

The Prairie Astronomer

August 2023 Volume 64, Issue #8



IN THIS ISSUE: Nebraska Star Party Photos
JWST: Most Distant Star Ever Detected



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer



The next meeting is August 29th at 7:30pm at Hyde Observatory

NEXT MEETING AND PROGRAM

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." Come join us as we take a journey through some of the key highlights from this first year of scientific discovery.

UPCOMING PROGRAMS

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

December: How to Buy a Telescope

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Cover: The 30th Annual Nebraska Star Party at Merritt Reservoir, July 19, 2023. By Mark Dahmke



CALENDAR

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

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

Branched Oak Observatory's Annual Star-B-Que
 Saturday, September 9th, 4pm.

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

Hoot n'Howl
 October 7, 6:30pm at Spring Creek Prairie

Partial Solar Eclipse
 October 14th, 10:32am to 1:15pm.
 Hyde Observatory will be open.

PAC Meeting
 Tuesday, October 24th, 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

President	Jason O'Flaherty jflaher@gmail.com
Vice President	Brett Boller proboller86@yahoo.com
2nd VP (Program Chair)	Bill Lohrberg wmlohrberg89@gmail.com
Secretary	Jim White jrwhite2188@gmail.com
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Club Observing Chair	Jim Kvasnicka jim.kvasnicka@yahoo.com
Outreach Coordinator	Christine Parkyn cpparkyn@gmail.com
Website and Newsletter Editor	Mark Dahmke mark@dahmke.com

Night Sky Network

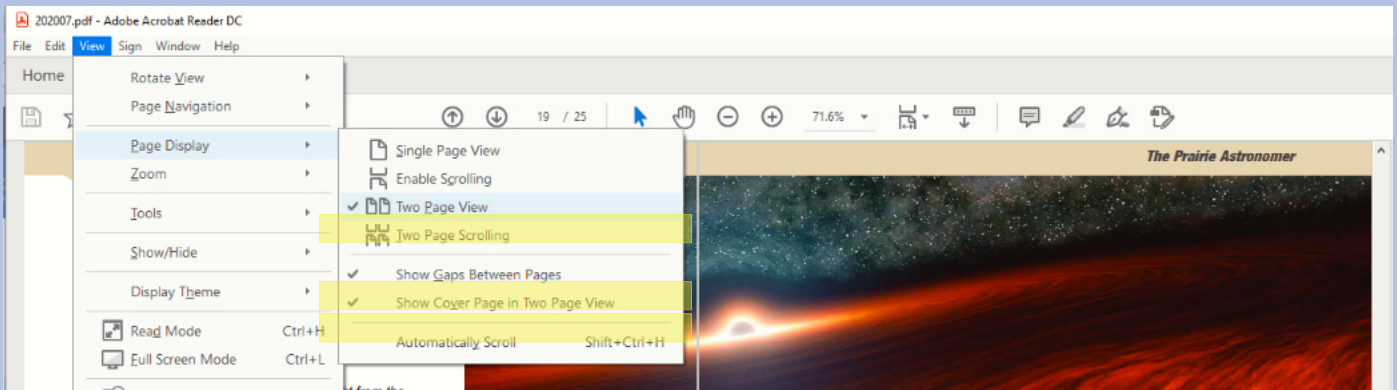


www.prairieastronomyclub.org

Notices

Newsletter Page View Format

How to Adjust Adobe Acrobat Settings for Two Page View



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

PAC Newsletter Archive

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

Pay Dues Online

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

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

PAC-LIST

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

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

The President's Message

Jason O'Flaherty

Greetings to all our starry-eyed members! I hope this letter finds you well, despite the scorching heat that seems to have blanketed our days. As I sit here writing to you in front of a portable air conditioner, I can't help but dream of the cooler embrace of September's breeze. But before we bid adieu to these sultry days, let's appreciate the summer nights and all they offer!

I apologize for my absence from our last meeting due to final exams. I sincerely thank Dan Delzell for stepping in and running the meeting. I was glad to hear that the slideshow of your great photos played well. I enjoyed looking at your pictures as I put them together. Even though I couldn't attend, I felt right there with you at the Nebraska Star Party when looking at them all.

Remember to mark your calendars for our upcoming meeting on August 29th at 7:30 p.m., where we will be celebrating the first anniversary of the

James Webb Space Telescope. Bob Kacvinsky has graciously agreed to present, and I encourage you to invite your friends and family to join us. Let's make this a memorable evening and spread the word about the wonders of space exploration.

Looking ahead, we will nominate new officers during our September meeting. This is your chance to get more involved in our club's leadership. If you're interested in holding a position or know someone who would be a great fit, please reach out to me or any of our officers or nominate them during the meeting. Our club is democratic, and everyone is welcome to run. If you'd like more information about the duties of each position, I can send that your way.

Also, we'll welcome Ethan Van Winkle as our presenter in September. He will discuss a year-long odyssey where high school teachers and students collaborated



with a Caltech professor to delve into the world of astronomy research.

A quick note regarding our October meeting: it falls on Halloween this year. While not everyone may celebrate, we want to be as accommodating as possible for those who do. Thus, we've decided to move our October meeting up by a week to Tuesday, October 24th. It will be held at Branched Oak Observatory, as is our tradition, where we will vote on our club officers for the following year.

Unfortunately, due to this date change, we've encountered a scheduling conflict with our October presenter. If you have any suggestions for a replacement presenter, please contact Bill Lohrberg.

Stellar regards,
Jason O'Flaherty

ARP 58

The Mantrap Skies Image Catalog

Arp 58, UGC 4457 is a bit over a half billion light-years away in the constellation of Cancer, not far from M44, the Beehive Cluster. I tried taking this at 0.5" per pixel but seeing wasn't really up to it so I reduced the image to 0.75" per pixel. Still higher than my normal image scale. Arp classifies this one as a spiral with a small, high surface brightness companion same as Arp 52. His notes say; "...companion on end of broken arm nearly star-like". I'd have to agree. Actually, there may be two galaxies on the arm and the arm appears detached from the galaxy to me. The obvious galaxy on the lower arm segment is LEDA 023937 an E0 elliptical galaxy that appears nearly starlike. What's really odd is that it is blue in color. Ellipticals aren't supposed to be blue as they are usually said to lack the dust and gas needed for new star formation. I could find no explanation for its blue color except one paper saying it's not a galaxy at all (see below). Unlike the also blue companion of Arp 52 which was also blue, this one does have a classification and distance. The distance is the



Rick Johnson

Rick Johnson, a founding member of the Prairie Astronomy Club, passed away in January, 2019. His legacy lives on through his comprehensive catalog of over 1600 images at www.mantrapskies.com.



ARP58, continued.

same as UGC 4457 so we know it is a true companion.

Complicating things is another galaxy, SDSS J03201.11+291311.9. This is the blue blob just left and slightly up from the blue E0 galaxy. To me, it looks like just the end of the mostly detached spiral arm but it is classed as a separate galaxy, not as part of a galaxy like I'd expect. I also found it referred to as a separate galaxy one reference. It has no classification.

More interesting to me is the very weird blue galaxy toward the upper right corner of my image. It is SDSS J083129.83+191455.2

but I can find no distance or classification data for it. It appears as two very different objects, a compact blue galaxy and a fuzzy arc above it. I find only one designation for it in the Sloan Digital Sky Survey, however. Nor can I find any paper on it. Seems worthy of one or two, at least in my image. Did it too encounter Arp 58? Sure looks distorted and blue like it recently encountered something and that's about all there is in the area.

Back to Arp 58, one paper insists that the arms couldn't have been the result of a tidal

interaction. Apparently saying these are HII regions, not separate galaxies at all. No one else seems to agree but it does explain a blue elliptical "galaxy". If that paper is right then that takes me back to that other strange galaxy in the upper right corner as being involved. Where's that Ph.D. candidate looking for a thesis when you want one?

Arp's Palomar 200" telescope image of the galaxies is at:

http://ned.ipac.caltech.edu/level5/Arp/Figures/big_arp58.jpeg

Outreach Opportunities

Christine Parkyn

Outreach opportunities for this fall are listed below. If you can help with either event, please email cpparky@gmail.com.

09/22/23 9pm to 10pm: Camp Erin Lincoln @ Carol Joy Holling Center in Ashland, need 1 more telescope.

10/07/23 6:30pm to 8pm: Hoot n'Howl @ Spring Creek Prairie in Denton, need 2 telescopes.

Meeting Minutes

Jim White

Jason O'Flaherty was out of town for this month's meeting so Dan Delzell was gracious enough to fill in. Dan started the meeting at 7:30. New members at tonight's meeting are Mike and Lee who met four club members on PAC hill at this year's Nebraska Star Party and were impressed enough that they decided to join the club. Dale and Louise were at their second meeting since they joined the club and recently bought a telescope.

At 7:34 Dan turned the meeting over to Jim Kvasnicka's for his monthly observing report. Star parties for the month of August are on Friday the 11th and Friday the 18th. We will have the star parties at the Clatonia Recreation Area. The observing site is north of Clatonia 1.5 miles on SW 100th Road. The entrance is on the left or west side of the road. Star parties for the month of September will be on Friday the 8th and Friday the 15th. Stay alert for Jim's monthly email letting the membership know where the September

star parties will be located, one of the two monthly star parties may be at Branched Oak Observatory. On July 19th comet 12P Pons Brooks had an outburst overnight and increased in brightness from a magnitude 16.6 to a magnitude 11.6, since the light from this comet is concentrated it should be visible in a 6" -8" telescope. Jim's complete observing report can be found in this newsletter.

At 7:42 Jim turned the meeting back over to Dan. Dan asked John Reinert if he had a treasurers report for the club. John stated that the Astronomical League took our money so the club is up to date with them, other than that there are no real changes at this time. Dan went over the benefits that members receive from being members of the Astronomical League which gives us access to their resources along with their quarterly publication The Reflector.

Upcoming events, August 29th will be our next meeting and will

be "James Webb Space Telescope Discovering the Heavens Year One". This will be presented by club member and NASA Ambassador Bob Kacvinsky. We took a new club photo at the June meeting, if you would like a [high resolution file](#) of this photo please see Mark Dahmke. An upcoming volunteer opportunity is on October 2nd there is the Hoot and Howl Fest at Spring Creek Prairie and will only run until about 30 minutes after sunset so will be mainly a solar viewing opportunity. There is a solar eclipse coming up in October on Saturday the 14th, (11:57 a.m. local time). On September 9th is the annual Star-B-Q at Branched Oak Observatory, if you would like to help with this event contact Brett or Brian. Last year they had approximately 1200 people attend throughout the event. April 8th of next year is the next total solar eclipse in North America. The meeting adjourned at 7:50 p.m. Tonight's program is photos and videos from this year's Nebraska Star Party.

September Observing

Jim Kvasnicka

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

Planets

Mercury: In the morning before sunrise.

Venus: Bright morning planet at magnitude -4.7.

Jupiter: Rises just before midnight at magnitude -2.7 with a disk 43.9" wide in Aries.

Saturn: In Aquarius at magnitude +0.4 with a disk 19.0" wide.

Uranus and Neptune: In Aries and Pisces at magnitude +5.7 and +7.8.

Mars: Not visible.

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.

Continued on next page.

Focus on Observing Programs

Jim Kvasnicka

The Two in the View Observing Program is one of the newer observing programs offered by the Astronomical League. Many times we look for a specific object and overlook objects that are very close by. We also tend to look at some objects as a set such as the Double Cluster, M81/M82, or the Andromeda Galaxy and her companion galaxies. This observing program is a continuation of that theme.

The Two in the View Observing Program includes different types of deep sky objects including galaxies, open clusters, double stars, and globular clusters. You should take time to understand if the objects are interacting with one another or just happen to fit in the same field of view. While you are doing the program you will have to balance magnification to fit the objects in the same field of view.

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

simple sketch of your observation.

To complete the Two in the View Observing Program you will have to observe 100 groupings from a list of 114. Items 109 - 114 allow you to observe your own favorite objects that fit in the same field of view. You can only do a maximum of 15 "make up your own" pairs.

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

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

September Observing, continued.

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. Large aperture is required to identify individual galaxies.

Webb Reveals Colors of Earendel, Most Distant Star Ever Detected

NASA's James Webb Space Telescope has followed up on observations by the Hubble Space Telescope of the farthest star ever detected in the very distant universe, within the first billion years after the big bang. Webb's NIRCam (Near-Infrared Camera) instrument reveals the star to be a massive B-type star more than twice as hot as our Sun, and about a million times more luminous.

The star, which the research team has dubbed Earendel, is located in the Sunrise Arc galaxy and is detectable only due to the combined power of human technology and nature via an effect called gravitational lensing. Both Hubble and Webb were able to detect Earendel due to its lucky alignment behind a wrinkle in space-time created by the massive galaxy cluster WHL0137-08. The galaxy cluster, located between us and Earendel, is so massive that it warps the fabric

of space itself, which produces a magnifying effect, allowing astronomers to look through the cluster like a magnifying glass.

While other features in the galaxy appear multiple times due to the gravitational lensing, Earendel only appears as a single point of light even in Webb's high-resolution infrared imaging. Based on this, astronomers determine the object is magnified by a factor of at least 4,000, and thus is extremely small – the most distant star ever detected, observed 1 billion years after the big bang. The previous record-holder for the most distant star was detected by Hubble and observed around 4 billion years after the big bang. Another research team using Webb recently identified a gravitationally lensed star they nicknamed Quyllur, a red giant star observed 3 billion years after the big bang.

Stars as massive as

Earendel often have companions. Astronomers did not expect Webb to reveal any companions of Earendel since they would be so close together and indistinguishable on the sky. However, based solely on the colors of Earendel, astronomers think they see hints of a cooler, redder companion star. This light has been stretched by the expansion of the universe to wavelengths longer than Hubble's instruments can detect, and so was only detectable with Webb.

Webb's NIRCam also shows other notable details in the Sunrise Arc, which is the most highly magnified galaxy yet detected in the universe's first billion years. Features include both young star-forming regions and older established star clusters as small as 10 light-years across. On either side of the wrinkle of maximum magnification, which runs right through Earendel, these features

Webb, continued.



This image from NASA's James Webb Space Telescope of a massive galaxy cluster called WHL0137-08 contains the most strongly magnified galaxy known in the universe's first billion years: the Sunrise Arc, and within that galaxy, the most distant star ever detected. In this image, the Sunrise Arc appears as a red streak just below the diffraction spike at the 5 o'clock position.

Credits: Image: NASA, ESA, CSA, D. Coe (STScI/AURA for ESA; Johns Hopkins University), B. Welch (NASA's Goddard Space Flight Center; University of Maryland, College Park). Image processing: Z. Levay.

Webb, continued.

are mirrored by the distortion of the gravitational lens. The region forming stars appears elongated, and is estimated to be less than 5 million years old. Smaller dots on either side of Earendel are two images of one older, more established star

cluster, estimated to be at least 10 million years old. Astronomers determined this star cluster is gravitationally bound and likely to persist until the present day. This shows us how the globular clusters in our own Milky Way might have looked

when they formed 13 billion years ago.

Astronomers are currently analyzing data from Webb's NIRSpec (Near-Infrared Spectrograph) instrument observations of the Sunrise Arc galaxy and



Webb's NIRCam (Near-Infrared Camera) instrument reveals the star, nicknamed Earendel, to be a massive B-type star more than twice as hot as our Sun, and about a million times more luminous.

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Webb, continued.

Earendel, which will provide precise composition and distance measurements for the galaxy.

Since Hubble's discovery of Earendel, Webb has detected other very distant stars using this technique, though none quite as far

as Earendel. The discoveries have opened a new realm of the universe to stellar physics, and new subject matter to scientists studying the early universe, where once galaxies were the smallest detectable cosmic objects. The research team has

cautious hope that this could be a step toward the eventual detection of one of the very first generation of stars, composed only of the raw ingredients of the universe created in the big bang – hydrogen and helium.

Nebraska Star Party Photos

Brett Boller



Above: Door prize, Kent Marts Explore Scientific

Above right: Bolo Brewing Wednesday evening

Right: Dob row



Astrophotography



Brett Boller 2023

*Veil Nebula
Brett Boller*

150mm Skywatcher Esprit, Canon t7i

*2 hours of data from various exposures, Lights Darks processed in
DSS, Enhanced in Photoshop*

Taken at Merritt Reservoir during The Nebraska Star Party

Astrophotography



The Milky Way at the Nebraska Star Party

Mark Dahmke

July 19, 2023

Panasonic Lumix GH5S with 10mm Voigtlander f/0.95 lens

ISO 3200, 20 seconds, f/1

Club Offices and Duties

Nominations for next year's officers will begin at the September meeting, and remain open until election at the October meeting.

Club officer nominations are made in September and elections are held in October. The following is a list of responsibilities of each of the officers and what is required to maintain a functioning club.

As stated in the bylaws, the club has five officers: President, Vice President, Secretary, Treasurer and Second Vice President. The business of the club is managed by a Board of Directors. The Board consists of the five elected officers. Each decision of the Board requires an affirmative vote by at least three Board members. The Board can also create additional non-elected offices as required and can initiate impeachment proceedings against officers who have been negligent in performing their duties.

The Prairie Astronomy Club has a fifty year history of service to club members and the community. Potential club officers should

have a good understanding of the history of the club, its formation and mission, its relationship with Hyde Observatory and the types of events, activities and outreach that is part of the tradition of the club. The most complete resource is the book *The Prairie Astronomy Club: Fifty Years of Amateur Astronomy*, which is in the club library or available as a PDF document.

President

The President organizes and directs the regular monthly meetings and all other club activities. The President also prepares the meeting agenda and PowerPoint for the meeting.

The President also officially represents the club at meetings at the regional and national level where he/she is in attendance or delegates this authority. The President has the authority to call meetings of the Board and to appoint non-elected officers.

The President should have good communication skills and be comfortable interacting with the media and public, be a good public speaker, be available to do radio and TV interviews and to deliver prepared introductions and remarks at club-sponsored events.

Another duty of the President is the annual club audit. Within 10 days of assuming office, the President must appoint a committee of three club members to perform the audit. The audit must be completed within 45 days of the close of the fiscal year which is October 31.

When assuming office, the President should hold a meeting of the Board to present his/her direction and ideas for the coming year, and appoint any unfilled non-elected positions.

Vice President

The Vice President is responsible for running

Club Offices and Duties, continued.

club meetings and other events in the absence of the President. The VP is also to be the mediator in cases of procedural dispute and must be available to assume the duties of any officer at the direction of the President. The VP also maintains control of the current inventory of all club property.

Secretary

The Secretary handles all Club correspondence, is responsible for the distribution of information received through official club correspondence and is in charge of Club publicity (often the job of Publicity or Outreach Coordinator is delegated to a non-elected member). The Secretary also sends out membership renewal notices and delivers meeting minutes to the newsletter editor. The Secretary is responsible for maintaining an accurate club membership roster. The master copy of the roster is currently maintained on the Night Sky Network website. The bylaws also require publication of the complete roster in the

newsletter on an annual basis.

Treasurer

The Treasurer is responsible for all Club funds and for keeping accurate records of all monetary transactions. The Treasurer must submit a written report of the club's monetary status at the request of the President or give a verbal report at the request of any member during regular meetings. He/she also prepares an annual financial report in November for publication in the newsletter and presentation at the November meeting. The Treasurer is also responsible for all tax filings and reporting requirements, to maintain the club's 501c3 status.

Second Vice President (and Program Chair)

The Second Vice President is responsible for the formation and presentation of the monthly club programs. Ideally the 2nd VP should try to plan ahead six months to one year to build a list of potential presenters or programs. The 2nd VP

also sends out email announcements of upcoming programs to the membership, and sends a program description to the newsletter/website editors.

The club usually has several appointed positions:

The Publications Chairperson (or Newsletter Editor) is responsible for editing and publishing the *Prairie Astronomer*. The newsletter editor may also be the website manager/editor. The newsletter editor should have a good working knowledge of desktop publishing software (and computers in general), graphics, photo editing, some design and layout experience and some experience with social networking and Internet marketing. The Website editor needs to be familiar with WordPress (or similar CMS software) and graphics and word processing applications. Ideally the newsletter and website editor(s) should have prior experience with the publication of a newsletter or website, or demonstrated skills. The

Club Offices and Duties, continued.

publications chairperson is also responsible for social networking for the club - posting Facebook and Twitter announcements for club meetings and events (or this responsibility might be delegated to another officer or someone appointed by the President).

If the club has an appointed Outreach Coordinator, the coordinator takes on some of the roles performed by other officers - organizes outreach events, shares in media communications tasks, puts together flyers, etc.

The Club Librarian (often the Vice President) manages the club library. He/she

keeps a current bibliographic listing of all Club library material including the archive of all back issues of The Prairie Astronomer. The Club Librarian and Secretary work together to maintain a record of club activities and regularly update the official club history.

The Observing Chairperson presents a monthly report at Club meetings and/or in the Prairie Astronomer. He/she keeps members informed of upcoming celestial events, sky objects of special interest and star parties.

The Recording Secretary (often the Club's elected Secretary) is responsible for keeping the minutes of the club meetings and

filing a copy with the Club Secretary. Minutes need to be kept in a systematic fashion as they record the history and life of the club and need to be published in the Prairie Astronomer on a monthly basis.

The Site Chairperson (if one is appointed) is responsible for establishing a site committee to oversee the maintenance and security of the club observing site.

While not a requirement of the bylaws, all club officers and appointees should have good computer and social media skills, should be accessible and responsive via email and phone. §



More NSP Photos

By Mark Dahmke



Looking Beyond the Stars

Brian Kruse



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 to find local clubs, events, and more!

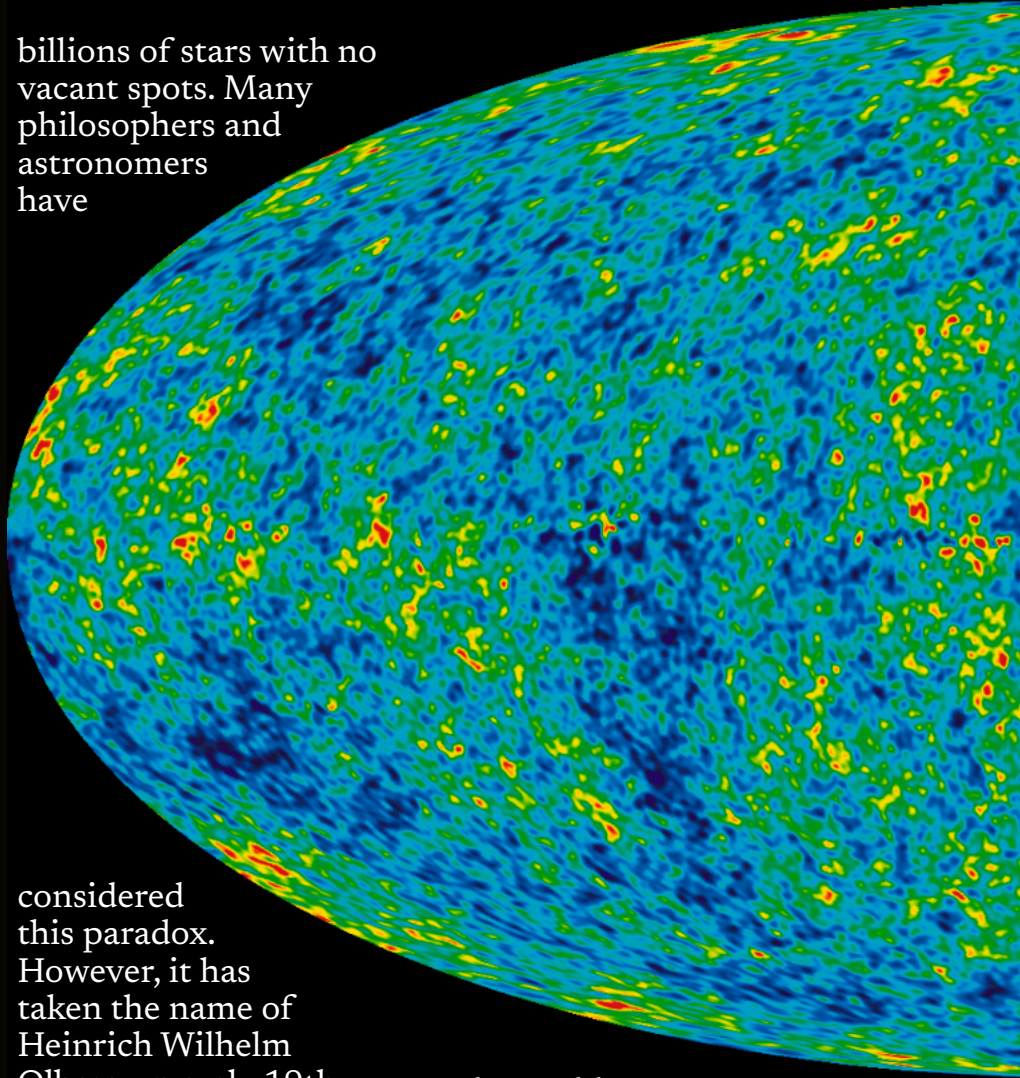
Looking up in awe at the night sky, the stars and planets pop out as bright points against a dark background. All of the stars that we see are nearby, within our own Milky Way Galaxy. And while the amount of stars visible from a dark sky location seems immense, the actual number is measurable only in the thousands. But what lies between the stars and why can't we see it? Both the Hubble telescope and the James Webb Space Telescope (Webb) have revealed that what appears as a dark background, even in our backyard telescopes, is populated with as many galaxies as there are stars in the Milky Way.

So, why is the night sky dark and not blazing with the light of all those distant galaxies? Much like looking into a dense forest where every line of sight has a tree, every direction we look in the sky has

billions of stars with no vacant spots. Many philosophers and astronomers have

considered this paradox. However, it has taken the name of Heinrich Wilhelm Olbers, an early 19th century German astronomer. Basically, Olbers Paradox asks why the night sky is dark if the Universe is infinitely old and static – there should be stars everywhere. The

observable phenomenon of a dark sky leads us directly into the debate about the very nature of the Universe – is it eternal and static, or is it dynamic and evolving?

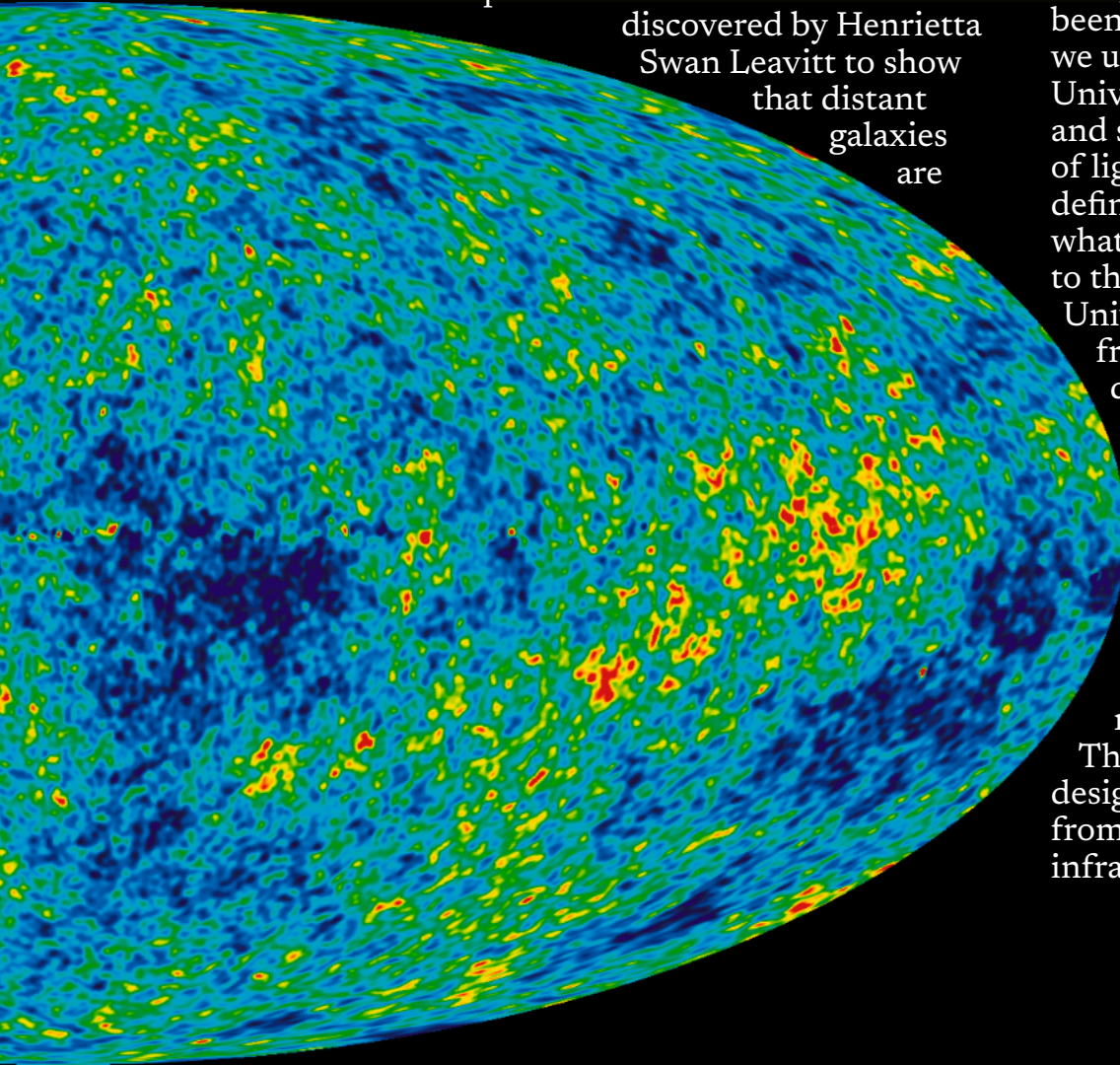


It was not until the 1960s with the discovery of the Cosmic Microwave Background that the debate was finally settled, though various lines of evidence for an evolving universe had built up

over the previous half century. The equations of Einstein's General Theory of Relativity suggested a dynamic universe, not eternal and unchanging as previously thought. Edwin Hubble used the cosmic distance ladder discovered by Henrietta Swan Leavitt to show that distant galaxies are

moving away from us – and the greater the distance, the faster they're moving away. Along with other evidence, this led to the recognition of an evolving Universe.

The paradox has since been resolved, now that we understand that the Universe has a finite age and size, with the speed of light having a definite value. Here's what's happening – due to the expansion of the Universe, the light from the oldest, most distant galaxies is shifted towards the longer wavelengths of the electromagnetic spectrum. So the farther an object is from us, the redder it appears. The Webb telescope is designed to detect light from distant objects in infrared light, beyond



The oldest light in the universe, called the cosmic microwave background, as observed by the Planck space telescope is shown in the oval sky map. An artist's concept of Planck is next to the map. The cosmic microwave background was imprinted on the sky when the universe was just 380,000 years old. It shows tiny temperature fluctuations that correspond to regions of slightly different densities, representing the seeds of all future structure: the stars and galaxies of today. (Image credit: ESA and the Planck Collaboration - D. Ducros) <https://go.nasa.gov/3qC4G5q>

Looking Beyond the Stars, continued.

the visible spectrum. Other telescopes detect light at still longer wavelengths, where it is stretched into the radio and microwave portions of the spectrum. The farther back we look, the more things are shifted out of the

visible, past the infrared, and all the way into the microwave wavelengths. If our eyes could see microwaves, we would behold a sky blazing with the light of the hot, young Universe – the Cosmic Microwave Background.

The next time you look up at the stars at night, turn your attention to the darkness between the stars, and ponder how you are seeing the result of a dynamic, evolving Universe.

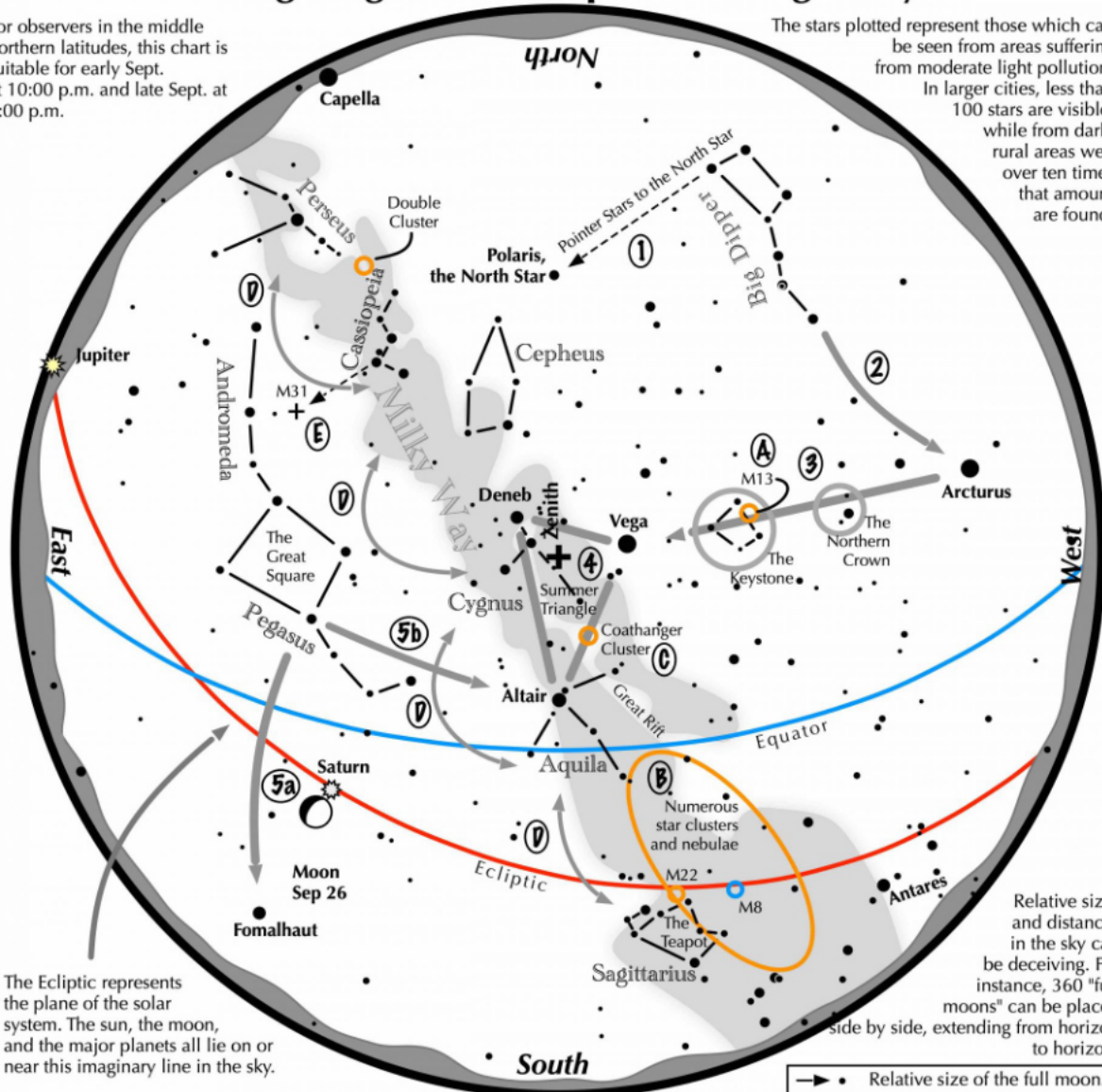


NASA's James Webb Space Telescope has produced the deepest and sharpest infrared image of the distant universe to date. Known as Webb's First Deep Field, this image of galaxy cluster SMACS 0723 is overflowing with detail. This slice of the vast universe is approximately the size of a grain of sand held at arm's length by someone on the ground. (Image Credit: NASA, ESA, CSA, STScI) <https://bit.ly/webbdeep>

Navigating the mid 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.

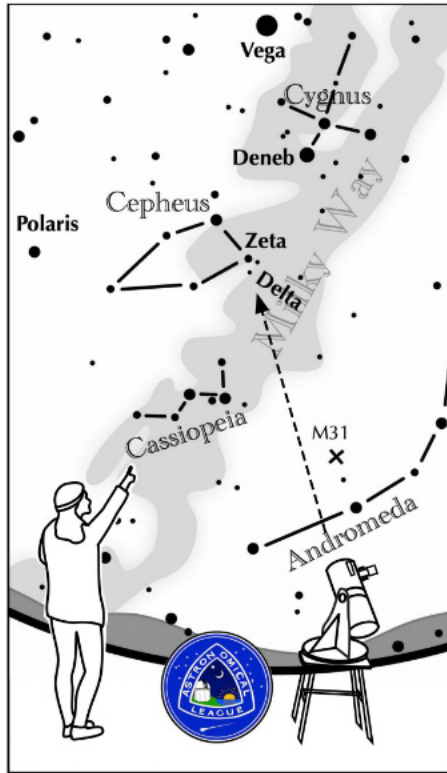
- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, 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.



ASTRONOMICAL LEAGUE Double Star Activity



Other Suns: Delta Cephei

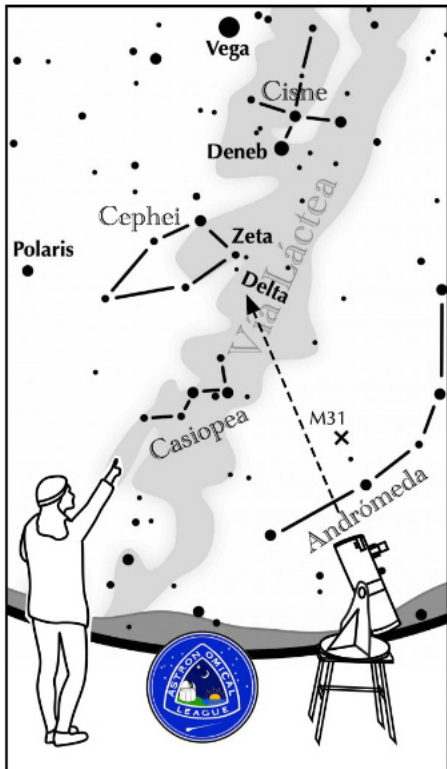
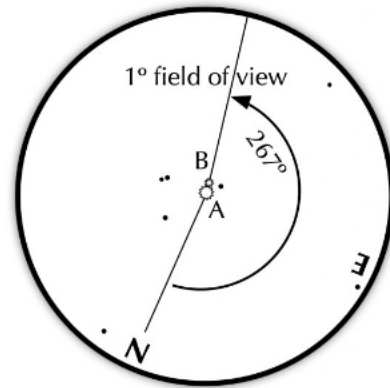
How to find Delta Cephei on a September evening

Face northeast and find bright Deneb, the northernmost star of Cygnus. It is nearly overhead. Between Deneb and the "W" shaped Cassiopeia lies the house-shaped constellation Cepheus. Find Zeta, the lower left star of the "house." Dimmer Delta shines just below it.

Suggested magnification: >20x
Suggested aperture: >2 inches

Beta Capricorni

A-B separation: 41 sec
A magnitude: 4.2
B magnitude: 6.1
Position Angle: 191°
A & B colors:
yellow, blue



Otros Soles: Delta Cephei

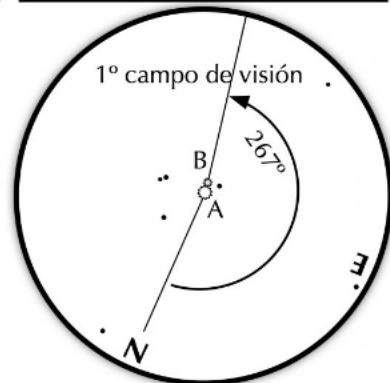
Cómo encontrar Delta Cephei en una tarde de Septiembre

Mire hacia el noreste y encuentre a la brillante Deneb, la estrella más al norte de Cisne. Está casi arriba. Entre Deneb y Casiopea en forma de "W" se encuentra la constelación de Cefeo en forma de casa. Encuentra a Zeta, la estrella inferior izquierda de la "casa". La Delta con brillo debil, esta justo debajo de ella.

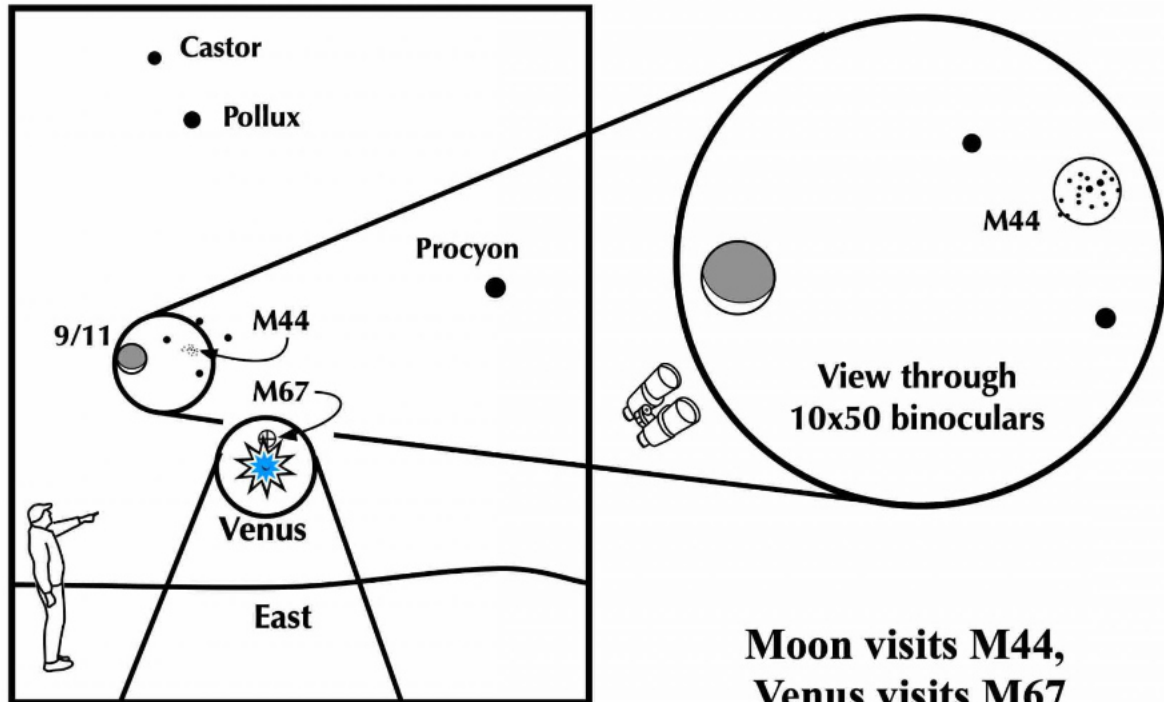
Ampliación sugerida: >20x,
Apertura sugerida: >50 mm

Delta Cephei

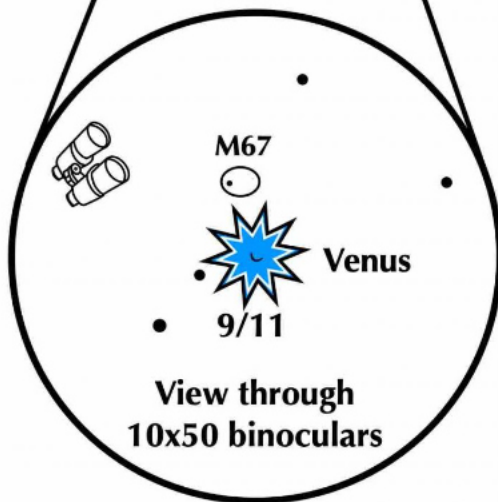
A-B separación: 41 sec
A magnitud: 4.2
B magnitud: 6.1
PA: 191°
A & B color:
amarilla, azul



If you can see only one celestial event in the morning this September, see this one.



Moon visits M44, Venus visits M67



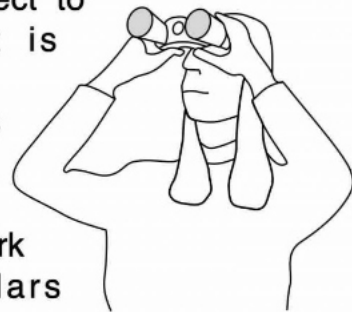
On the morning of Sep 11, look to the east 90 minutes before sunrise.

- The crescent moon, full with earthshine, glows left of M44, the Beehive cluster.
- M44 can easily be seen in binoculars.

• The dazzling object to their lower right is Venus.

- Just above Venus lies another star cluster, M67. If viewed from a dark location, binoculars should reveal its fuzzy presence.

• If the binoculars are securely mounted, the tiny crescent of Venus should be barely discerned amid the planet's glare.



From the Archives

August, 1983

Got the Time?

Out at the observatory we have a strange clock.

Very few people know what it is much less how to use it or worse how to explain it to the public that shows up each Saturday night.

Unfortunately it glows a bright red in the darkness of the observatory. This seems to draw the people to it that much more.

So what is this clock, what does it do and how does it do it and why would an amateur use it?

The clock is called a sidereal (pronounced cye-deer-e-all) that's from my English 101 class 1971. There are a number of different methods of keeping time for amateur astronomers. But the one that usually raises the most questions is sidereal. Sun time is the time we are all familiar with. It is the time interval required for the sun to appear in the same place in the sky on two successive days. Our

time pieces are set to this 24 hour time period. It is the time we are most familiar with and it guides all of our daily functions. Sidereal time on the other hand is the length of a day based on the stars.

This time interval is 23 hours 56 minutes 4.1 seconds. Roughly speaking star time is about 4 minutes faster than sun time. This doesn't seem like much of a time difference in our everyday lives but if we are trying to observe a remote, dim, deep sky object accurate star time and those 4 minutes can

be very important.

Now that you know a basic difference between sun time and sidereal time how do we translate all this to the telescope? The use of setting circles on your telescope can be aided by knowing the sidereal time. Knowing the sidereal time helps you transfer the coordinates (right ascension and declination) from the star map to your telescope.

Once the telescope is moved to the proper settings on the circles the object is usually



Sidereal clock by Joe St. Lucas & Bill Welker, 1974

close at hand. The purist who wants to know the "exact" time goes through a rather complicated procedure. He finds his longitude and through the use of tables and knowing his civil time he can extract his sidereal time. There are other more easy ways. One way is to buy a cheap alarm clock, (or subscribe to Time Magazine and get one free). Set up your your telescope until it is pointing directly south, wait until a known star in the area of the celestial equator is in the center of the eyepiece. Then look up your star's right ascension in your star atlas. Then set your clock to this time and you're all set.

Your cheap clock is now a sidereal clock. Now back off all you purists, you're in the minority out there! I know this lacks accuracy but lets take a look at just how much accuracy is

Since your cheap clock is not a true sidereal clock it will lose time as time goes on. But most average viewing sessions are 2 to 4 hours long.

Within that time period you will be losing only 20 to 40 seconds of sidereal time.

This discussion is certainly not in any depth. We could use a program centering around the use and further explanation of all the time periods astronomers are concerned with, sidereal time, earth time, universal time, ephemeris time, synodic time periods. And the use of setting circles. This is also not an endorsement of the use of setting circles. There is always some discussion about the validity of using setting circles. I for one have used them twice in 15 years of viewing. I feel I gain a greater appreciation of the sky and the use and feel of my telescope by "star and galaxy hopping" to those dim elusive deep sky objects.

I do believe that though I don't use setting circles nor use sidereal timepieces I do feel understanding them as well as all time systems has its merits. For a knowledge of time and space relationships deepens our

understanding of the heavens as a whole. Not only should one know what stars are visible on a given night, but why they are visible leads to a real understanding of the sky and its mechanics.

Russ Genzmer

HOW TO PRONOUNCE THE NAME OF THE PERSEIDS METEOR SHOWER	
GENERALLY ACCEPTED	PER-SEE-IDS PURSE-YIDS
ALSO HEARD SOMETIMES	PER-SEE-IDS PER-SAY-IDS
GENERALLY FROWNED ON	PER-SIDES PER-ZAY-UDS PER-SUDS
DEFINITELY WRONG	PERKY-IDS PEWPEWPEWS PER-SAY-SAYS PERCIES PURPS PEPSIDS PEEPS

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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