

The Prairie Astronomer

August, 2026 Volume 67, Issue #8



Jim White 2026

IN THIS ISSUE: PLUTO'S ATMOSPHERE
MORE NSP PHOTOS
LION NEBULA



THE *Prairie*
Astronomy
Club

Night Sky Network



THE NEWSLETTER OF THE PRAIRIE ASTRONOMY CLUB



David Woolf, Kalamazoo, MI at NSP 2018
Photo by Mark Dahmke

Next meeting: Tuesday August 25th 7:30pm at Hyde Observatory

NEXT MEETING

Program: "Nancy Grace Roman Space Telescope - Understanding Our Place in Our Universe"

How did the Universe Evolve? Dark Matter and Dark Energy - Where do these fit in a 3D map of our universe? Planets Outside Our Own Solar System - Are we alone?

Presented by Bob Kacvinsky, NASA/JPL Solar System Ambassador.

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Cover: Crescent Nebula by Jim White



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.

2026 STAR PARTY DATES

	Date	Date
January	9	<u>16</u>
February	13	<u>20</u>
March	13	<u>20</u>
April	10	<u>17</u>
May	8	<u>15</u>
June	5	<u>12</u>
July	10	<u>17</u>
NSP	7/12-7/17	
August	7	<u>14</u>
September	4	<u>11</u>
October	2	<u>9</u>
November	<u>6</u>	13
December	4	<u>11</u>

Underlined dates are closest to the New Moon.

CALENDAR



August Meeting

Tuesday, August 25th, 7:30pm, Hyde Observatory
Program: Nancy Grace Roman Space Telescope - Understanding Our Place in the Universe

September Meeting

Tuesday, September 29th, 7:30pm Hyde Observatory

October Meeting

Tuesday, October 27th, 7:30pm Hyde Observatory

PAC Google calendar:

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

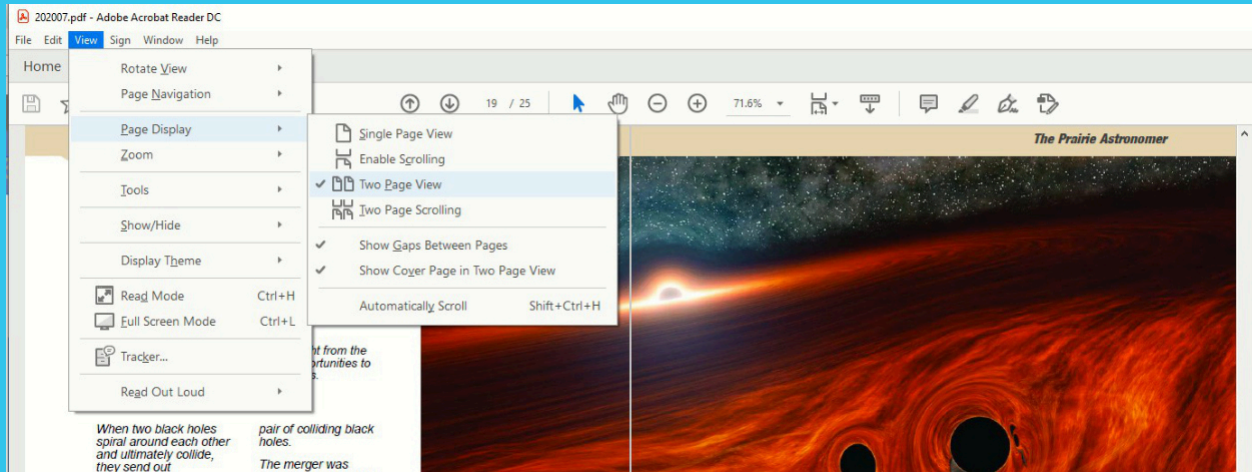
CLUB OFFICERS

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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.

Pay Dues

<https://www.prairieastronomyclub.org/pay-dues-online/>

Pay online using Paypal or a credit card. An individual membership is \$30/year or family membership is \$36/year. Students memberships are only \$12 annually with a small volunteer requirement for our youth members.

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 want to start by apologizing for the last-minute cancellation of our meeting last month. I had every intention of putting together a presentation, but time got away from me, and before I knew it, I was boarding a plane for Europe. I appreciate your understanding.

I also want to thank everyone who came out for our annual Solar Party in June, along with everyone who brought telescopes to share. The clouds threatened to spoil things for a while, but we managed to sneak in enough peeks at the sun to send everyone home satisfied.

Looking ahead to our next meeting, I'm excited to share that club member and NASA Solar System Ambassador Bob Kacvinsky has volunteered to give us a

presentation on the Nancy Grace Roman Space Telescope. The timing couldn't be better, as the telescope is set to launch in just over a week, on August 30. We'll get to learn all about it at the meeting, then turn around and watch the launch event together with our universal space enthusiasts and follow its progress from there.

Before Bob's presentation, we'll also be running a slideshow of photos from NSP. Thank you again to everyone who sent theirs in. The images our



members have been producing are out of this world, figuratively and literally. I'm continually amazed at what so many of you are able to capture, and this is shaping up to be our best slideshow yet.

Thank you all, and I hope to see everyone at the meeting.

Clear skies,

Jason O'Flaherty

President, Prairie Astronomy Club

Welcome to the
Prairie Astronomy Club

Travis Miller, Lincoln
Michael Lysik of Yorba Linda, CA

NEW MEMBERS

ARP 96

The Mantrap Skies Image Catalog

Arp 96 falls under Arp's category for spiral galaxies with elliptical galaxies on their arms. They are located 205 million light-years away based on their redshifts which are virtually identical. But we can't say the elliptical is on the arm of the spiral. It would be better to say it appears to be on the arm. If it really were I suspect the arm (more a plume) would be more highly distorted. Arp stated his categories as if they were fact when they were more how they appeared to him. In some cases the galaxy on a spiral's arm is now known to be a far distant galaxy. His other categories were often incorrect. Especially those that he said categorized as material ejected from the nucleus. That's not true for any in that category that I've been able to determine. In this case, their redshifts are virtually identical indicating they are closely related but that doesn't mean one is on the arm of the other. Still, interaction likely is why the spiral's arms are so distended. Also, note the faint arc of stars at the southern end of the lower galaxies halo about halfway to the red star below it. Why is this short arc so well defined? I found nothing on it.



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.



ARP 96, continued

Arp's comment on this pair reads: "Faint diffuse counter arm, and arm leading to companion." These don't follow the curve of the two arms of the spiral galaxy and lie beyond them. They appear even more diffuse than the spiral which is surprisingly diffuse for a spiral to begin with. I would call them plumes rather than arms. It appears to be an old spiral in which star formation ceased several billion years ago turning it somewhat red in color as the bluer stars have all burned out and turned to faint white dwarfs, pulsars etc. that give off little light. Since it is usually the hot blue stars that give a spiral it's highly detailed features it isn't surprising that without them it looks awfully fuzzy. This could be the result of an interaction far older than its encounter with the current elliptical companion but I doubt it.

This pair is known as UGC 03536B/MCG +14-04-10 (spiral) and UGC 3536A/MCG +14-04-11 (elliptical). NED says the spiral is Sc while the Elliptical is just listed as E or E? A note at NED says of it: "Compact symmetrical object with red envelope." The pair is located in Cepheus only 3.4 degrees from the pole. Certainly, it would qualify as the Arp North Pole Galaxy. Imaging this close to the pole is testament to how precisely I've achieved polar alignment. It takes extreme accuracy to go for two hours without image rotation at this declination as any who have tried it can attest. Until the storm forced me to take out my two Polaris trees I'd not been able to do any imaging in this part of the sky. The Arp 25-114 pair is less than a degree further from the pole. This close to the pole I can ignore my rule of sticking within 2 hours of the meridian

as it makes very little difference.

Actually, this is a triple galaxy in the WBL (White+Bliton+Bhavsar groups) and KTG (Karachentsev Isolated Triplets of Galaxies Catalogue) catalogs. The third galaxy is CGCG 362-033/MCG +14-04-014/PGC 020191 among other designations. It is the obvious spiral to the northeast. It is listed as Sa in NED. It appears to have a ring structure in my image not mentioned in the classification. This may be due to my resolution and when seen at higher resolution is not a ring at all. I was unable to find any images of it on the net with even as much resolution as I have.

No other galaxy in the image has a redshift at NED so I didn't prepare an annotated image.

This image was taken at 0.5" per pixel. The image has been cropped

ARP 96, continued

however as even cropped it is 3006x2004 pixels in size. These galaxies are quite small in angular size and I took advantage of one of the very rare nights when this was possible.

Arp's image of the pair is at: http://ned.ipac.caltech.edu/level5/Arp/Figures/big_arp96.jpeg
For his image, he used 103a-D film. I used a lot

of it in my film days before 2415 film was available. I still had part of a 100' roll in my freezer when I gave up film work. I threw it out as it was about 20 years old as I'd changed to hypered 2415 years before. It is rather well matched to the human eye for its response covering 4700 to 6000 angstroms. So lops off the blue and red ends of

the spectrum passing mostly the region our eye is most sensitive to. Arp used no filter. Since these galaxies are somewhat red I'd have expected him to have used 103a-E which is more red sensitive.

Arp's image: http://ned.ipac.caltech.edu/level5/Arp/Figures/big_arp96.jpeg

OBSERVING AWARDS

Congratulations to Bob Kacvinsky for completing the Open Cluster Observing Program. Bob is the first PAC member to complete the Open Cluster Observing Program, and this is the 12th observing program Bob has completed. Bob also received the Master Observer Award in 2018.

NSP Photos



Explore Scientific representative Kent Marts sets up on Dob Row.



*Sunset with 16" Lightbridge (Bob's) and Jim's Teeter.
By Bob Kacvinsky*



*Orbs at dusk.
By John Reinert*



Jim White takes a northerly view with the Valentine nebulae (city lights) on the horizon. By John Reinert



*The Dob Row Mob at sunset.
By John Reinert*

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](#)

Focus on Constellations: Aquila

Jim Kvasnicka

Aquila, the Eagle is probably one of the oldest constellations in the sky. The Greeks inherited it from the cultures of Mesopotamia, the Babylonians, and the Sumerians. Aquila is on the celestial equator and cut through by the Milky Way. Altair the brightest star in the constellation is 16.5 light years distant, making it one of the nearest stars to our Solar System. Altair makes up the Summer Triangle along with Deneb and Vega. The name Altair is from Arabic for "The Eagle". Though Aquila is on the Milky Way it is poor in open clusters. Part of the reason for this is the obscuring clouds of the Great Rift

which block the light of distant open clusters. Aquila is rich in planetary nebulae and a good place to look for dark dust clouds. Aquila is best seen in the month of September.

Showpiece Objects

Planetary Nebulae: NGC 6781

Open Clusters: NGC 6709, NGC 6755

Multiple Stars: 11 Aquilae, 15 Aquilae, 23 Aquilae

Mythology

It is said in the old Greek myths that during the ten-year war between followers of Zeus and the giant Titans that a magnificent eagle known as Aquila was ever

by the side of Zeus waiting to carry his thunderbolts that Zeus hurled down to kill the giant Titans. It was for his loyalty that the eagle was given a place among the stars as the constellation Aquila.

Number of Objects

Magnitude 12.0 and

Brighter

Galaxies: 1

Globular Clusters: 3

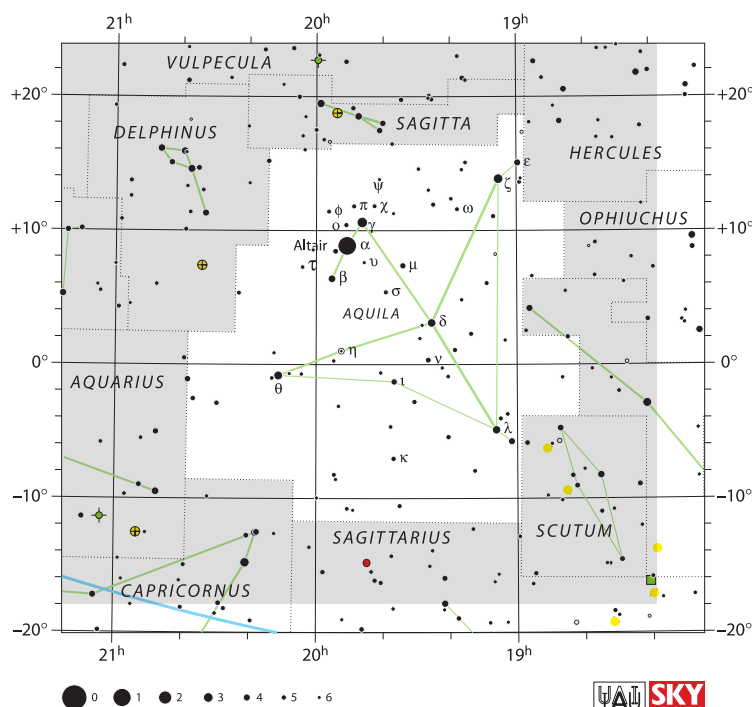
Open Clusters: 4

Planetary Nebulae: 8

Dark Nebulae: 11

Bright Nebulae: 0

SNREM: 0



By IAU and Sky & Telescope magazine (Roger Sinnott & Rick Fienberg) - [1], CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=15407534>

September Observing

Jim Kvasnicka

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

Planets

Mercury: Not visible.

Venus: Low in the west, not visible by mid-September.

Mars: Rises around midnight in Gemini. Magnitude +1.2 with a disk 5.3" wide.

Jupiter: Morning planet in Cancer at magnitude -1.8 with a disk 32" wide.

Saturn: Morning planet in Pisces at magnitude +0.4 with a disk 19.4" wide.

Uranus: In Taurus at magnitude +5.7 with a disk 3.7" wide.

Neptune: In Pisces at magnitude +7.8 with a disk 2.4" wide.

Messier List

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

M14: Class VII globular cluster in Ophiuchus.

M22: Class VIII globular cluster in Sagittarius.

M28: Class IV globular cluster in Sagittarius.

M54: Class III globular cluster in Sagittarius.

M69: Class V globular cluster in Sagittarius.

M70: Class V globular cluster in Sagittarius.

M92: Class IV globular cluster in Hercules.

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

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

NGC and other Deep Sky Objects

NGC 6826: The Blinking Planetary in Cygnus.

NGC 6905: The Blue Flash Nebula in Delphinus.

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

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

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

NGC 7006: Class I globular cluster in Delphinus.

Double Star Program List

Otto Struve 525: Yellow and blue pair in Lyra.

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

Zeta Aquarii: Yellow and white pair.

94 Aquarii: Yellow primary with a pale blue secondary.

Alpha Capricornus: Wide pair of yellow stars.

Beta Capricornus: Yellow and blue stars.

36 Ophiuchi: Yellow-orange pair of stars.



Omicron Ophiuchi:

Yellow primary with a light-yellow secondary.

70 Ophiuchi: Yellow and orange stars.

Challenge Object

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

Club Outreach

Don Hain

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A few weeks ago I found that Arcturus is so bright that there is no need to “arc to Arcturus” ... and in fact no way to do so if you are looking for stars in the early evening as is the case if a person is trying to align scopes at Hyde. Vega, part of the Summer Triangle is another one of those stars that is visible quite early on in the evening sky. With magnitudes of -0.05 and +0.03, Arcturus and Vega are the fourth and fifth brightest stars above.

While being a teacher did not work out for me, I did make an effort to become a high school math and physics teacher. Let's do a bit of interesting math concerning the distance to these two “top 5” stars:

- The distances are typically given in light years:
 - Arcturus = a bit over 36 ly

- Vega = a bit over 25 ly
- That is a lot of miles** ... a number hard to grasp. However, one of the principal distances that have helped humans grasp the scale of, as well as the workings of our solar system is the astronomical unit (AU), the distance between the earth and the sun. Two AU (the distance across the ellipse that makes up our orbit about the sun) is a critical metric as well. That doubling of a single AU of 93 million miles gives us 186 million miles, or 1,000 times the distance that light can travel in a second. A nice coincidence***.
- The number of seconds in a year is pretty easy to figure:

$$365.25 \text{ days} * 24 \text{ hours} / 1 \text{ day} * 60 \text{ minutes} / 1 \text{ hour} * 60 \text{ seconds} / 1 \text{ minute} =$$



31,557,600 seconds, and that times 186,000 miles / second is going to be a really big number. That number is 5.879 to the 12th power.

- Wait though, 5.879 looks a lot the number of feet in a mile, and the AU distance of 93 million miles is a bit more than 90% of 100 million miles. ... What is 90% of 5.879 ??? That figure is 5.291. I think we have something here!
- There are 5,280 feet in a mile (of course! ... what a logical number compared to that strange metric system 😊).

The above does not quite “ring a bell” for me though. Hmmmm. Let's play things the other direction. Inches can take us the other

Club Outreach

direction, with an inch giving us a 1200% increase in the count of units over feet. 5,280 feet is 63,360 inches. $5.879 / .93$ is 6.32. Let's think about that ... If you figure out (or google) how many AU's are in a light year you will find there are $63,241 \text{ AU} = 1 \text{ ly}$!!!

So, one mile is basically the distance light travels if each inch is an AU. Picture the Sun at the zero mile mark. The Earth would be 1" away, making an orbit 2" in diameter around that zero mile mark every 365.25 days!

What about in relation to Vega and Arcturus though?

There are 25.4 millimeters in an inch. So if we let $1 \text{ mm} = 1 \text{ AU}$ in our scale, there would be 25.4 ly in a mile.

Now, leave our Sun at the zero mark. The earth will now be 1mm away, traversing a circle 1mm on either side as we circle around.

Our two bright summer stars:

How far would Vega (at magnitude -0.05) be? ... Just a bit closer than the the mile mark, out at 25.04 ly

Arcturus (at magnitude +0.03) ? ... A bit closer than the 1.5 mile mark, out at 36.7 ly

Two bright stars we will be seeing after school is in swing and winter stars are out:

Spica (apparent magnitude of -1.46), the brightest star is out at 8.6 ly. It would only be $\frac{1}{3}$ of a mile out in our scale model.

Capella (at magnitude +0.08) would be not quite 2 miles out in our scale model.

** Some of the mathematical ramblings here are based on the US customary system of measurement. Some of us had school days where track events took place on courses measured in that imperial system of measurement. If you would like to learn more about the US system of measurements (and want a few laughs), see

Liberty and Measurements - Washington's Dream SNL .

***That the number 186 shows up in both the speed of light and the distance across the earth's orbit is a nice aid to help remember both the speed of light and the distance to the sun. Additionally, it makes for fairly simple math to grasp how long it takes light to get to us from our sun once those two things are known. I.e. 60 seconds make up a minute, and $60 * 16$ is 960 but $60 * 17$ is too much (at 1,020 seconds). That means that it would take light between 16 and 17 minutes to get across the diameter of our orbit ... or about $8 \frac{1}{2}$ minutes to reach across the radius to supply us with sunlight.

Club Outreach

Upcoming event(s):

Hyde Observatory: OPEN

When: Saturday nights ... and other nights for groups per request

Where: Hyde Observatory

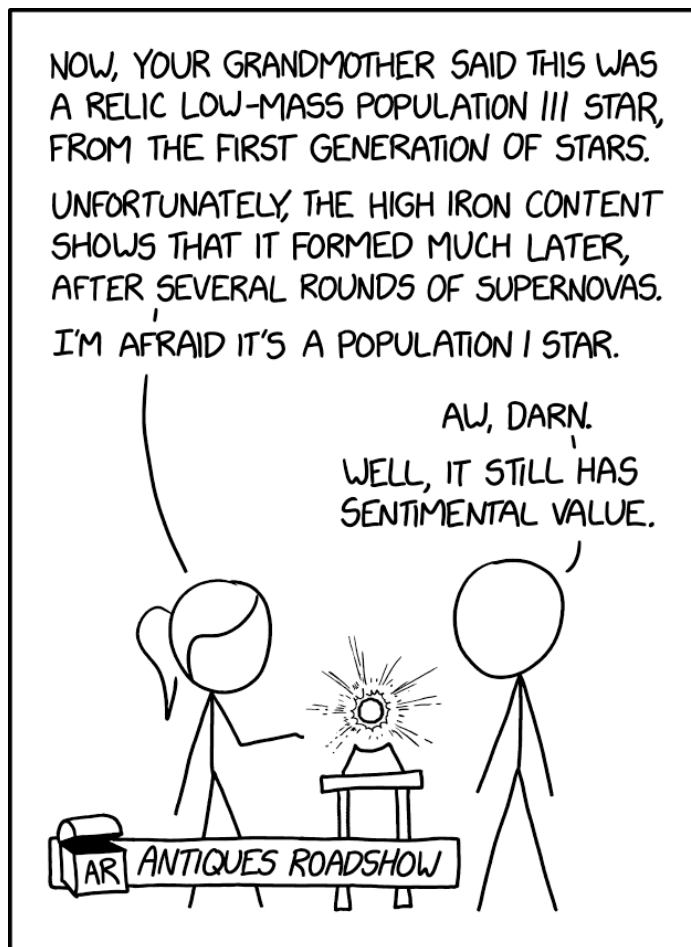
Sponsored by: Lincoln Parks and Rec / Hyde Board of Directors

Special Group nights: per requests to Pioneers Park Nature Center at 4024417895 or naturecenter@lincoln.ne.gov

Needs: volunteers willing to work out on the deck or manage the shows in the classroom about one Saturday per month, or nights scheduled by request of a group

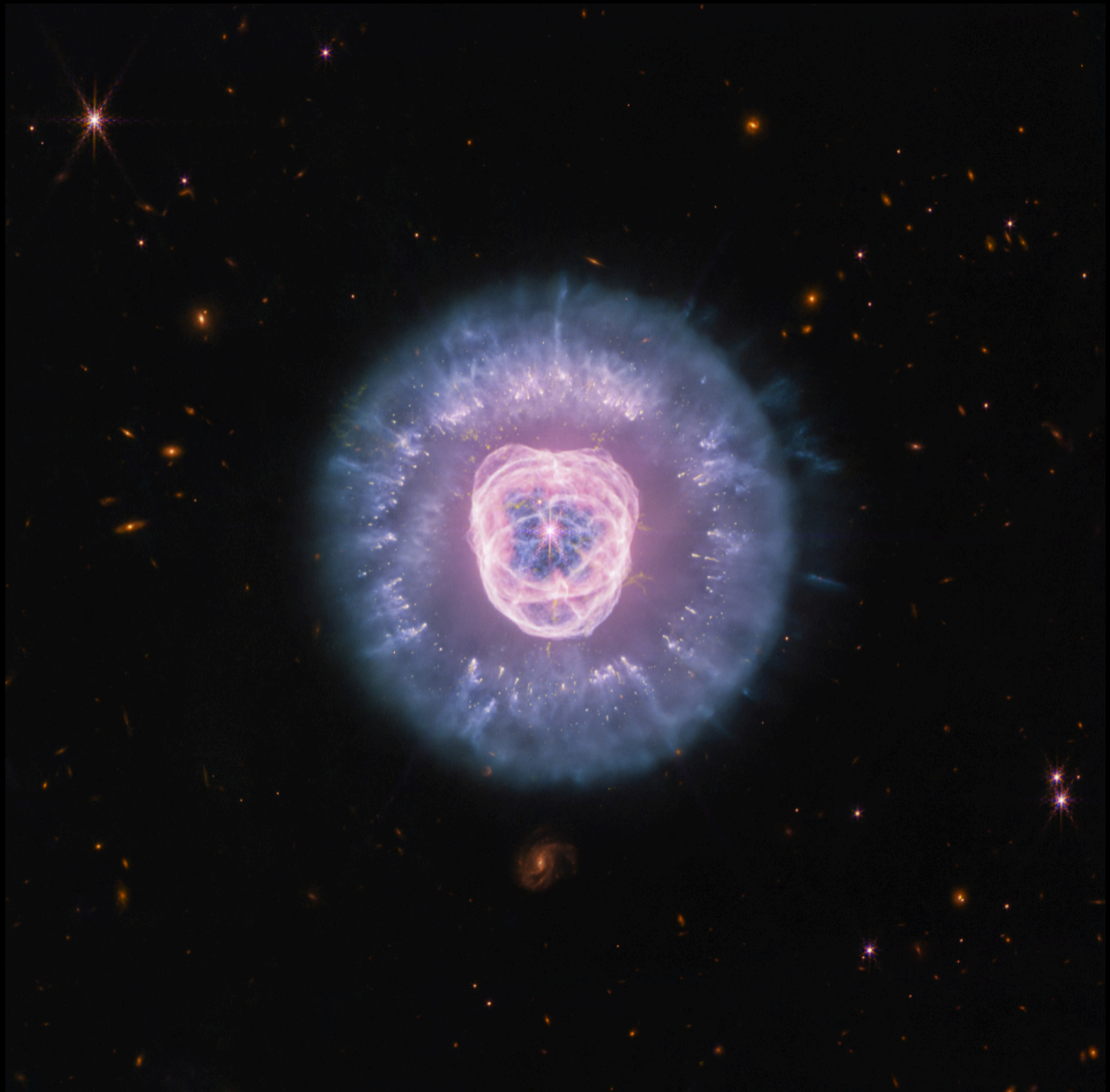
See <https://www.hydeobservatory.info/volunteer/> for more information

See <https://forms.gle/ZKr4ivapvUhfejwL6> for the volunteer form to get paperwork with the city started. Since Hyde offers the activity through city government a background check is needed. Submission of this form will get that going.



xkcd.com

Lion Nebula (NIRCam and MIRI Image)



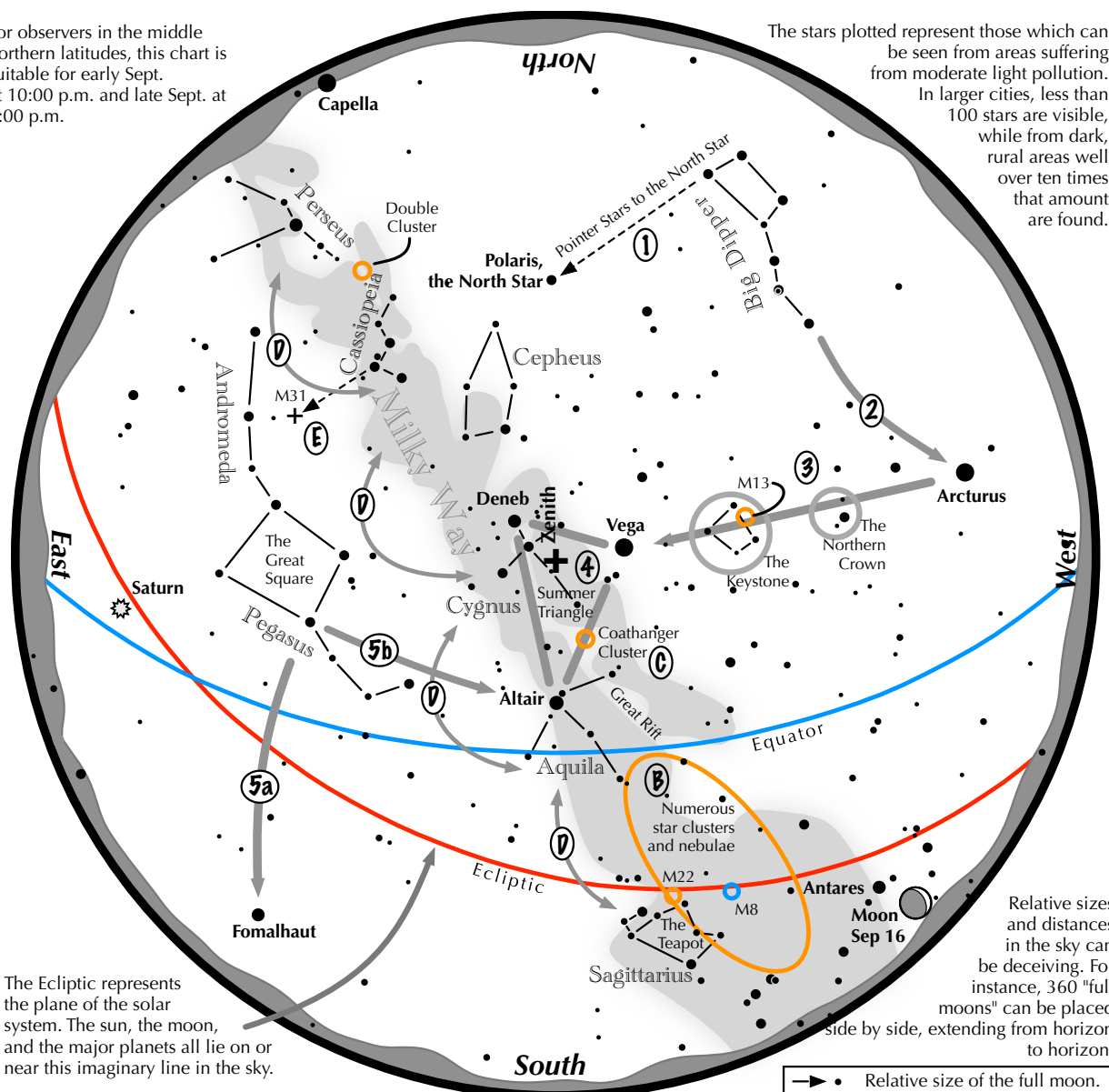
NASA's James Webb Space Telescope imaged the planetary nebula NGC 2392, the Lion Nebula, using the observatory's NIRCam and MIRI instruments. The central star's remains are responsible for the nebula's structure, including a lion face-shaped bubble of ionized gas and dust "mane."

Image: NASA, ESA, CSA, STScI; Image Processing: Alyssa Pagan (STScI)

Navigating the September Night Sky

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

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



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

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

→ • Relative size of the full moon.

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

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

Binocular Highlights

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



If you can catch only one celestial event in the morning this September, see one of these two.



September 6:

Celestial Parallelogram of Castor, Pollux, Mars, and the Moon

September 24:

Mars aligns with Castor and Pollux forming the Triplets of Gemini

Look in the east 90 minutes before sunrise on Sep. 6.

- The twin stars of Gemini – Castor and Pollux – along with Mars and the crescent moon, full with earthshine, form an attractive parallelogram.
- Jupiter peeks above the eastern horizon.

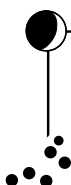
Again, look in the east 90 minutes before sunrise on Sep. 24.

- Mars aligns with Castor and Pollux, forming the Triplets of Gemini. Its brightness equals that of Pollux.

Astronomical League Outreach



Galileo Observing Program Activity



**All you need are 10x50 binoculars on a steady mount –
and clear and reasonably dark skies!**



Observe (and draw) ...

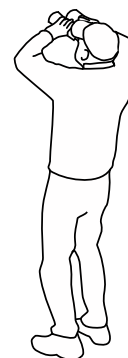
- ★ the Pleiades star cluster visible from late fall through early spring,
- ★ the changing phases of Venus,
- ★ craters and surface markings on the moon,
- ★ the Beehive star cluster (M44) in winter through mid spring,
- ★ sunspots (*must use proper full-aperture solar filters*),
- ★ the changing positions of Jupiter's Galilean moons,
- ★ Jupiter's Galilean moons in eclipse,
- ★ a comet and track its path across the heavens,
- ★ the stars of the Orion's Head Nebula (Lambda Orionis),
- ★ the non-starlike quality of Saturn,
- ★ and identify Neptune,

Optional ...

- ★ aurora,
- ★ supernova.

for all the details of this wonderful program, please visit:

<https://www.astroleague.org/galileo-observing-program/>



Scientists Watch as a Distant World's Atmosphere Shrinks and Thins

Carolyn Collins Petersen, [Universe Today](#)

As dwarf planet Pluto moves along in its distant, high-obliquity 248-year orbit, its atmosphere is changing. That's because it's beginning an 88-year march through colder, darker parts of the outer Solar System. As a consequence, the

mostly-nitrogen atmosphere is expected to grow gradually thinner and eventually freeze out over the coming decades. When that happens, the atmosphere will shrink, but it may or may not completely fall to the surface.

Scientists led by Planetary Science Institute's Senior Scientist Amanda Sckafoose are using the light from distant stars to track that thinning process by measuring how much starlight passes through the



A New Horizons parting shot of Pluto's thin, hazy atmosphere as it appeared in 2015. Scientists are measuring starlight as it streams through the atmosphere to get information about how the blanket of nitrogen and other gases is changing as Pluto moves farther from the Sun. Courtesy New Horizons, NASA. Public domain.

Pluto, continued



Pluto's haze layers as seen by New Horizons in 2015. Starlight streaming through the layers can reveal details of their structure and changes over time. Credit: NASA/JHUAPL/SwRI

tenuous atmosphere. They've reported that recent observations show Pluto's atmospheric pressure decreased by 16% between mid 2021 and July 2023. Before that and at the time of the New Horizons flyby in 2015, the surface pressure remained constant at about 1 Pascal (~10 millibars) with an occasional increase influenced by sunlight falling on the northern pole. By comparison, that is about 1/100,000 of

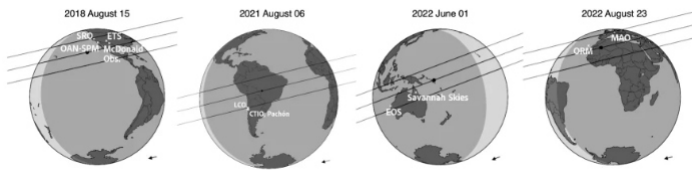
Earth's surface pressure of around 101,000 Pa. The occultations also show changes in atmospheric structures between the upper and lower parts.

Tracking Starlight to Watch an Atmospheric Change

It's difficult to study Pluto's atmosphere from anywhere in the Solar System beyond Pluto itself. It's a small world very far away. We know that as it approaches perihelion (its closest

point to the Sun in its orbit), it receives more heat than it does at aphelion, which causes atmospheric variations over time. Planetary scientists once thought that as Pluto reaches aphelion, its atmosphere would freeze out and basically fall to the surface. That may not happen, and recent atmospheric models based on observations and flyby data suggest that it retains some part of its atmosphere throughout its 248-year "year". So, observers

Pluto, continued



These maps show example paths of Pluto's occultation shadows. Four of 10 occultations could be observed from multiple locations on Earth in the most recent studies. The solid lines indicate the top, middle and bottom of Pluto's shadow on each date, and the arrows near the bottom of the image show the direction of motion of the shadow. White text indicates the locations of the successful observing stations. The black dots are the closest approaches of Pluto to the Earth in the centers of the shadow paths. Credit: A. Sickafoose

have to rely on changes in whatever atmosphere exists as it travels through space.

There's at least one handy observational clue that gives scientists some hope about observing changes in the atmosphere: the gases combine to form hazes. As the pressure drops, those hazes have begun to thin out. Eventually, they will settle lower to the surface (and possibly some of it could actually coat the Pluto landscape). The exact physics of the

atmosphere isn't well understood, but it is tightly coupled with the properties of Pluto's surface ices, according to Sickafoose. "We're at a particularly interesting point for Pluto," she explained. "Our work suggests that the atmosphere has recently started decreasing in pressure. I am hopeful that we'll be able to get more data in the next years to decades to specifically confirm or refute this trend."

So, how to study a distant, thin atmosphere

as it shrinks and freezes? The answer lies in events called "occultations". These occur when Pluto (or any world) passes in front of (occults) a more distant star or other object. For Pluto, when it does this, the light from the distant stars can pass through the atmosphere. That trip through the tenuous blanket of gases changes the starlight. Some gets absorbed or deflected, and lost to our view. The "depth" of the hazes determines how much light is absorbed. If there's a lot of haze, more light disappears than from areas where there's little haze. So, the variations in light can give a map of the hazes and their thickness at any given time. Over repeated observations, scientists can measure how the hazes are thinning out and dropping lower toward the surface. Pluto Presents Challenges

Pluto, continued

Occultations of distant stars by Pluto can be tricky. Faint as it is, when Pluto occults a star, that casts the planet's shadow across our planet. It's a faint shadow, to be sure, but with the right instruments, it can be picked up and measured. However, that also means the shadow can be spread out across thousands of miles of continents and oceans. So, teams of observers also get spread out across the shadow's paths, just as we do for solar eclipses here on Earth. That makes gathering data about Pluto's atmosphere a challenge, but it also has an upside: different observers in different regions will capture data about different parts of Pluto's atmosphere. Sickafoose pointed out that the teams often look for paths that will take the shadow over places with good facilities for observing. "We often prefer to observe predicted occultations

that have shadow paths over large observatories because that equipment and data have proven successful," she said.

"Then, we try to improve those datasets by collaborating with local observers in the shadow paths."

Once the occultation begins, the teams look for distinct changes in the data about the Plutonian atmosphere and its hazes. What matters most in these observations is how bright the star appears throughout the event. The teams use telescopes to measure how much light is detected before, during, and after the occultation. That allows them to calculate how much the light fades (or is deflected by particles in the atmosphere), and how long it takes before the light comes back. That, in turn, gives a good idea of the density of the atmosphere in different regions.

"I'm constantly amazed at how the simple technique of watching starlight dim and reappear allows us to study a thin atmosphere – a few millionths of the Earth's – on a world two-thirds the size of our Moon and 30 times farther from the Sun," Sickafoose said. Atmospheric Science via Occultations

Measuring multiple occultations is a painstaking way to indirectly measure a planet's atmosphere and its changing pressure. In the team's paper, they point out obvious changes at Pluto, including some variations between different regions of the Plutonian atmosphere. They wrote: "Our results indicate a pressure plateau between the New Horizons flyby in 2015 through roughly 2021 and suggest that the atmospheric pressure has started to drop. Between 2015-2021 and

Pluto, continued

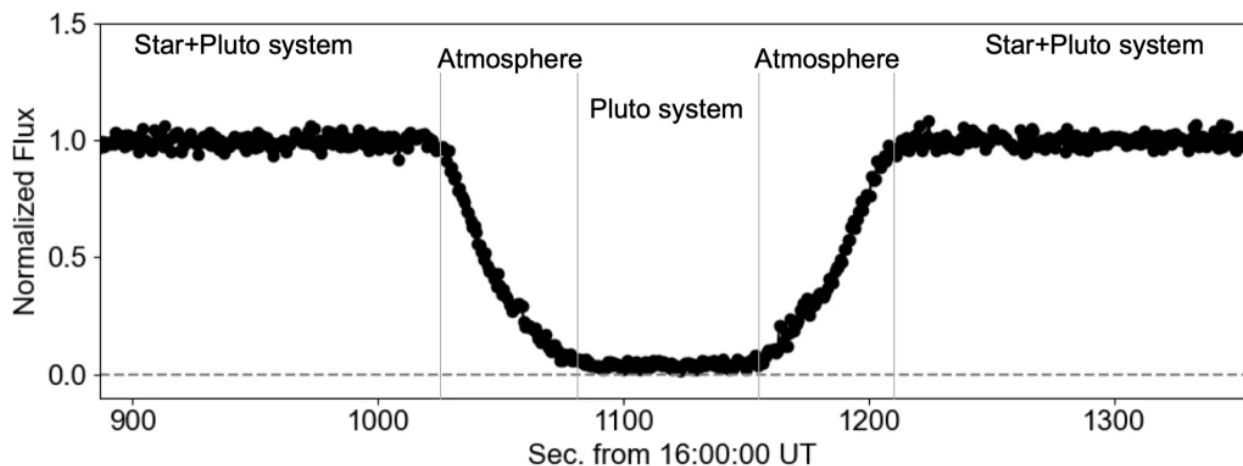
2022, the clear-atmosphere pressure at 1275 km decreased $7 \pm 6\%$, and it dropped $16 \pm 2\%$ for pressure at 1,215 km when including haze.

"From 2017-2023, the upper atmospheric structure is consistent, while there is a change in light-curve slope in the lower atmosphere. This change-of-slope is consistent with haze particles settling over yearly or shorter

timescales. Spikes in one light curve are indicative of intermittent buoyancy waves."

Ultimately, despite these useful occultation measurements, many questions remain unanswered about Pluto's atmospheric changes in the coming decades. As it moves farther from the Sun, will its gases freeze out completely, or will the planet retain a hazy, but

smaller, denser, hazier atmosphere closer to the surface? Clearly, additional measurements are needed, as well as further analysis of the current occultation data. Those should shed more light on the changing characteristics of the upper and lower parts of that atmosphere as temperatures and light intensities drop.



Light curve from the 2026 June 1 occultation, observed from Savannah Skies Observatory in Chillagoe, Queensland, Australia. The gray vertical lines indicate different stages of the occultation. The baseline flux level contains combined light from the star and the Pluto system (Pluto plus all of its moons). The flux drops gradually as the starlight bends and scatters in Pluto's atmosphere, reaching nearly zero flux as defined by only light coming from the Pluto system. As the star appears on the other side of Pluto, the light gradually reappears in the atmosphere before returning to full strength. Credit: A. Sickafoose

Astrophotography



*LBN437(Gecko Nebula) & SH2-126 by Brett Boller
William Optics Redcat 51mm @NSP 7-17-26
73 x 180 Seconds*

Astrophotography



*Wide Angle Rho Ophiuchi by Brett Boller
Canon R6 markII / Canon 24-105 f2.8 @ 61mm
85 x15 piggybacked on telescope mount*

Astrophotography



B104. Fish hook. SeeStar S50 15 20 second exposures. No processing.

B72. SNAKE. with her three eggs B67; B68; B69. SeeStar S50 29 minutes total of 20 second exposures.

By Bob Kacvinsky

Astrophotography



Jim White 2026

Crescent Nebula, NGC6888 by Jim White. Also known as NGC 6888, Caldwell 27 and Sharpless 105. The Crescent Nebula is approximately 5000 light years from earth in the constellation Cygnus and was discovered by William Herschel in 1792. This image is the combination of 66 180 second images taken on August 23rd and 24th of 2025 with no filter and 50 360 second images taken on August 2nd of 2026 using an L-eNhance filter. All of the images were calibrated with corresponding dark frames, flat frames and dark flat frames. The frames were all stacked, calibrated and processed using PixInsight software. This isn't the first time that I have combined multi-night exposures but is the first time that I have combined multi-year exposures and exposures with different exposure times. This was taken from my patio in South Lincoln. My equipment: Celestron 925 EdgeHD SCT telescope, Celestron CGX Equatorial Mount, ZWO ASI 2400MC Pro Imaging Camera, Celestron OAG (Off-Axis-Guider), ZWO ASI 174MM mini Guide Camera, Mount control and imaging was controlled with a Windows 11 PC running N.I.N.A. to combine CPWI for mount control, PHD2 for guide camera control, N.I.N.A. to control guiding and imaging cameras and Stellarium to provide target coordinates to N.I.N.A. I'm looking forward to adding more data to this image in the future!

Astrophotography



*M17 Omega Nebulae by John Reinert
ISO 32000 25 sec, Nikon D780 with 2800mm FL Celestron CPC 1100. Full frame 24.5
MP sensor.*

Astrophotography



Nikon D780 28mm Nikkor f3.5, ISO 10000, 20 sec exposure of the Milky Way from Dob Row. By John Reinert

Astrophotography



Saturn by John Reinert

ISO 400 1/13sec, Nikon D780 with 2800mm FL Celestron CPC 1100 cropped image of Saturn nearly matched what I saw using my ES 12mm 92 degree AFOV eyepiece. I was thrilled to see it. Saturn is at 38 degrees elevation from the horizon at 3:35am CDT.

From the Archives, August 1976

Observatory Committee Makes Its Pitch To Council: No Money From City Funds

A good turnout of Prairie Astronomy Club members helped to fill the City Council chambers to overflowing on the night of August 12. The occasion was the Lincoln City Council's annual final public budget review, and the club members were there to show their support for the proposed Community Observatory. Former Nebraska Governor Bob Crosby, Dale Rathe, Science Curriculum Coordinator for the Lincoln Public schools, and Lee Thomas, Station and Program Manager of KLMS, presented the case to the Council. The Observatory Committee, headed by Professor Carroll Moore, has raised all most exactly half of the \$60,000 needed to complete the observatory, in Holmes Park. Anyone following news reports of the city's financial woes could

probably have foretold the outcome of our plea for funds: we were not alone. The Council was in no mood to add money to anybody's, budget, especially at the last minute for a project that they had had no opportunity to discuss in detail. They listened politely, and, in a later executive session decided, in effect, no way. With perfect 20/20 hindsight, it is obvious that we should have presented our proposal first to the Mayor. Her budget after all, is the jumping-off point of most council discussions. And most of the general avenue sharing funds, of which we were attempting to get an amount earmarked for the observatory are apportioned in the mayor's budget. At least we would have had the advantage of having presented our case in

several courts and in plenty of time to allow some considered judgment. It was a matter of something less than one hour between first proposal to the council and the time when the Council members were forced to make their final decision. If somebody asked you to decide whether to give them \$30,000, and you had to make up your mind in one hour, and you were confronted by a roomful of taxpayers who wanted to hold down spending, what would you have done? The observatory committee will meet in early September to determine a plan of action to solicit further contributions. We have little doubt that the observatory can be built—it is simply a question of how soon, and for how much.

MEMBERSHIP INFO

REGULAR MEMBER - \$30 per year.
Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - \$36 per year.
Same as regular member except gets 2 votes at club meetings.

STUDENT MEMBER - \$12 per year
with volunteer requirement.

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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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.

