done  
Before it froze, .... "*

Robert Frost, thank you for that reminder of old man winter marching our way, peering in on our activities, offering up a chance for cold clear nights and hot drinks as we watch yet again a progression into a season of holidays and get-togethers. Orion will be standing straight up in a few months, the constellation peering into our state from a vantage point off to our south earlier and earlier in the evening.

Thanks to all who have helped out at outreach events, shared photos, taken time to attend meetings or just chatted

with folks about our place amongst the stars. The one currently on the PAC platter is the "How to Buy a Telescope" event that PAC holds as we move into the holiday season. That is held in place of the regular meeting / as our November meeting. Because I have family in Wisconsin and grandkids with school activities going on at that time this year, I will not be in attendance. Hopefully a number of us will be able to make it though. I know Jason plans to be there. Feel free to just show up, but if you are planning to be

there it would be great to hear from you so there is a good feel for how many will be attending and the club has an idea of what type of scopes members might bring in to give folks first hand looks at actual pieces of equipment.

Note that I do plan to send out an email to those of us on the email list inviting folks to the "How to Buy a Telescope" event scheduled for Tuesday, November 26th, 7:30PM at Hyde. You may see that before this newsletter hits your inbox.

## Outreach Calendar

*Scheduled events to be aware of:*

PAC Annual "How to Buy a Telescope":

When: Tuesday November 26th,  
7:30PM

Where: Hyde Memorial Observatory

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](mailto:dhain00@gmail.com) if you've not  
already made a board member aware  
you are coming)

Visit: <https://www.prairieastronomyclub.org/> for more info

Hyde Observatory: every Saturday  
night throughout the year (except for  
weekends of major holidays)

7:00pm to 10:00pm (October thru  
March)

Where: Hyde Memorial Observatory

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

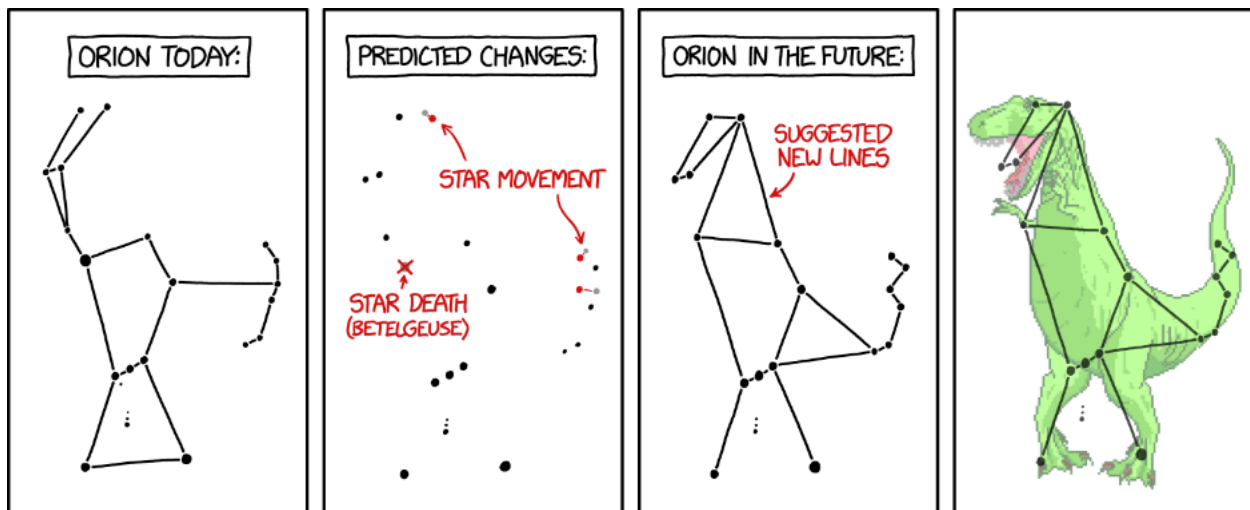
Needs: visit <https://www.hydeobservatory.info/volunteer/> to  
become a volunteer

Outreach Coordinator contact  
information:

Don Hain [dhain00@gmail.com](mailto:dhain00@gmail.com)

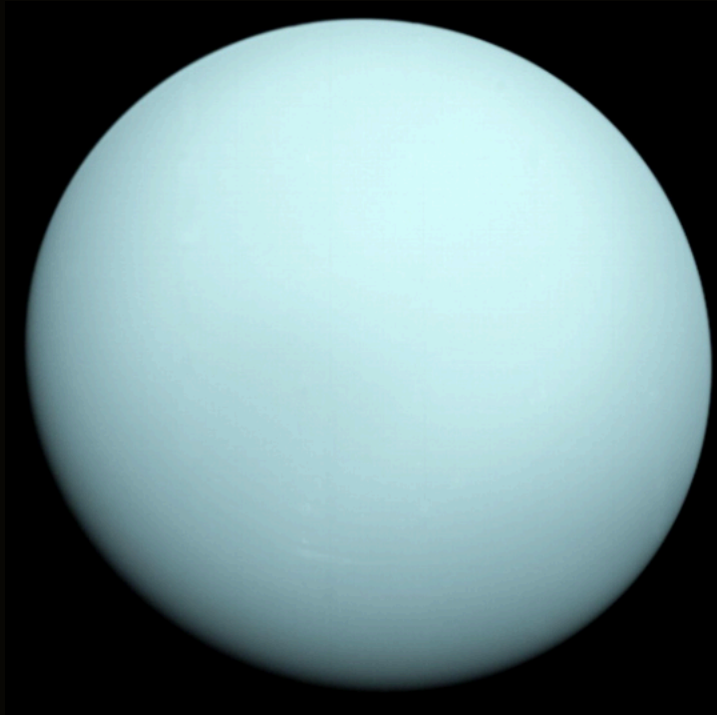
phone: 402 440 5318

### The Future of Orion



[xkcd.com](http://xkcd.com)

## Mining Old Data From NASA's Voyager 2 Solves Several Uranus Mysteries



*NASA's Voyager 2 captured this image of Uranus while flying by the ice giant in 1986. New research using data from the mission shows a solar wind event took place during the flyby, leading to a mystery about the planet's magnetosphere that now may be solved. Credit: NASA/JPL-Caltech*

***NASA's Voyager 2 flyby of Uranus decades ago shaped scientists' understanding of the planet but also introduced unexplained oddities. A recent data dive has offered answers.***

When NASA's Voyager 2 spacecraft flew by Uranus in 1986, it provided scientists' first — and, so far, only — close glimpse of this strange, sideways-rotating outer planet. Alongside the discovery of new moons and rings, baffling new mysteries confronted scientists. The energized particles around the planet defied their understanding of how magnetic fields work to trap particle radiation,

and Uranus earned a reputation as an outlier in our solar system.

Now, new research analyzing the data collected during that flyby 38 years ago has found that the source of that particular mystery is a cosmic coincidence: It turns out that in the days just before Voyager 2's flyby, the planet had been affected by an unusual kind of space weather that squashed the planet's magnetic

field, dramatically compressing Uranus' magnetosphere.

"If Voyager 2 had arrived just a few days earlier, it would have observed a completely different magnetosphere at Uranus," said Jamie Jasinski of NASA's Jet Propulsion Laboratory in Southern California and lead author of the new work published in *Nature Astronomy*. "The spacecraft saw Uranus in conditions that only



## Uranus, continued

occur about 4% of the time.”

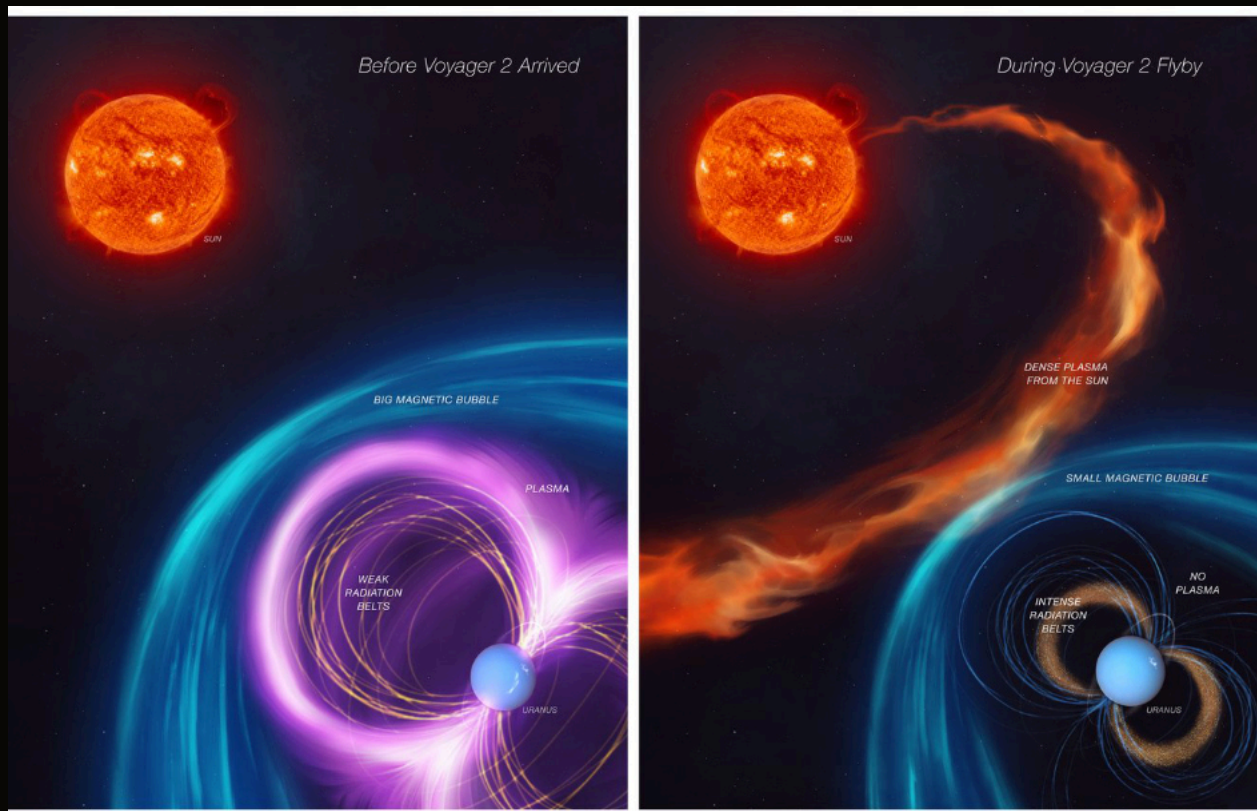
Magnetospheres serve as protective bubbles around planets (including Earth) with magnetic cores and magnetic fields, shielding them from jets of ionized gas — or plasma — that stream out from the Sun in the solar wind. Learning more about how magnetospheres work is important for understanding our own

planet, as well as those in seldom-visited corners of our solar system and beyond.

That’s why scientists were eager to study Uranus’ magnetosphere, and what they saw in the Voyager 2 data in 1986 flummoxed them. Inside the planet’s magnetosphere were electron radiation belts with an intensity second only to Jupiter’s notoriously brutal radiation belts. But there

was apparently no source of energized particles to feed those active belts; in fact, the rest of Uranus’ magnetosphere was almost devoid of plasma.

The missing plasma also puzzled scientists because they knew that the five major Uranian moons in the magnetic bubble should have produced water ions, as icy moons around other outer planets do. They concluded that the



*The first panel of this artist's concept depicts how Uranus's magnetosphere — its protective bubble — was behaving before the flyby of NASA's Voyager 2. The second panel shows an unusual kind of solar weather was happening during the 1986 flyby, giving scientists a skewed view of the magnetosphere. Credit: NASA/JPL-Caltech*

## Uranus, continued

moons must be inert with no ongoing activity.

### Solving the Mystery

So why was no plasma observed, and what was happening to beef up the radiation belts? The new data analysis points to the solar wind. When plasma from the Sun pounded and compressed the magnetosphere, it likely drove plasma out of the system. The solar wind event also would have briefly intensified the dynamics of the magnetosphere, which would have fed the belts by injecting electrons into them.

The findings could be good news for those five major moons of Uranus: Some of them might be geologically active after

all. With an explanation for the temporarily missing plasma, researchers say it's plausible that the moons actually may have been spewing ions into the surrounding bubble all along.

Planetary scientists are focusing on bolstering their knowledge about the mysterious Uranus system, which the National Academies' 2023 Planetary Science and Astrobiology Decadal Survey prioritized as a target for a future NASA mission.

JPL's Linda Spilker was among the Voyager 2 mission scientists glued to the images and other data that flowed in during the Uranus flyby in 1986. She remembers the anticipation and

excitement of the event, which changed how scientists thought about the Uranian system.

"The flyby was packed with surprises, and we were searching for an explanation of its unusual behavior. The magnetosphere Voyager 2 measured was only a snapshot in time," said Spilker, who has returned to the iconic mission to lead its science team as project scientist. "This new work explains some of the apparent contradictions, and it will change our view of Uranus once again."

Voyager 2, now in interstellar space, is almost 13 billion miles (21 billion kilometers) from Earth.

## December's Night Sky Notes: Spot the King of Planets



*This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](http://nightsky.jpl.nasa.gov) to find local clubs, events, and more!*

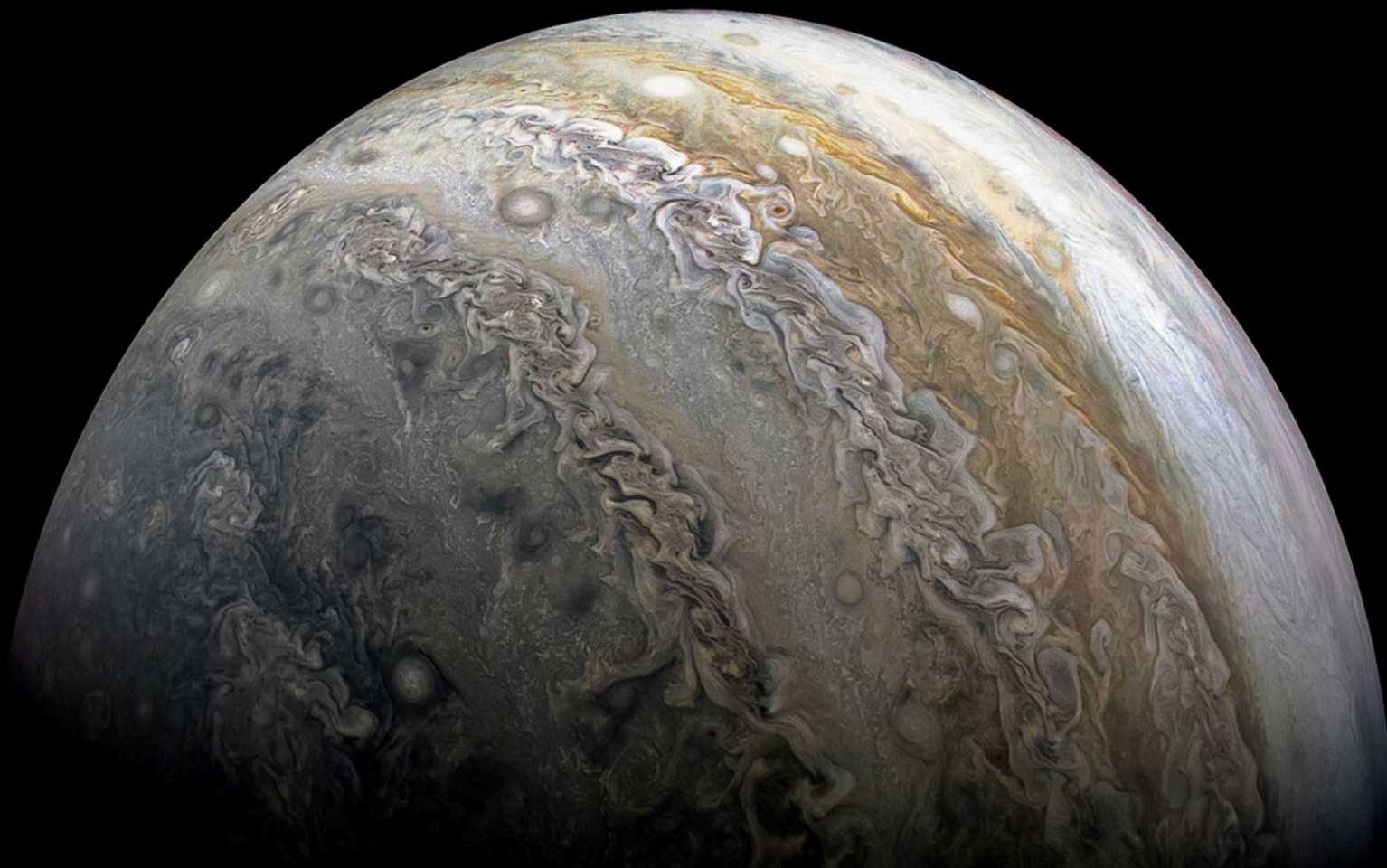
*By David Prosper,  
Kat Troche*

Jupiter is our solar system's undisputed king of the planets! Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than the planet Mercury. What's more, you can easily observe Jupiter and its moons with a modest

instrument, just like Galileo did over 400 years ago.

Jupiter's position as our solar system's largest planet is truly earned; you could fit 11 Earths along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1300 Earths to fill it up – and that would still not be quite enough! However, despite its

formidable size, Jupiter's true rule over the outer solar system comes from its enormous mass. If you took all of the planets in our solar system and put them together, they would still only be half as massive as Jupiter all by itself. Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner solar





## King of Planets, continued

system and also draw them into itself, as famously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere. Its multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Galileo probe but also by observers back on Earth!

Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movements from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at

opposition. That's impressive for a planet that, at its closest to Earth, is still over 365 million miles (587 million km) away. It's even more impressive that the giant world remains very bright to Earthbound observers at its furthest distance: 600 million miles (968 million km)! While the King of Planets has a coterie of 95 known moons, only the four large moons that Galileo originally observed in 1610 – Io, Europa, Ganymede, and Calisto – can be easily observed by Earth-based observers with very modest equipment. These are called, appropriately enough, the Galilean moons. Most telescopes will show the moons as faint star-like objects neatly lined up close to bright Jupiter. Most binoculars

will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but sometimes they can pass behind or in front of Jupiter or even each other. Telescopes will also show details like Jupiter's cloud bands and, if powerful enough, large storms like its famous Great Red Spot, and the shadows of the Galilean moons passing between the Sun and Jupiter. Sketching the positions of Jupiter's moons during the course of an evening – and night to night – can be a rewarding project! You can download an activity guide from the Astronomical Society of the Pacific at [bit.ly/drawjupitermoons](http://bit.ly/drawjupitermoons)

Now in its eighth year, NASA's Juno mission is

*Photo on previous page: NASA's Juno mission captured this look at the southern hemisphere of Jupiter on Feb. 17, 2020, during one of the spacecraft's close approaches to the giant planet. This high-resolution view is a composite of four images captured by the JunoCam imager and assembled by citizen scientist Kevin M. Gill. Credit: NASA, JPL-Caltech, SwRI, MSSS | Image processing by NASA's Juno mission captured this look at the southern hemisphere of Jupiter on Feb. 17, 2020, during one of the spacecraft's close approaches to the giant planet. This high-resolution view is a composite of four images captured by the JunoCam imager and assembled by citizen scientist Kevin M. Gill. Credit: NASA, JPL-Caltech, SwRI, MSSS | Image processing by Kevin M. Gill, © CC BY M. Gill, © CC BY*

## King of Planets, continued

one of just nine spacecraft to have visited this impressive world. Juno entered Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious interior. The years have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this gassy world's guts. Juno's mission has since been

extended to include the study of its large moons, and since 2021 the plucky probe, increasingly battered by Jupiter's powerful radiation belts, has made close flybys of the icy moons Ganymede and Europa, along with volcanic Io. What else will we potentially learn in 2030 with the Europa Clipper mission?

Find the latest discoveries from Juno and NASA's missions to Jupiter at [science.nasa.gov/jupiter/](https://science.nasa.gov/jupiter/)

Originally posted by Dave Prosper: February 2023

Last Updated by Kat Troche: November 2024

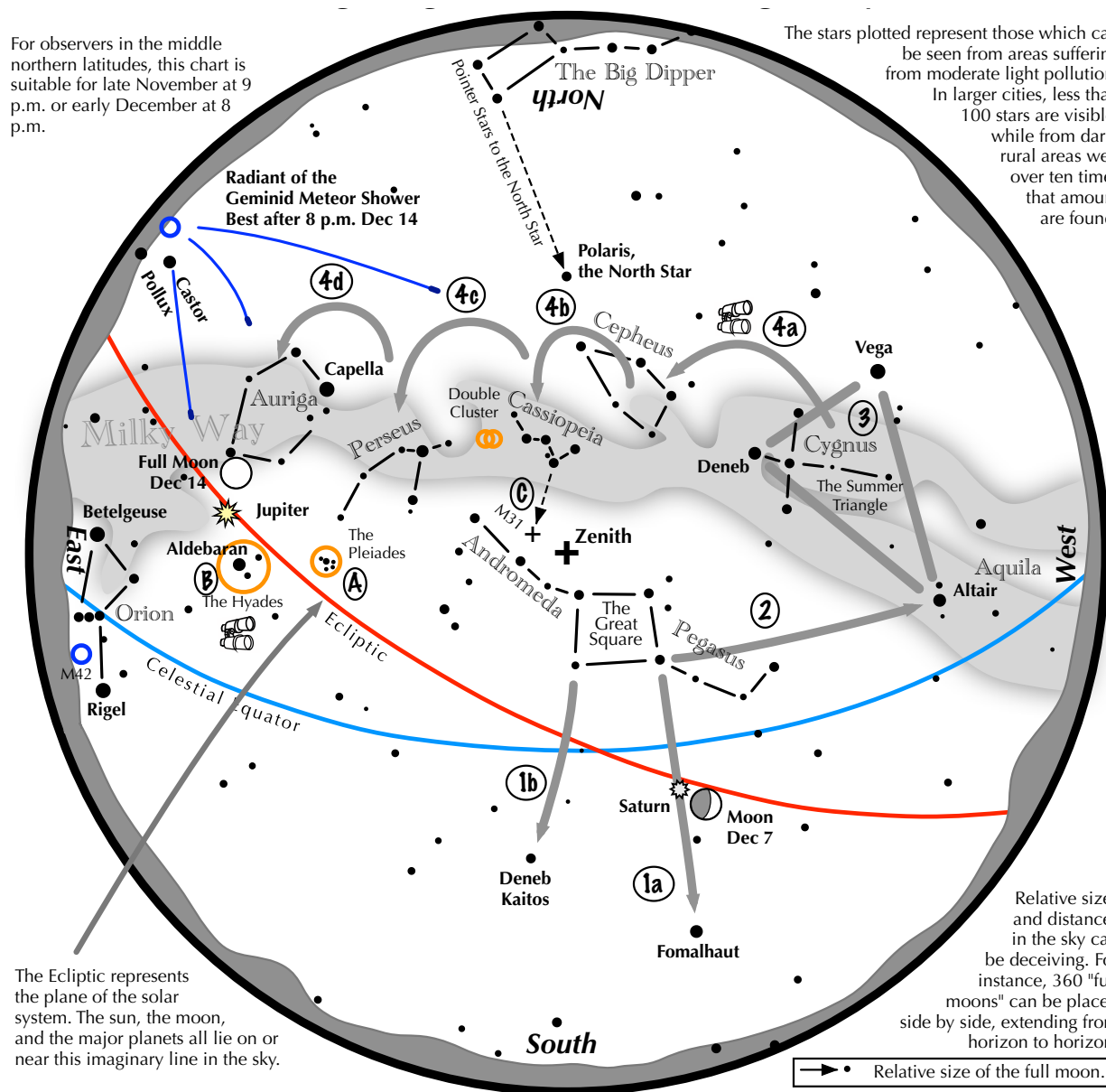


*Look for Jupiter near the Eye of the Bull, Aldebaran, in the Taurus constellation on the evening of December 15, 2024. Binoculars may help you spot Jupiter's moons as small bright star-like objects on either side of the planet. A small telescope will show them easily, along with Jupiter's famed cloud bands. How many can you count? Credit: Stellarium Web*

# Navigating the mid December Night Sky

For observers in the middle northern latitudes, this chart is suitable for late November at 9 p.m. or early December at 8 p.m.

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



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

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

- 1 Face south. Almost overhead is the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend an imaginary line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the southwest. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second bright star in the south.
- 2 Draw another line, this time westward following the southern edge of the Square. It strikes Altair, part of the "Summer Triangle."
- 3 Locate Vega and Deneb, the other two stars of the "Summer Triangle." Vega is its brightest member while Deneb sits in the middle of the Milky Way.
- 4 Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, to Perseus, and finally to Auriga with its bright star Capella.

### Binocular Highlights

- A and B:** Examine the stars of the Pleiades and Hyades, two naked eye star clusters.  
**C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.  
**D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas.



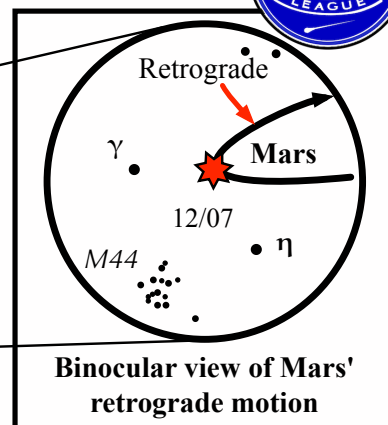
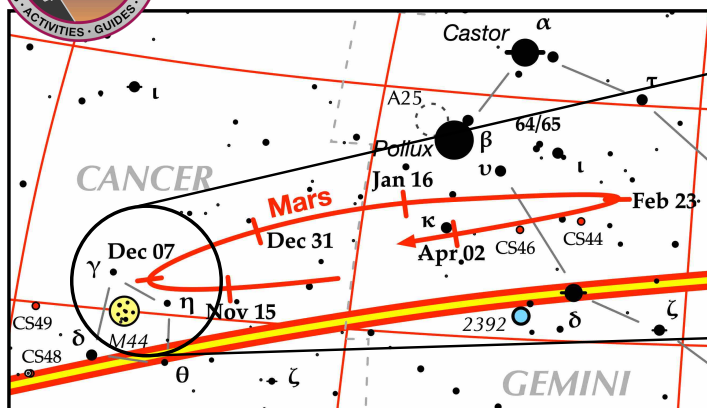


# Astronomical League Observing Project



## Observing Project: Retrograde Motion of Mars

See this for yourself!



### Relative apparent size of Mars



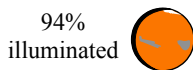
94%  
illuminated

Dec. 7, 2024  
Magnitude: -0.6  
Diameter: 12 seconds  
Distance: 71 million miles



100%  
illuminated

Opposition  
Jan. 16, 2025  
Magnitude: -1.4  
Diameter: 15 seconds  
Distance: 60 million miles



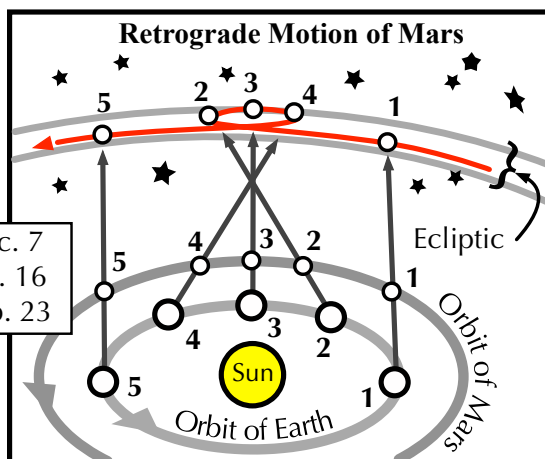
94%  
illuminated

Feb. 23, 2025  
Magnitude: -0.4  
Diameter: 11 seconds  
Distance: 76 million miles

Over the next four months, observe Mars using binoculars on every clear night, then plot its changing position among the background stars.

Mars nears M44, the Beehive star cluster, in central Cancer in early December. It reaches its closest point to it on December 7, after which it enters retrograde motion, inching westward each evening until February 23, 2025. Mars then lies in central Gemini.

Mars will also be growing in angular size as Earth slowly overtakes it on January 16, 2025. (Actually, the two planets are closest on January 11. The discrepancy is due to Mars' elliptical orbit.) At this time, it shows its largest angular size – 15 arc seconds – until April 2031. By February 23, the Red Planet ceases moving westward nightly, shifting its direction eastward (called prograde motion).



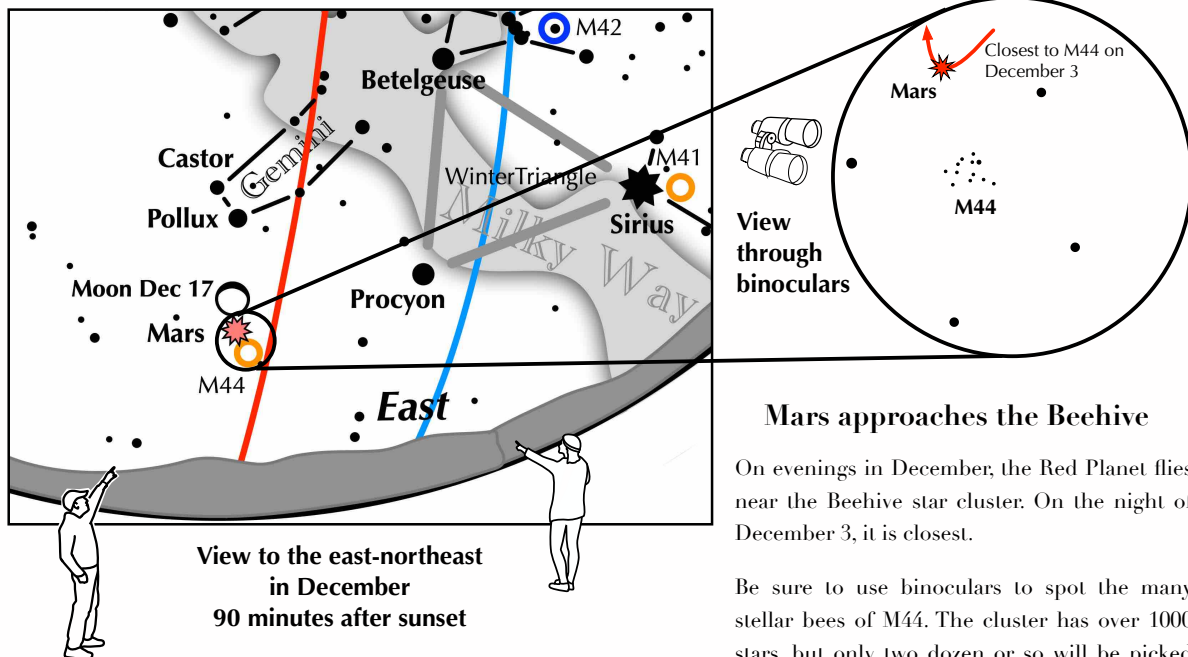
### Mars at its brightest, largest & closest:

Jan. 11, 2025  
-1.4 mag., 15 arc seconds, 59.8 million miles  
It won't come any closer until Apr 11, 2031.

**Why do this activity?** This planetary dance can only be explained if both Earth and Mars orbit our sun following definable elliptical paths. Our view from Earth clearly shows this to those people who take the time to look carefully enough.

# Astronomical League Challenge

On a moonless evening in December, try this challenge:



View to the east-northeast  
in December  
90 minutes after sunset

On December 7, Mars starts its retrograde motion, moving slightly each evening westward until February.

Even though Mars and M44 lie near each other in binoculars, they are nowhere near each other in three-dimensional space. M44 is 50 million times farther than the Mars!

It has taken the light from M44's stars over 575 years to reach your eyes!

## Mars approaches the Beehive

On evenings in December, the Red Planet flies near the Beehive star cluster. On the night of December 3, it is closest.

Be sure to use binoculars to spot the many stellar bees of M44. The cluster has over 1000 stars, but only two dozen or so will be picked out with binoculars.



## Astronomical.League

on Facebook ...

Monthly sky maps,  
Observing activities,  
AL LIVE sessions,  
League news & a whole lot more!



## AL YouTube Channel

Observing Program Previews: What a program requires of the Observer.

Our View from Earth: How to find interesting celestial objects in three minutes. Perfect for club viewing.

# Astrophotography



*M33 - Triangulum Galaxy - by Jason O'Flaherty*

*33 Frames @ 60sec ISO 3200 F/6.3 945mm*

*NexStar 6SE w/ focal reducer & Nikon Z8*

*Edited in Siril and Photoshop*



# Astrophotography



*Orion Nebula from Burwell - by Brett Boller*

*Two versions processed differently. One is a softer background to make it more appealing. The other one shows more details in the clouds. Esprit 150mm Refractor, Canon t7i, Guided tracking, 40 - 4 minute light frames, No dark frames*





# Astrophotography



*NGC 1579, The Northern Trifid Nebula - by Jim White*

*51 Light frames each is 150 seconds long, 25 Darks, Flats and Dark Flats, Celestron 925 EdgeHD SCT, Celestron CGX Mount, ZWO ASI2400MC Pro Imaging Camera, Celestron OAG*



*NGC 7380, The Wizard Nebula by Jim White*

*41 Light frames each is 240 seconds long, 25 Darks, Flats and Dark Flats, Celestron 925 EdgeHD SCT, Celestron CGX Mount, ZWO ASI2400MC Pro Imaging Camera*

# Astrophotography



*C/2023 A3 Tsuchinshan-ATLAS - by John Reinert  
Louisville, KY October 13th, 2024*

*12MP iPhone camera, 24mm f1.78, ISO 2000, 1/9 second exposure(s), likely stacked.*

*Above: Green laser projected through Celestron 15/70 binoculars*





# From the Archives

November, 2004

## President's Observations – Ron Veys

It's gonna feel a little funny standing up in front of the room and running the meeting again, instead of sitting in the audience and "going along for the ride." In case you don't remember (and if you've joined the club within the last twenty three years, you won't), I served as President of the PAC from 1978 – 1981. In fact, the last time I was elected President of PAC:

1. Jimmy Carter was President of the USA.
2. Joey Churilla wasn't born yet (heck, his parents were probably still in high school!!)
3. Home computers, CD's, DVD's, and cell phones didn't exist.
4. Gasoline cost about 57 cents a gallon.
5. Everyone thought Rick Johnson would never get married.
6. The space shuttle had not yet flown.
7. Jack Dunn had hair.

My life has changed in the mean time, too. Since then I've:

1. Had four kids
  - a. Sent two to college (a third starts next year)
  - b. Married one off
2. Moved into a new house
3. Owned seventeen cars (by my count,

plus or minus 3)

4. Worked at five different full time jobs (involving two career changes)
5. Had an artificial valve put in my heart

But some things haven't changed:

1. I'm still married to the same wonderful woman (Cindy, for 27 years now)
2. Lee Thomas still weighs around 120 lb. and still has the "golden voice"
3. Hyde Observatory is still open every Saturday night
4. Dave Knisely still isn't married (except to his telescope)
5. Rick Johnson still wears flannel shirts
6. I'm still as awed by the beauty of the stars as I have been since I was 10 years old. Astronomy is still my favorite hobby.

Someone once said that the only thing that never changes in life is the fact that things change. During my current term as President of the PAC, I hope that together we can make some positive changes to our club.

– Ron

## 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](https://www.amazon.com) or [lulu.com](https://www.lulu.com).*

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