

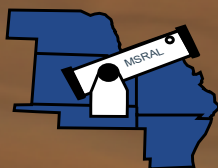
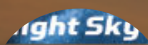
The Prairie Astronomer

August 2021 Volume 62, Issue #8

MARS

Perseverance Rover as Seen by Ingenuity Helicopter

**August Meeting:
Review of the Nebraska Star Party**



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer



NEXT MEETING AND PROGRAM

August 31, 7:30pm via Zoom

Review of the Nebraska Star Party

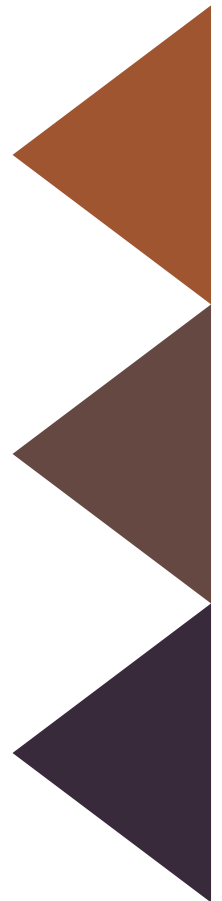
FUTURE PROGRAMS

September: Nominations for club officers and a report from survey committee.
Program to be announced.

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Cover: "South Séítah" region of Jezero Crater, captured by NASA's Ingenuity Mars Helicopter during its 11th flight on Aug. 4, 2021. Toward the top - left of center - just beyond the dune field is the Perseverance rover. Helicopter altitude was 39 feet. This image was upscaled by 2X using Topaz Gigapixel AI by Mark Dahmke.



CALENDAR

PAC Meeting
August 31, 2021, 7:30pm
Via Zoom

PAC Meeting
September 28, 7:30pm

PAC Meeting
October 26, 7:30pm

PAC Meeting
November 30, 7:30pm

2021 STAR PARTY DATES

	Date	Date
January	8	15
February	5	12
March	5	12
April	2	9
May	7	14
June	4	11
July	2	9
August	Jul 30	6
September	Aug 27	3
October	1	8
November	Oct 29	5
December	Nov 26	3

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

CLUB OFFICERS

President	Bob Kacvinsky kacvinskyb@yahoo.com
Vice President	Rick Brown rickbrown2000@gmail.com
2nd VP (Program Chair)	James Quach jamesq@utexas.edu
Secretary	Bill Lohrberg wmlohrberg89@gmail.com
Treasurer	John Reinert jr6@aol.com
Club Observing Chair	Jim Kvasnicka jim.kvasnicka@yahoo.com
Outreach Coordinator	Mike Kearns mkearns@neb.rr.com
Website and Newsletter Editor	Mark Dahmke mark@dahmke.com



Shop through Amazon Smile to automatically donate to PAC:
smile.amazon.com/ch/47-6044523



www.prairieastronomyclub.org

Meeting Minutes

Bill Lohrberg

PAC meeting minutes July 27, 2021 as recorded by Bill Lohrberg

Club President Bob Kacvinsky began the meeting at 7:25pm. 10 members in attendance. This was the first in person, non-zoom PAC meeting since early 2020 and was held out on the lawn of Hyde observatory in conjunction with the solar observing "near star" party (rescheduled from June which was a bust due to clouds). Dave Churilla, and Lee Taylor with their H-Alpha solar scopes and Jim Kvasnicka with his 10" Newtonian dob and white light filter had set up for solar observing earlier. There were some nice prominences visible in the H-Alpha scopes but no sun spots visible despite there being quite a few active regions just days prior.

Bob welcomed all to what was an abbreviated meeting (as Bob was on

crutches recovering from surgery due to an Achilles heel injury!) Bob thanked those who participated and responded to the survey for suggestions on how to improve the club in general. Stressed the importance of getting feedback from the membership on how to improve PAC, gain new membership and keep interest going. Also a reminder that coming up in September will be the officer nominations elections. Bob and other officers will be stepping down after many years of service.

Dave Churilla gave a presentation on solar observing, the equipment needed and tips suggestions and general information about the sun and the merits of solar observing. He invited anyone who might be interested in solar observing to contact him, to do some observing or learn more about solar

observing in general.

Observing chair Jim Kvasnicka presented the Binocular Messier Observing award to Brett Boller who had completed his observations recently. Congratulations to Brett!

Bob Kacvinsky presented the program on Star Party etiquette, handed out a list with tips on how to prepare and general rules of conduct for NSP or any other star party.

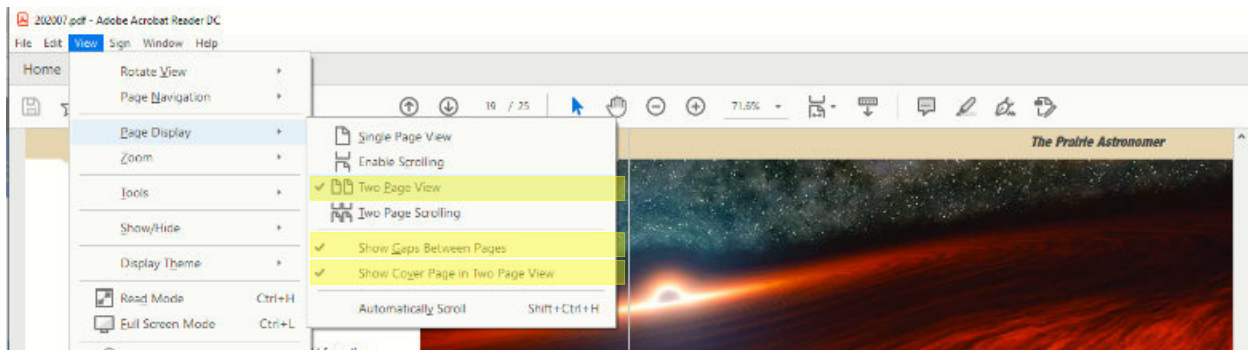
At 7:40 pm the meeting was adjourned.

Observing Award

Congratulations to Christine Parklyn for completing the Beyond Polaris Observing Program. Christine is the 1st PAC member to complete the Beyond Polaris Observing Program and this is the first observing award that Christine has received.

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.**

*Aerial view of the Nebraska Star Party, August 3, 2021
by Mark Dahmke*



The President's Message

Bob Kacvinsky



After 18 months I was hoping that we would finally not be focusing on COVID updates but unfortunately with the present "yellow dial" levels we are again not able to use Hyde for physical meetings. Our August meeting will be via Zoom. I will send out a link and details around August 26-27th via the NightSky Network. Please plan to participate in the August 31st meeting starting at 7:30 PM.

Our August meeting program will be hosted by Brett Boller featuring photos from your recent observations or star parties including the Nebraska Star Party August 1-6. If you have photos you would like to include in the presentation, please forward them onto Brett at proboller86@yahoo.com. I understand there are some interesting photos of the smoky sunsets that might also be included.

Since late 2019 we have a dozen new members, many of which have recently purchased new telescopes. Jim Kvasnicka has offered to host quarterly Lunar Observing nights where 3-4 experienced members will be available to help with telescope and observing questions. The next Lunar Star Party will be listed in the monthly newsletter. Details for all our star parties are listed within the newsletter. Please consider attending one of the club star parties. It is a great way to get involved, learn for others, and be amazed at the night wonders.

Hyde Observatory Saturday night observing has been suspended since mid-July once Lincoln moved into the yellow category. If you are interested in being a Hyde volunteer once this latest risk wave has passed, please drop a note to Annalisa Holmgren at

annalisa.holmgren@gmail.com. It is a great way to get involved and the deck leads will provide you with training and information. Working on the deck is fun and does not require much prep or knowledge of the night sky. Everyone is welcome.

This summer you've received emails from Jim Kvasnicka with a PAC survey. Please take a couple of minutes to provide your thoughts, ideas, suggestions, or critiques if you have not yet responded. The PAC Board established a committee made up of past PAC presidents and asked them to gather inputs from each of you on ways to improve our club. Your comments will be kept private within the small committee, so we are asking for candid and frank feedback. The success of PAC is determined by how the club meets your expectations and needs.

Please take a few minutes and provide your comments and ideas. The survey will focus on both short- and long-term areas, club activities, outreach, meeting formats, speakers, and officer makeup as potential subjects.

Brett Boller recently sent a notice for the Branched Oak StarBQ on September 4th from 5-11 pm. If you would like to attend and set up your telescope for public viewing, there are several cement pads available. There will be activities for

kids so bring the family and make it a fun night out.

We are hoping to be back “together” for our September club meeting. September is when initial nominations for new club officers can be offered. Please heartfully consider stepping up your participation in PAC by offering your name for an office. Covid has prevented us over the past 18 months from much of the outreach and community involvement that PAC is so well recognized. This is a

great opportunity for you to get in on the ground floor as PAC will begin to reactivate and reengage in public outreach. If you have any questions about any of the duties of club office positions, please reach out to the Board member or myself for more information.

Dark and Clear Skies to you,
Bob Kacvinsky
PAC-President
kacvinskyb@yahoo.com
402-840-0084



NSP exceeded 380 attendees this year!



Rick Johnson

ARP 33

Arp 33 and 326

Another twofer deal on Arp Atlas entries. Most of them are completely unrelated objects that happen to be in the same field. Not this time. Arp 33 is part of Arp 326. Arp 326 is in Arp's category, Galaxy groups, chains of galaxies. The chain is located in Virgo right near the southwestern corner of Bootes. As can be seen in the annotated image this isn't a real chain but consists of galaxies of at least 2 different groups. Since redshift data is available for only 3 of the 7 galaxies Kanipe and Webb consider part of the chain its hard to determine what is really going on here. The chain members, as defined by Kanipe and Webb are (from north to south):

MAPS-NGP
O_559_0677185 530 mly

CGCG 045-052, Spiral at 530 mly

SDSS

J133727.40+063044.4 Not in Webb/Knipe's list

MAPS-NGP
O_559_0677872

UGC 08610, Sa at 530 mly

MAPS-NGP
O_559_0792305 520 mly

ARP 33/UGC 08613, SB at 340 mly

LEDA 214126, E? 340 mly

The classification of LEDA 214126 seems way off, Looks pretty much a spiral to me. For this reason, I left the classification off of the annotated image. UGC 08596 at 320 million light-years, classed as simply S and UGC 08623 classed as Sd at 340 million light-years. It is seen edge-on and is extremely flat. So flat it made the Flat Galaxy Catalog. It would appear these two are likely members of the same group as Arp 33/UGC 08613. Why Kanipe and



The Mantrap Skies Image Catalog

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.



Webb left out SDSS J133727.40+063044.4 I don't know. It is slightly brighter than MAPS-NGP O_559_0677872 just below it. While I identified MAPS-NGP O_559_0682366 NED had little on it. Just seemed big and bright enough to deserve mention. It looks like a nice face on spiral but NED omits a classification for it.

This brings us to Arp 33. While a member of the Arp 326 "chain" it made the Atlas under the Integral Sign category. It is a bit better integral sign than most of the others in that category, some of which require a lot of imagination to see as that math symbol. NED considers Arp 33 to also include LEDA 214126 which is also part of the Arp 326 group. Arp did include it in his image

of Arp 33. The VV catalog considers UGC 08613 to be 4 galaxies; VV 6a through VV 6d. NED, however, says these are just parts of the galaxy. Something likely drew Arp 33 out into the integral shape. VV 6c and d seems a possibility. UGC 08596 shows a rather distorted arm on its east side and is also a possible cause of Arp 33's distorted shape.

NED and the Sloan survey identify a lot of other objects around Arp 33 that are similar to the VV objects. None of them are listed as being part of the galaxy, however. I've identified a few of them. It would get too crowded to identify them all. How some are part of the galaxy and the rest not I haven't figured out.

The image contains three asteroids. West to east (right to left), they are (102745) 1999 VZ111 at magnitude 18.2, 2006 ST289 at a very optimistic estimated magnitude of 19.8 and one not yet known to the Minor Planet Center. I did it yet again. Imaged an asteroid but discovered it a year too late to do anything about it so it is still undiscovered. It was taken April 7, 2010 and not processed until now. I do have to clean up this backlog somehow.

The 200" had sufficient field of view to do the entire group with its corrector lens in place. These online images are not made from the original plates but from first generation prints, Arp processed to bring out the detail he was interested in.

PAC Newsletter Archive

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

September Observing

Jim Kvasnicka



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

Planets

Mercury: Very low at dusk in the WSW difficult to see.

Mars: Very low in the WSW in the Sun's after-glow difficult to see.

Venus: Higher than Mercury at magnitude -4.1, hard to miss.

Jupiter: Shines at magnitude -2.7 with a disk 48.3" wide in Capricornus.

Saturn: Shines at magnitude +0.4 with a disk 18.2" wide in Capricornus.

Uranus and Neptune: Look for Uranus in Aries and Neptune in Aquarius.

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. Large aperture is required to identify individual galaxies.

Focus on Constellations

Cygnus

Jim Kvasnicka

Cygnus, the Swan, is also known as the Northern Cross. The Swan's head is marked by the double star Albireo, and the tail by Deneb. The Swan seems to be flying SW down the Milky Way toward Aquila, the Eagle. Cygnus covers 804 square degrees and contains the most visually beautiful part of the northern Milky Way. Cygnus contains a number of individual objects that are pleasing to look at. Albireo is the most observed double star in the night sky. The North America and Veil Nebula are often photographed. Cygnus contains a number of planetary nebulae and open clusters. The constellation Cygnus is best seen in September.

Showpiece Objects

Planetary Nebulae: NGC 6826 (Blinking Planetary)

Open Clusters: M29, M39

SNREM: NGC 6960-92 (Veil Nebula)

Double Stars: Albireo, 18 Cygni, 61 Cygni

Mythology

Cygnus was identified with the Swan into which Jupiter turned himself when he wished to seduce Leda, the wife of Tyndareus, King of Sparta. From this union was born Pollux and Helen of Troy. Castor was fathered by Tyndareus, and was therefore, unlike Pollux, was not immortal.

Number of Objects
Magnitude 12.0 and
Brighter

Galaxies: 2
Globular Clusters: 0
Open Clusters: 28
Planetary Nebulae: 6
Dark Nebulae: 15
Bright Nebulae: 3
SNREM: 5



By Till Credner - Own work: AlltheSky.com, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=20042019>

From the Archives

August, 1980

For those who saw the slides of my all-astronomy vacation in the Desert Southwest last month, I am sure, the usual fascination was with those great big telescopes we'd all like to have in our back yards— if our back yards were on mountaintops, and we had \$30 or 40 million to squander.

Between the lines, however, I probably didn't convey the curious sense one gets when brushing elbows with professional astronomers, as you have the opportunity to do as a member of Astronomical Society of the Pacific. If you read their books and papers, or see them lecture, you conclude the professional astronomers are unemotional, totally rational, logical, and, except for the ears, like Mr. Spock. One cannot imagine that (gasp!) petty politics could tarnish their monk-like dedication to True Science.

Well, brother, t'aint so!

Jealousy hovers above the astronomical peaks of Arizona like a vulture circling on an updraft.

High atop 6,000 foot Kitt Peak, where another telescope could not be added to the clutter without stacking it atop an already existing structure, the glow of pride over the 158 inch Mayall reflector

Observations by the Editor – Lee Thomas

occasionally darkens in salvos fired in the direction of Mount Hopkins 30 miles to the southeast, where the MMT sits in its unromantic bunker. The Multiple Mirror Monster, say the Kitt Peakers, is beset with problems and may never work. Besides, they smirk, Mount Hopkins was never as good a site as Kitt Peak, or it would have been selected for the 4 meter back in 1959.

Meantime, the band of astronomers-turned-mountangoats camped in an old schoolhouse at Amado, Arizona, the base camp of Mount Hopkins, daily make their way up the tortuous grades to the 8,600 foot summit to tinker with their 6 mirror marvel. They note, quite properly, that it is the first major optical breakthrough since Newton decided that mirrors were good for something other than primping. They glare contemptuously toward Kitt (easily visible from Hopkins on a clear day), commenting acidly that 6,800 feet puts all those fancy big apertures right on the brink of the Tucson inversion layer, with trapped air pollution and writhing thermal currents... and, that no matter how peachy the agreement with the Tucson city fathers about

light pollution, the city's growth is slowly eating away at the Kitt Peak skies. Why even Phoenix, 100 miles north, glows visibly in Kitt's night sky, while Hopkins is relatively sheltered from both cities by intervening ridges.

The MMT boys defend their new toy, while devoting 75% of its time to "engineering adjustments" which, according to the Kitt Peak faction, translated, means the sophisticated laser system designed to align the secondaries to converge star images to within 1 arc second resolution doesn't work... and, they hint darkly, it never will. On Mount Hopkins, they note that the 153 inch Mayall really has a defective mirror, damaged on one edge by clumsy handling (and since masked off), and therefore it has never worked up to its specifications. Kitt was, they smile, just an expensive experiment in the design of the good mirror—which went to Cerro Tololo.

And I thought my business had some big egos!

Astrophotography

Brett Boller



Above: Captured on Dob Row at Merritt, Celestron 11" Edge, Canon t7i, Eyepiece Projection with 6.3 mm eyepiece. Took 1 minute video to get 3600 frames, Stacked the best 50% in Registax, Touch up in photoshop

Below: Single capture of Perseids from 8-11-21 in Friend NE.



Right: 70 minute time lapse with T7i 20 sec subs from the parking lot of trading post. 13mm wide angle.

Below: Perseids Meteor Shower 8-11-21 Friend NE. Canon T7i with 13mm wide angle. 20 sec subs for 6.5 hours.



Astrophotography

Mark Dahmke



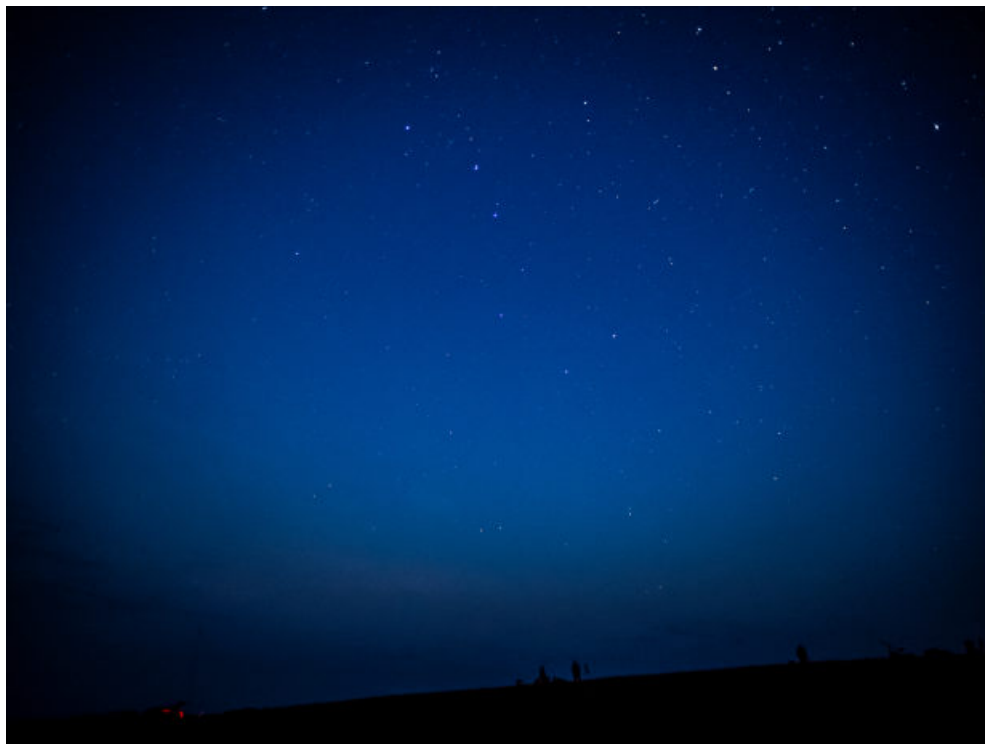
©Mark Dahmke
PHOTOGRAPHY

The Milky Way and Bolide, August 3, 2021 at NSP. 6 seconds, ISO 3200, f/1, 21mm effective focal length. Voigtlander 10.5mm f/0.95 lens and Panasonic Lumix GH5s.

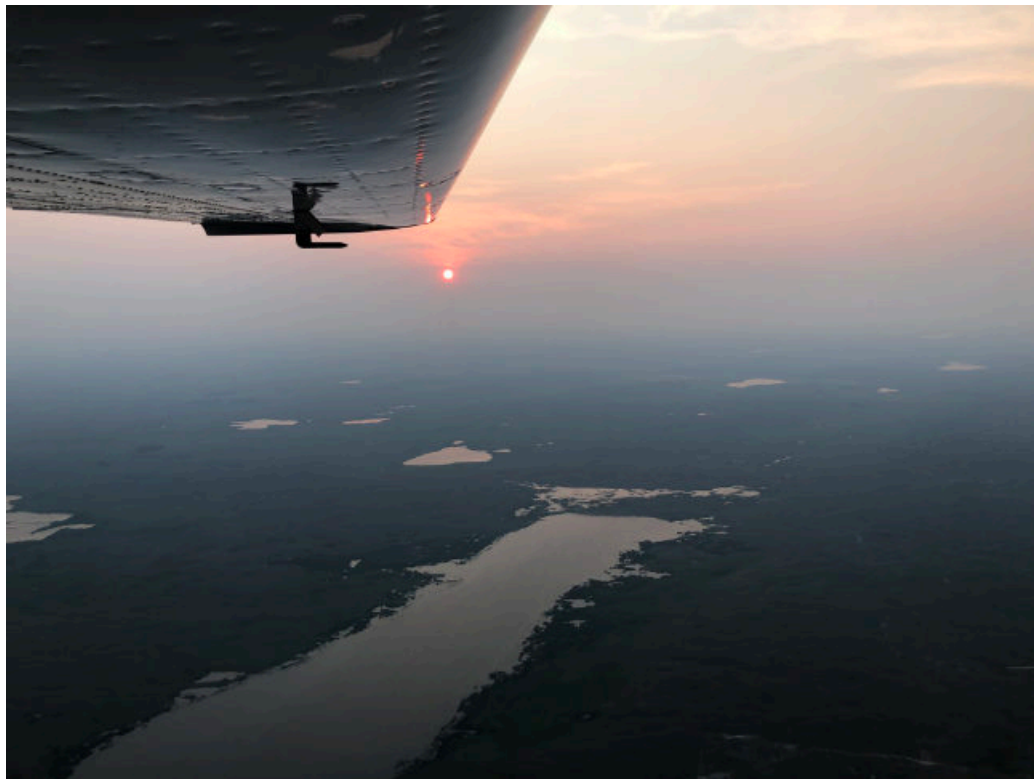
Right: Twilight at NSP.
1.6 seconds at ISO
6400, f/1, 21mm
effective focal length.

Below: Highway 7
north of Brewster,
Nebraska. Taken at
4:30am, August 3rd. 13
seconds at ISO 6400
at f/1.

All photos taken with
a Voigtlander 10.5mm
f/0.95 lens and
Panasonic Lumix
GH5s.



NSP Photos



The view south of Valentine, by Rob Landis.

Diane Knutson of IDA addresses Nebraska Star Party about light pollution.

Photo by Jack Dunn.



Guest speakers:
Diane Knutson and
Rob Landis



The road less traveled: South of Merritt Reservoir to Highway 83.



NSP Photos

James Quach



Beeds Sunset

Canon EOS 5DS-R, Canon EF 70-200L f/2.8 at 200mm, f/5.6, 1/250, ISO250

Dob Row

Olympus OM-D E-M1II, M.Zuiko ED 7-14mm f2.8 PRO at 7mm, f/2.8, 30 seconds, ISO3200



Milky Way

*Canon EOS
5DS-R,
Samyang/
Rokinon
14mm f/2.8 at
f/2.8, 30
seconds,
ISO3200*



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 club for the coming year, and appoint any unfilled non-elected positions.

Vice President

The Vice President is responsible for running 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 HTML, 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 publications chairperson is also responsible for social networking for the club - posting Facebook and Twitter announcements for club meetings and events.

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. §

Catch Andromeda Rising!

David Prosper



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

If you're thinking of a galaxy, the image in your head is probably the Andromeda Galaxy! Studies of this massive neighboring galaxy, also called M31, have played an incredibly important role in shaping modern astronomy. As a bonus for stargazers, the Andromeda Galaxy is also a beautiful sight.

Have you heard that all the stars you see at night are part of our Milky Way galaxy? While that is mostly true, one star-like object located near the border between the constellations of Andromeda and Cassiopeia appears fuzzy to unaided eyes. That's because it's not a star, but the Andromeda Galaxy, its trillion stars appearing to our eyes as a 3.4 magnitude patch of haze. Why so dim? Distance! It's

outside our galaxy, around 2.5 million light years distant - so far away that the light you see left M31's stars when our earliest ancestors figured out stone tools. Binoculars show more detail: M31's bright core stands out, along with a bit of its wispy, saucer-shaped disc. Telescopes bring out greater detail but often can't view the entire galaxy at once.

Depending on the quality of your skies and your magnification, you may be able to make out individual globular clusters, structure, and at least two of its orbiting dwarf galaxies: M110 and M32. Light pollution and thin clouds, smoke, or haze will severely hamper observing fainter detail, as they will for any "faint fuzzy." Surprisingly, persistent stargazers can still spot M31's core from

areas of moderate light pollution as long as skies are otherwise clear.

Modern astronomy was greatly shaped by studies of the Andromeda Galaxy. A hundred years ago, the idea that there were other galaxies beside our own was not widely accepted, and so M31 was called the "Andromeda Nebula." Increasingly detailed observations of M31 caused astronomers to question its place in our universe – was M31 its own "island universe," and not part of our Milky Way? Harlow Shapley and Heber Curtis engaged in the "Great Debate" of 1920 over its nature. Curtis argued forcefully from his observations of dimmer than expected nova, dust lanes, and other oddities that the "nebula" was in fact an entirely different galaxy

from our own. A few years later, Edwin Hubble, building on Henrietta Leavitt's work on Cepheid variable stars as a "standard candle" for distance measurement, concluded that M31 was indeed another galaxy after he observed Cepheids in photos of Andromeda, and estimated M31's distance

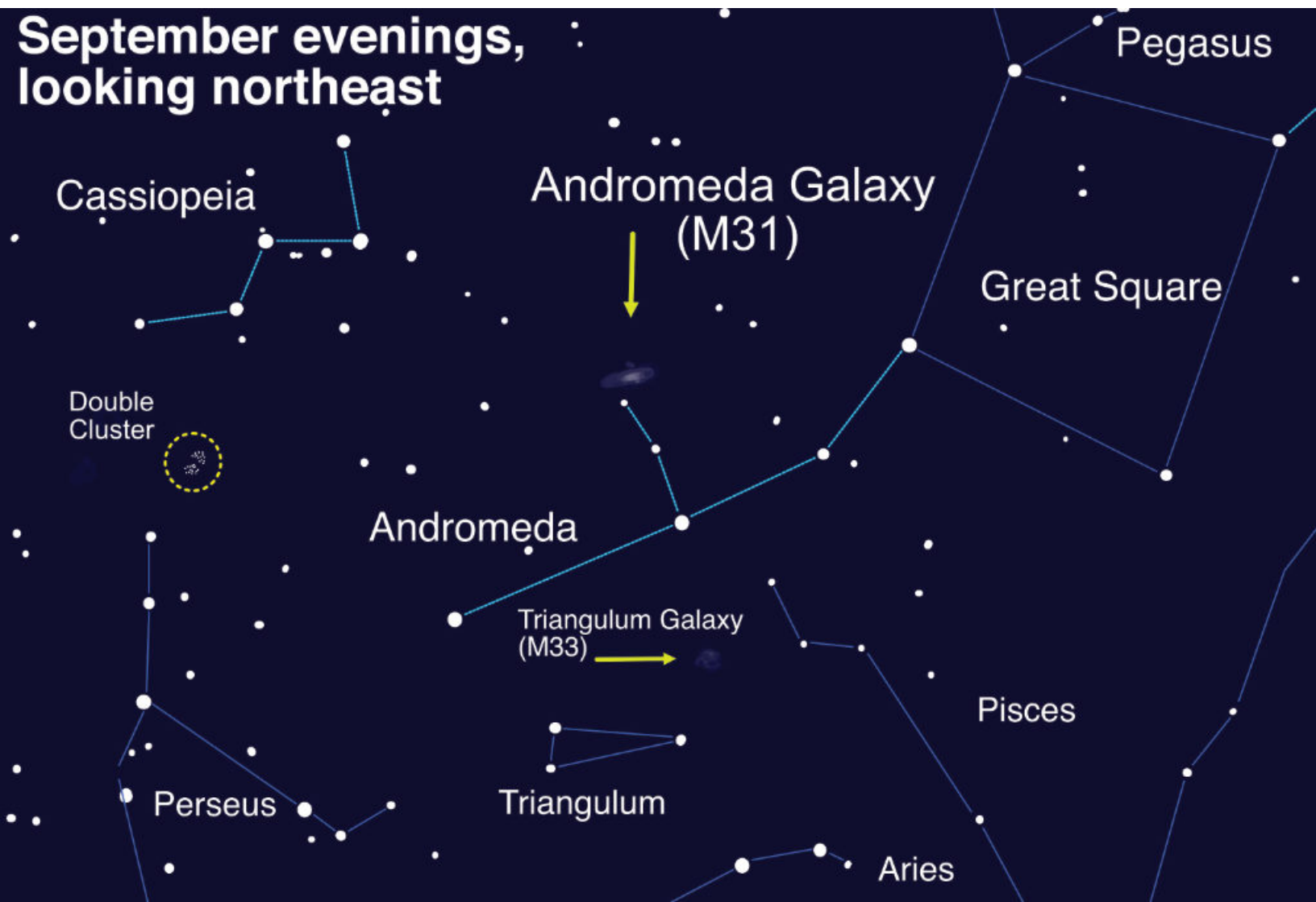
as far outside our galaxy's boundaries. And so, the Andromeda Nebula became known as the Andromeda Galaxy.

These discoveries inspire astronomers to this day, who continue to observe M31 and many other galaxies for hints about the nature of our universe. One of the Hubble Space

Telescope's longest-running observing campaigns was a study of M31: the Panchromatic Hubble Andromeda Treasury (PHAT): bit.ly/m31phat. Dig into NASA's latest discoveries about the Andromeda Galaxy, and the cosmos at large, at nasa.gov.

Spot the Andromeda Galaxy! M31's more common name comes from its parent constellation, which becomes prominent as autumn arrives in the Northern Hemisphere. Surprising amounts of detail can be observed with unaided eyes from dark sky sites. Hints of it can even be made out from light polluted areas. Image created with

September evenings, looking northeast



Andromeda... continued.

HUBBLE MAPS THE HALO AROUND THE ANDROMEDA GALAXY



*While M31's disc appears larger than you might expect (about 3 Moon widths wide), its "galactic halo" is much, much larger – as you can see here. In fact, it is suspected that its halo is so huge that it may already mingle with our Milky Way's own halo, which makes sense since our galaxies are expected to merge sometime in the next few billion years! The dots are quasars, objects located behind the halo, which are the very energetic cores of distant galaxies powered by black holes at their center. The Hubble team studied the composition of M31's halo by measuring how the quasars' light was absorbed by the halo's material. Credits: NASA, ESA, and E. Wheatley (STScI)
Source: <https://bit.ly/m31halo>*

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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