

The Prairie Astronomer

July 2023 Volume 64, Issue #7



IN THIS ISSUE: Webb Celebrates First Year
August Night Sky



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer



The next meeting is July 25th at 7:30pm at Hyde Observatory

NEXT MEETING AND PROGRAM

At the July meeting we will show photos and video taken at the Nebraska Star Party.

If you have astronomy-related photos, videos, or drawings you'd like to showcase, please send them to me at jason@oflaherty.com contact. Include a list of any people featured in the pictures and a brief description, so we can fully appreciate each submission.

UPCOMING PROGRAMS

August: Highlights of the first year of operation of the James Webb Space Telescope (Bob Kacvinsky)

September: A More Complete List of Young Stellar Objects Candidates in AFGL490 (Ethan Van Winkle)

October (tentative): The Accelerating Expanding Universe: Dark Matter, Dark Energy, And Einstein's Cosmological Constant (Bharat Ratra)

December: How to Buy a Telescope

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Cover: On June 27th, members of the Prairie Astronomy Club gathered for a group photo at Hyde Observatory. Aerial photo by Mark Dahmke.



CALENDAR

The PAC Calendar is now available as a [Google Calendar](#).

Nebraska Star Party
July 16-22 at Merritt Reservoir, Valentine, Nebraska

PAC Meeting
Tuesday, July 25th, 7:30pm at Hyde Observatory
Program: A review of the Nebraska Star Party

PAC Meeting
Tuesday, August 29th 7:30pm at Hyde Observatory
Program: Highlights of the first year of JWST discoveries

PAC Meeting
Tuesday, September 26th, 7:30pm at Hyde Observatory
Program: A More Complete List of Young Stellar Objects Candidates in AFGL490

PAC Meeting
Tuesday, October 31st, 7:30pm at Branched Oak Observatory

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

2023 STAR PARTY DATES

	Date	Date
January	13	20
February	10	17
March	17	24
April	14	21
May	12	19
June	9	16
July	7	14
NSP	7/16	7/22
August	11	18
September	8	15
October	6	13
November	3	10
December	8	15

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

CLUB OFFICERS

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Night Sky Network

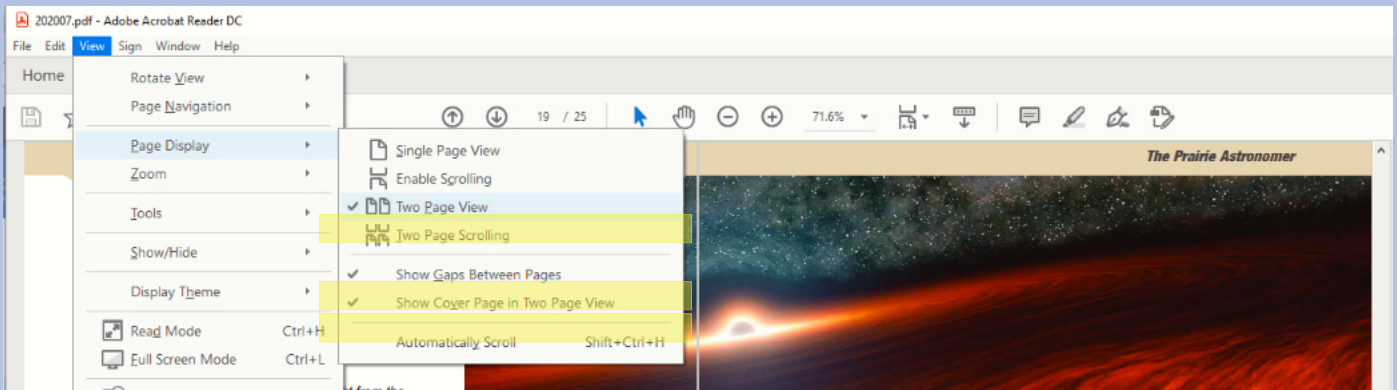


www.prairieastronomyclub.org

Notices

New Newsletter Format

How to Adjust Adobe Acrobat Settings for Two Page View



To view this newsletter in magazine spread format in Acrobat, select View ->Page Display->Two Page View. Acrobat will then show two pages side by side. Also make sure the checkboxes “Show Cover Page in Two Page View” and “Show Gaps Between Pages” are checked. If you have it setup correctly, the cover page will be displayed by itself and subsequent pages will be side by side with the odd numbered pages on the left.

PAC Newsletter Archive

Back issues of the *Prairie Astronomer* from 1962 to present are available online:
<https://newsletters.prairieastronomyclub.org/>

Pay Dues Online

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

If you're already a member and are renewing within 30 days of your anniversary date, select the early renewal option for a discount.

PAC-LIST

Subscribe through [GoogleGroups](#) or contact Mark Dahmke to be added to the list. You'll need a Google/gmail account, but if you want to use a different email address, just associate that address with your google account to access Google Groups. Once subscribed, you can view message history through the GoogleGroups website.

To post messages to the list, send to this address: pac-list@googlegroups.com

The President's Message

Jason O'Flaherty

I hope this letter finds you all in good spirits and with a continued fascination for the wonders of the universe. As we dive into the heart of summer, it's time for another exciting edition of our monthly newsletter, packed with updates and reminders for our excellent astronomy community.

First, I'd like to remind you about our upcoming meeting on July 25th at 7:30 p.m. After a refreshing two-month break with various formats, we will be returning to our usual meeting style. Instead of a presenter, we have our annual photography event to look forward to. We'll be showcasing your photos from the Nebraska Star Party, as well as any others that our talented members would like to share. If you have any drawings, photos, or videos you'd like to contribute from the past few months, please send them to

jason@oflaherty. contact, along with a short description. It's a fantastic opportunity to appreciate the beauty of the night sky through the lenses of our fellow astronomers. We will also return to sharing our meetings on Zoom for those unable to attend in person.

Looking ahead to our August meeting, mark your calendars for a momentous occasion. We will be celebrating the one-year anniversary of the James Webb Space Telescope. To enlighten us on the remarkable discoveries made in its inaugural year, our own NASA Solar System Ambassador, Bob Kacvinsky, will present "James Webb Space Telescope: Discovering the Heavens Year 1. A review of new discoveries by the Webb Space Telescope." It promises to be an entertaining evening.

We have started advertising this



presentation to the public to expand our reach and share our passion with the broader community. Keep an eye on our Facebook Page for more information, and please help us spread the word to anyone you think would be interested. As always, our meetings are free and open to the public. We welcome newcomers and would love a good turnout for this special event.

Thank you to everyone who braved the heat and attended our Solar Observing Party at the June meeting. Despite the challenges posed by the bright sun, the group photos taken by Mark Dahmke and I turned out great. A special thank you to those of you who took the time to set up your scopes for the solar

Continued on page 8...

ARP 57

The Mantrap Skies Image Catalog

Arp 57 is in the southeast corner of Coma Berenices just a few minutes of arc across the border from Virgo. The bottom of the image is in Virgo in fact. It is about 813 million light-years away. Arp put it in his category of spirals with high surface brightness companions on its arm. This time finding the galaxy on the arm is easy as his comment reads: "Small companion connected to end of arm." Or is it easy? Seems there are two galaxies on the end of the arm, a small round blue one followed a bit further out by a larger red oval one. To add to the confusion there's a third one just west of the core of the main galaxy. All are marked on the annotated image. The problem is there's no red shift distance for the two on the end of the arm. The third one no one seems to mention is at the same distance and far closer to the core, at least by line of sight. Or is it just a knot in the spiral arm and not a true galaxy? Then there's the more distant companion also at about the same distance. It doesn't appear distorted so likely hasn't interacted with Arp 57 though obviously is



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.



ARP57, continued.

nearby. The two "on" the arm may be as well, I just can't tell. NED makes no attempt to classify any galaxy in the image even the obvious ones.

Edit: Since this was written NED now has a redshift for the galaxy at the end of the drawn-out arm. It shows it to be at the same distance as the spiral galaxy. It is indeed part of the system and likely a true companion. Possibly the cause of the drawn-out arm.

Coverage of this field at NED is hit or miss it appears. In the upper left area of the image three rather bright galaxies aren't in their data base. But below the topmost of the three is a 22.4 magnitude galaxy I've marked that is. Also below these three is a large group of very faint galaxies mostly 22nd and 23rd magnitude. Those I checked are in NED. They appear to be an obvious cluster but NED lists none in this area. Nor does it list a redshift for any in the

group -- very frustrating.

A bit above and right of this area is an object at 3.4 billion light-years that is listed in NED as both a Seyfert 1 galaxy and a quasar. Its PSF does fit a point source so likely is a rather close quasar.

This image was taken on a night of far better seeing than normal so was binned 1x1 for a 0.5" per pixel image scale.

BIENVENUE EN LOUISIANE! (WELCOME TO LOUISIANA!)

Join us for this unique and exciting amateur astronomy gathering!



July 26–29, 2023

Hilton Baton Rouge
Capitol Center Hotel
201 Lafayette Street
Baton Rouge, LA 70801

ALCON 2023



KEYNOTE SPEAKERS

- ★ David Eicher—writer, editor-in-chief of *Astronomy Magazine*
- ★ Fred Espenak—co-author of *Totality: The Great American Eclipses of 2017 and 2024*
- ★ David Levy—author, comet hunter

FIELD TRIPS

- ★ Irene Pennington Planetarium
 - ★ LIGO (Laser Interferometer Gravitational-Wave Observatory) Livingston*
 - ★ Louisiana State University Physics & Astronomy
 - ★ Highland Road Park Observatory
- *Spaces are limited for this trip!

SPEAKERS ★ Pranvera Hyseni ★ Guy Consolmagno ★ Dan Davis ★ And many more!

Brought to Baton Rouge by the **Baton Rouge Astronomical Society**

★★ Registration is now open! Check alcon2023.org ★★



President's Message, continued.

viewing. This yearly event exists only because of your help.

Regretfully, I won't be able to accompany those embarking on the journey to Valentine for the 30th Annual Nebraska Star Party. Unfortunately, my class finals fall during the

same week. However, I wish all the attendees safe travels and clear skies for a memorable and awe-inspiring experience.

Thank you all for your continued support and dedication to our astronomy club. Through our shared

enthusiasm and collective curiosity, we can truly appreciate the vast mysteries that lie beyond our world.

Clear skies and best wishes,

Jason O'Flaherty



Outreach Opportunities

Christine Parkyn

Thanks to all who supported our recent outreach events in April! Below are upcoming outreach events. To volunteer to support an event, let Christine Parkyn know at cpparky@gmail.com.

Stargazing for Camp Erin Johnson: September 22, 2023 at Carol Joy Holling from 9:00 to 10:00 p.m. Need 4 volunteers

Focus on Observing Programs

Jim Kvasnicka

Binocular Observing Programs

If you don't own a telescope there are several observing programs designated for binoculars that you can do. Currently there are four observing programs for binoculars.

- Binocular Messier Observing Program
- Binocular Deep Sky Observing Program
- Binocular Double Star Observing Program
- Binocular Variable Star Observing Program

Binocular Messier Observing Program

To qualify for the Binocular Messier Observing Program you must observe 50 or more of the objects from the Messier list.

Binocular Deep Sky Observing Program

The Binocular Deep Sky Observing Program has 60 selected objects you must observe.

Binocular Double Star Observing Program

You must observe 50 double stars from a list of 120 to choose from.

Binocular Variable Star Observing Program

First you must obtain an AAVSO

observer code and make a total of 60 observations from at least 15 different binocular variables.

To record your observations you can use the logs provided on the Astronomical League website or you can use your own. Your observing logs should include: your name, object, date, time, seeing conditions, location, binocular size, and a description of what you observed.

When you complete any of the Binocular Observing Program you will need to submit a copy of your observing logs to me for review. If your logs are accurate and complete I will submit your name to the Binocular Observing Program chair for approval. The chair will mail to me your certificate and pin which I will present to you at our monthly PAC meeting.

If you have any questions regarding any of the Binocular Observing Programs or need help getting started please contact me and I will be glad to help.

August Observing

Jim Kvasnicka

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

Planets

Mercury and Mars: Low in the west, difficult to see.

Jupiter: Morning planet in Aries at magnitude -2.4.

Saturn: Morning planet in Aquarius at magnitude +0.5.

Uranus and Neptune: Morning planets in Aries and Pisces.

Venus: At inferior conjunction on 8/13. Best seen at the end of the month in the morning.

Meteor Showers

Perseids: Peaks the night of August 12-13. Expect up to 90 meteors per hour. The Moon will not interfere, the thin crescent will rise 1.5 hours before twilight.

Messier List

M6/M7: Open clusters in Scorpius.

M8: The Lagoon Nebula in Sagittarius.

M9/M10: Class VIII and VII globular clusters in Ophiuchus.

M12/M19: Class IX and VIII globular clusters in Ophiuchus.

M20: The Trifid Nebula in Sagittarius.

M21/M23: Open clusters in Sagittarius.

M62/M107: Class IV and X globular clusters in Ophiuchus.

Last Month: M3, M4, M5, M53, M68, M80, M83



Next Month:

M13, M14,
M22, M28,
M54, M69, M70, M92

NGC and other Deep Sky Objects

NGC 6717: Palomar 9, Class VIII globular cluster in Sagittarius.

NGC 6741: Planetary nebula in Aquila.

NGC 6781: Planetary nebula in Aquila.

NGC 6818: Little Gem, planetary nebula in Sagittarius.

B86: The Ink Spot, dark nebula in Sagittarius.

Double Star Program List

Struve 2404: Close pair of orange stars in Aquila.

57 Aquilae: Pair of white stars.

Beta Cygni: Albireo, gold and blue stars.

31 Cygni: Yellow primary with a blue secondary.

61 Cygni: Two orange stars.

Epsilon Lyrae: The Double Double.

Zeta Lyrae: Yellow pair.

Beta Lyrae: Yellow primary with multiple white stars.

Challenge Object

NGC 6822: Barnard's Galaxy in Sagittarius.

Webb Celebrates First Year of Science With Close-up on Birth of Sun-like Stars

NASA's Jet Propulsion Laboratory led the development and delivery of Webb's Mid-Infrared Instrument (MIRI).

From our cosmic backyard in the solar system to distant galaxies near the dawn of time, NASA's James Webb Space Telescope has delivered on its promise of revealing the universe like never before in its first year of science operations. To celebrate the completion of a successful first year, NASA has released Webb's image of a small star-forming region in the Rho Ophiuchi cloud complex.

"In just one year, the James Webb Space Telescope has transformed humanity's view of the cosmos, peering into dust clouds and seeing light from faraway corners of the universe for the very first time. Every new image is a new discovery, empowering scientists around the globe to ask and answer questions they once could never dream of," said NASA Administrator Bill

Nelson. "Webb is an investment in American innovation but also a scientific feat made possible with NASA's international partners that share a can-do spirit to push the boundaries of what is known to be possible. Thousands of engineers, scientists, and leaders poured their life's passion into this mission, and their efforts will continue to improve our understanding of the origins of the universe – and our place in it."

The new Webb image released today features the nearest star-forming region to us. Its proximity at 390 light-years allows for a highly detailed close-up, with no foreground stars in the intervening space.

"On its first anniversary, the James Webb Space Telescope has already delivered upon its promise to unfold the universe, gifting

humanity with a breathtaking treasure trove of images and science that will last for decades," said Nicola Fox, associate administrator of NASA's Science Mission Directorate in Washington. "An engineering marvel built by the world's leading scientists and engineers, Webb has given us a more intricate understanding of galaxies, stars, and the atmospheres of planets outside of our solar system than ever before, laying the groundwork for NASA to lead the world in a new era of scientific discovery and the search for habitable worlds."

Webb's image shows a region containing approximately 50 young stars, all of them similar in mass to the Sun, or smaller. The darkest areas are the densest, where thick dust cocoons still-forming protostars. Huge bipolar

Webb, continued.



The first anniversary image from NASA's Webb is of the Rho Ophiuchi cloud complex, the closest star-forming region to Earth. Jets bursting from young stars crisscross the image, impacting the surrounding interstellar gas and lighting up molecular hydrogen, shown in red. NASA, ESA, CSA, STScI, and K. Pontoppidan (STScI). Image Processing: A. Pagan (STScI)

Webb, continued.

jets of molecular hydrogen, represented in red, dominate the image, appearing horizontally across the upper third and vertically on the right. These occur when a star first bursts through its natal envelope of cosmic dust, shooting out a pair of opposing jets into space like a newborn first stretching her arms out into the world. In contrast, the star S1 has carved out a glowing cave of dust in the lower half of the image. It is the only star in the image that is significantly more massive than the Sun.

“Webb’s image of Rho Ophiuchi allows us to witness a very brief period in the stellar lifecycle with new clarity. Our own Sun experienced a phase like this, long ago, and now we have the technology to see the beginning of another star’s story,” said Klaus Pontoppidan, who served as Webb project scientist at the Space Telescope Science Institute in Baltimore, Maryland, since before the telescope’s launch and through the first year of operations.

Some stars in the image display telltale shadows indicating protoplanetary disks – potential future planetary systems in the making.

A Full Year, Across the Full Sky

From its very first deep field image, unveiled by President Joe Biden, Vice President Kamala Harris, and Nelson live at the White House, Webb has delivered on its promise to show us more of the universe than ever before. However, Webb revealed much more than distant galaxies in the early universe.

“The breadth of science Webb is capable of exploring really becomes clear now, when we have a full year’s worth of data from targets across the sky,” said Eric Smith, associate director for research in the Astrophysics Division at NASA Headquarters and Webb program scientist. “Webb’s first year of science has not only taught us new things about our universe, but it has

revealed the capabilities of the telescope to be greater than our expectations, meaning future discoveries will be even more amazing.” The global astronomy community has spent the past year excitedly poring over Webb’s initial public data and getting a feel for how to work with it.

Beyond the stunning infrared images, what really has scientists excited are Webb’s crisp spectra – the detailed information that can be gleaned from light by the telescope’s spectroscopic instruments. Webb’s spectra have confirmed the distances of some of the farthest galaxies ever observed and have discovered the earliest, most distant supermassive black holes. They have identified the compositions of planet atmospheres (or lack thereof) with more detail than ever before and have narrowed down what kinds of atmospheres may exist on rocky exoplanets for the first time. They also have revealed the chemical makeup of

Webb, continued.

stellar nurseries and protoplanetary disks, detecting water, organic carbon-containing molecules, and more. Already, Webb observations have resulted in hundreds of scientific papers answering longstanding questions and raising new ones to address with Webb.

The breadth of Webb science is also apparent in its observations of the region of space we are most familiar with – our own solar system.

Faint rings of gas giants appear out of the darkness, dotted by moons, while in the background Webb shows distant galaxies. By comparing detections of water and other molecules in our solar system with those found in the disks of other, much younger planetary systems, Webb is helping to build up clues about our own origins – how Earth became the ideal place for life as we know it.

“With a year of science

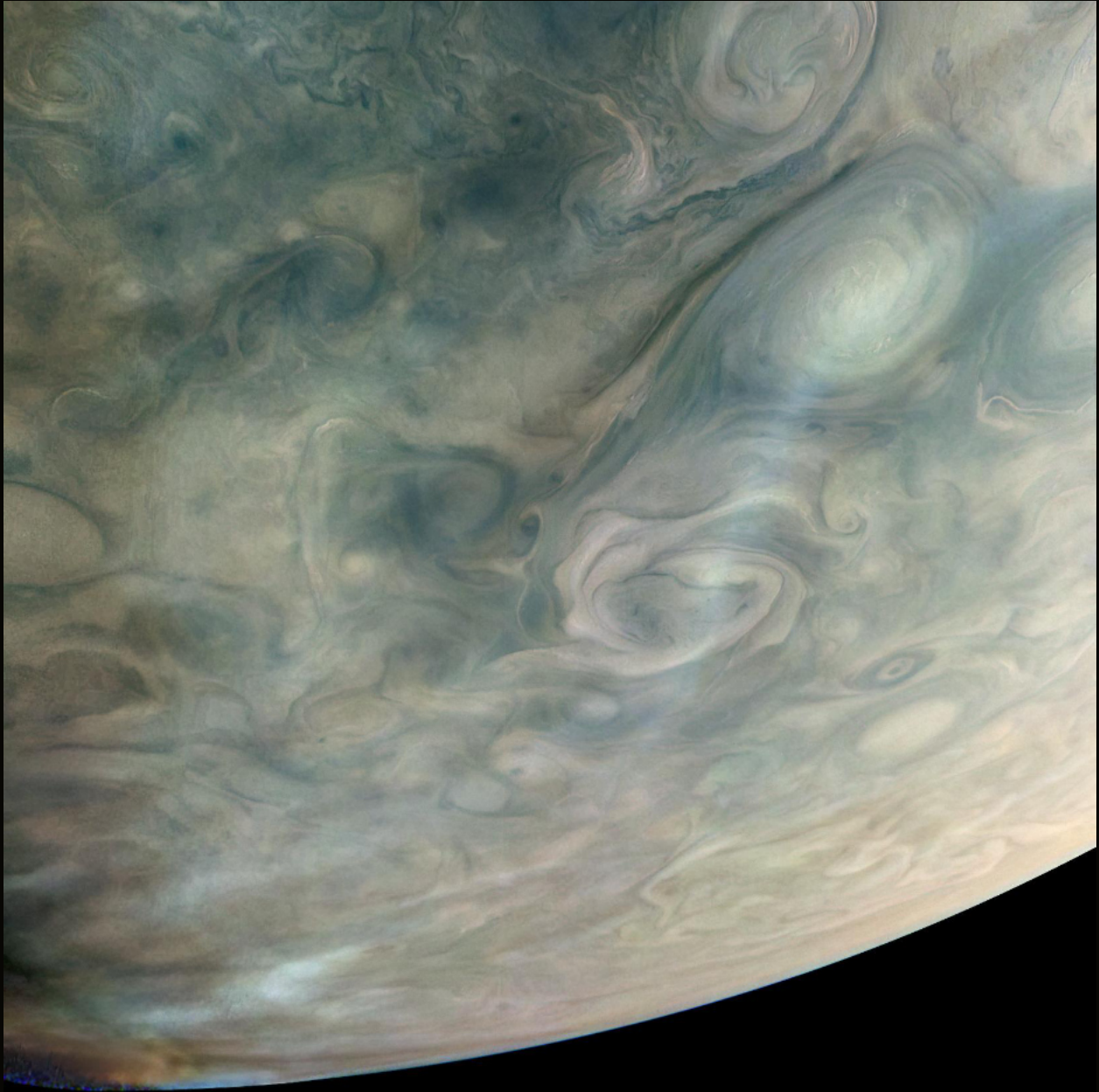
under our belts, we know exactly how powerful this telescope is and have delivered a year of spectacular data and discoveries,” said Webb Senior Project Scientist Jane Rigby of NASA’s Goddard Space Flight Center. “We’ve selected an ambitious set of observations for year two – that builds on everything we’ve learned so far. Webb’s science mission is just getting started – there’s so much more to come.”

NASA’s James Webb Space Telescope has produced the deepest and sharpest infrared image of the distant universe to date. Known as Webb’s First Deep Field, this image of galaxy cluster SMACS 0723 is overflowing with detail.

Credit: NASA, ESA, CSA, and STScI



Juno Observes High-Altitude Hazes in Jupiter's Atmosphere



Images: NASA/JPL-Caltech/SwRI/MSSS 2023-03-01 05:44:36 Product ID: JNCF_2023060_A9C00105_V01 Image processing: Björn Jónsson

As NASA's Juno spacecraft flew low over the giant planet's cloud tops, its JunoCam instrument captured this look at bands of high-altitude haze forming above cyclones in an area known as Jet N7. March, 2023.

Credit: Image data: NASA/JPL-Caltech/SwRI/MSSS Image processing by Björn Jónsson © CC NC SA

Astrophotography *Dave Knisely*

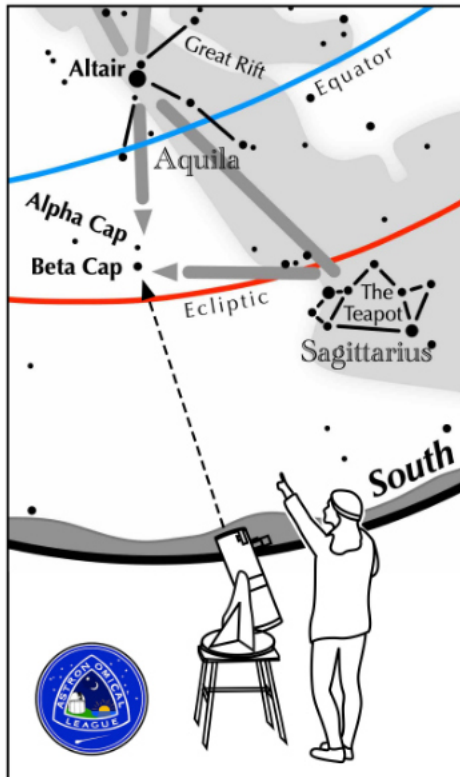


The Milky Way and my "Black Mamba" telescope

At Big Indian Lake south of Wymore

*(30 seconds on a Canon Rebel XT Model 350D,
18-55mm lens set to 18mm f/5.6, ISO 1600).*

ASTRONOMICAL LEAGUE Double Star Activity



Other Suns: Beta Capricorni

How to find Beta Capricorni on an August evening

Find bright Altair, the southeastern member of the Summer Triangle. Then locate the "Teapot" asterism of Sagittarius. Use them to form a right triangle with Beta Capricorni being the right angle vertex.

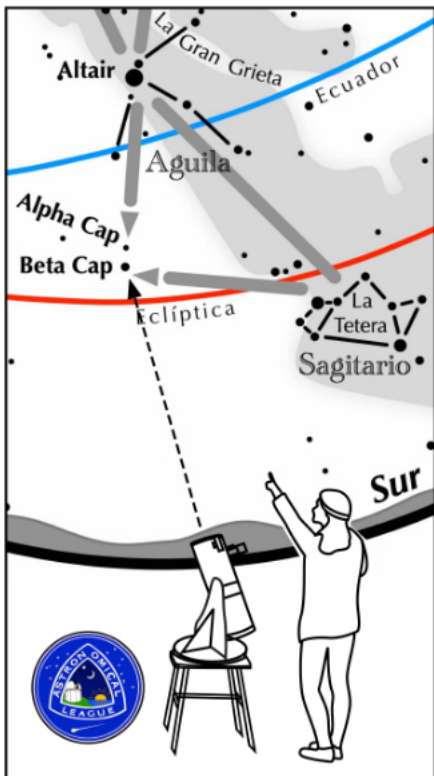
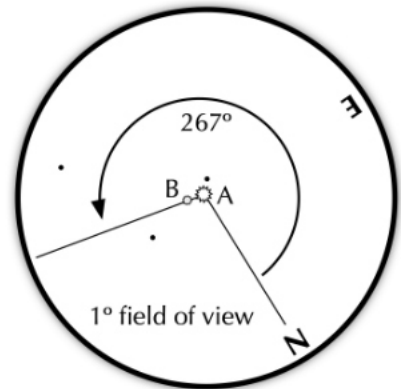
Suggested magnification: >10x
Suggested aperture: >2 inches

Beta Capricorni

A-B separation: 207 sec
A magnitude: 3.2
B magnitude: 6.1
Position Angle: 267°
A & B colors:
orange, white



Good binocular object!



Otros Soles: Beta Capricorni

Cómo encontrar Beta Capricorni en una tarde de Agosto

Encuentra al brillante Altair, el miembro del sureste del Triángulo de Verano. Luego ubique el asterismo "Tetera" de Sagitario. Úsalos para formar un triángulo rectángulo con Beta Capricorni como vértice del ángulo recto.

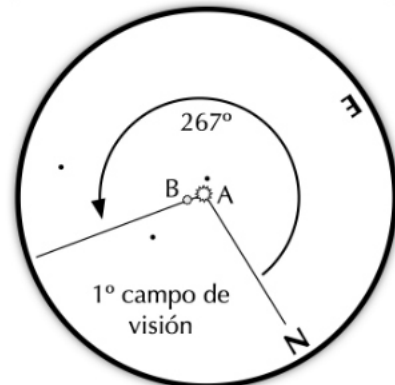
Ampliación sugerida: >10x,
Apertura sugerida: >50 mm

Beta Capricorni

A-B separación: 207 sec
A magnitud: 3.2
B magnitud: 6.1
PA: 267°
A & B color:
naranja, blanca



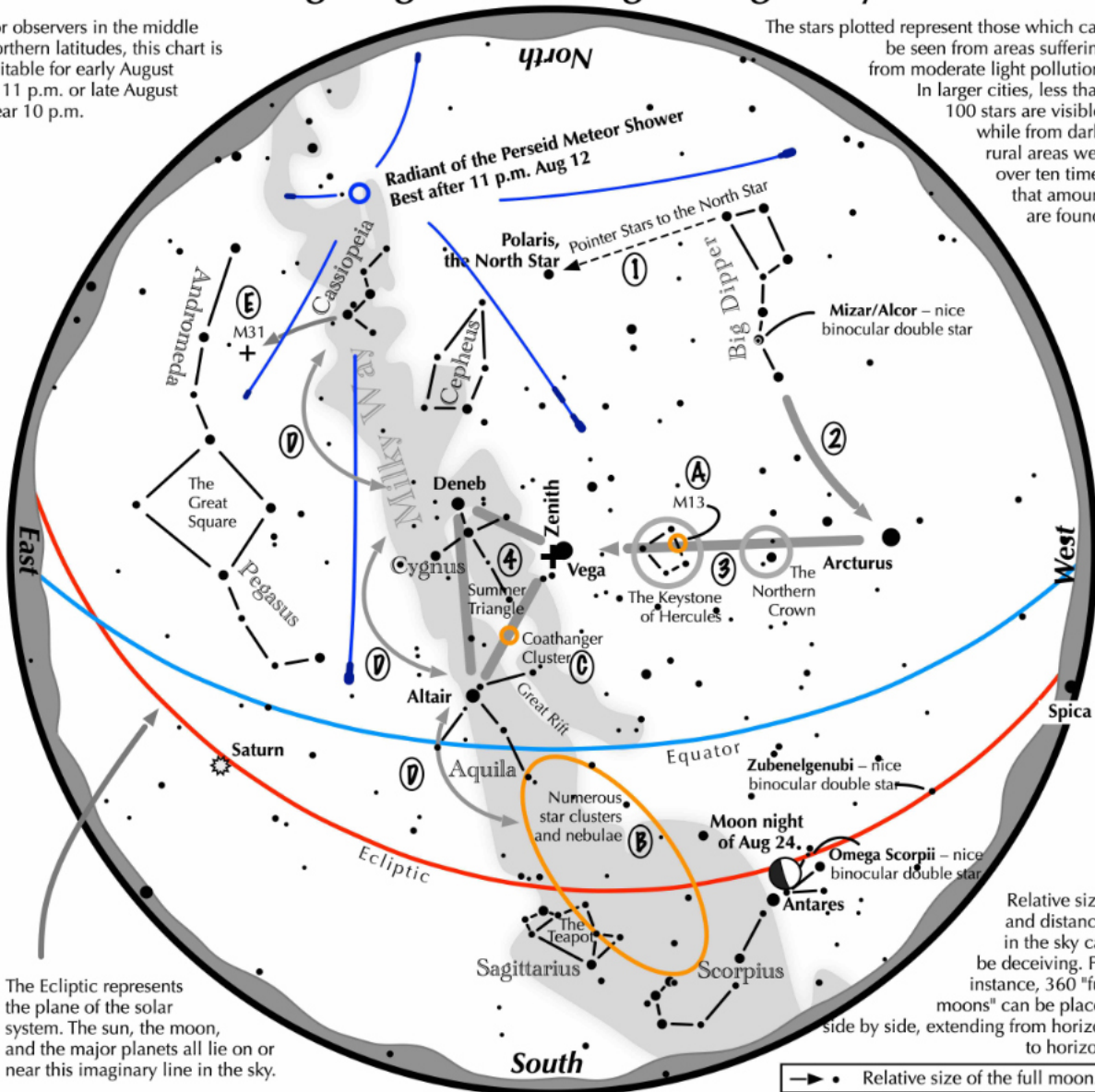
Buena estrella doble para binoculares!



Navigating the mid August Night Sky

For observers in the middle northern latitudes, this chart is suitable for early August at 11 p.m. or late August near 10 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 August night sky: Simply start with what you know or with what you can easily find.

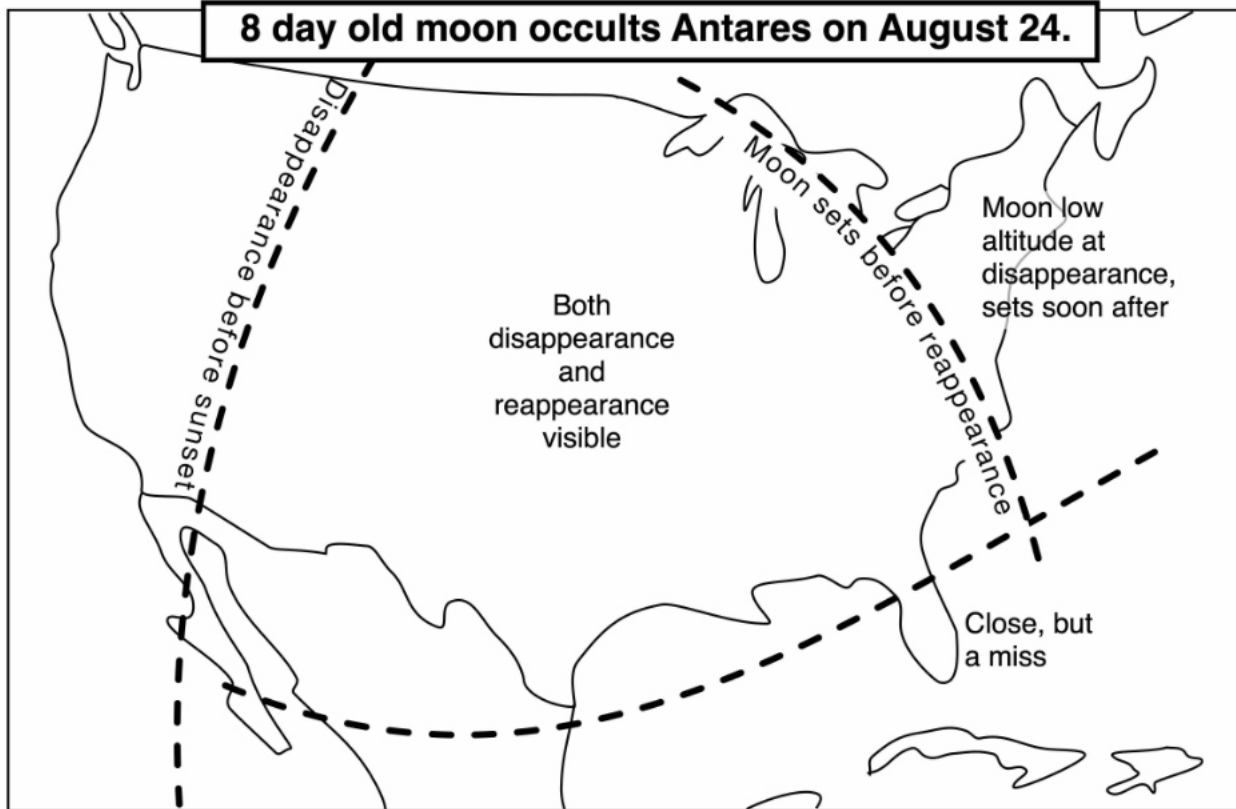
- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the June evening sky.
- 3 To the northeast of Arcturus shines another star of the same brightness, 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 High in the East lies the summer triangle stars of Vega, Altair, and Deneb.

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 see only one celestial event this August, see this one.

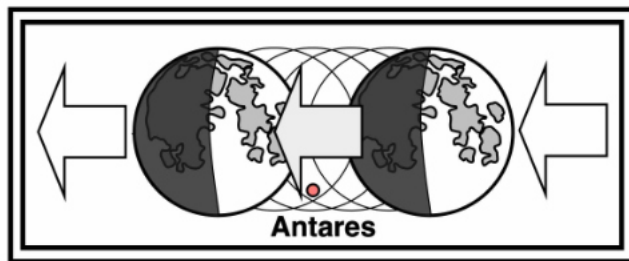


The full occultation event on Aug. 24 of Antares by the moon occurs for the central part of the US. Both coasts will not see the complete event. For disappearance and reappearance times in your area, visit the International Occultation Timing Association webpage:

<http://lunar-occultations.com/iota/bstar/0824zc2366.htm>



Start looking in the southwest shortly after sunset on August 24. Watch the moon slowly approach Antares, then suddenly block it. Binoculars will give better view.



Occultations demonstrate the moon's eastward orbital motion as Earth's rotation causes it to move in a westward arc across the night sky.



From the Archives

July, 2003

A Mars Report - Dr. Martin Gaskell

At least one PAC member has asked me what has happened to my Mars reports, so here is my first report on the run-up to the closest opposition in 50,000 years or so.

I first made an observation of Mars before dawn December 27, 2002 when Mars was 4.5" across. This made an interesting comparison with my post-dawn Friday observation (June 27) because the longitude on Mars was almost identical, except that in (our) December the Martian date was mid-July, and now that it is almost (our) July, the Martian date is late October. When I looked just after Christmas, Mars had its summer-sized N. polar cap towards us (tilt = +15 deg.); now the southern hemisphere is tipped towards us (tilt = -21 deg.), the N polar cap is shrouded in its winter haze

and the other cap (the S. polar cap) is in all its early spring glory.

The disk is now just over 16 arcseconds across, much bigger than it ever reached at opposition in the early to mid-1990s. There's a lot I could say about what I saw last week, and everything is much sharper than it was during the global dust storm of the last (2001) opposition, but a list of classical names of features might not mean much to most club members. I'll therefore concentrate on just the most interesting feature. This is the S. polar ice cap. It is very

obviously non-uniform now. It is breaking up irregularly. In the S. hemisphere of Mars it is the equivalent of April in Nebraska. The cap is asymmetric about the rotation axis. The region above Margaritifer Sinus is a pure white; the region above Syrtis

Major (very well placed before dawn right now) is a mottled off-white and I could see a division or rift between the two regions.

So, get out with your telescopes before dawn and carefully draw what you see in the S. polar cap. You'll see some interesting changes over the next few months.

Mars is low this year and I haven't seen it in good seeing yet, but the few moments of good seeing last week showed a huge amount of detail.

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

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