June, 2013 Volume 54, Issue #6

# The Prairie Astronomer

The Official Newsletter of the Prairie Astronomy Club

IN THIS ISSUE:



## June Program

PAC Social and Barbecue

## Featured Photo

The Eyes Galaxy along with the Markarian Chain, by Brett Boller. It was taken on a Celestron 11 inch CGE Edge HD Optics with Hyperstar. 30-1 minute subs stacked in deep sky stacker and processed with Gimp. Canon Rebel XS DSLR camera.

Night Sky Network

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: **Regular $30/yr, Family $35/yr**. Address all new memberships and renewals to: **The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585**. For other club information, please contact one of the club officers listed to the right. Newsletter comments and articles should be submitted to: **Mark Dahmke, P. O. Box 5585, Lincoln, NE 68505 or** mark@dahmke.com, no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.

## Meeting Minutes

Jason Noelle called meeting to order at 7:32 PM May 28, 2013 at Hyde Observatory in Lincoln, NE.

Jason announced program "Observing the Sun in H-Alpha" by David Knisely to occur after business meeting.

Jason announced next meeting June 25 Summer Social & Barbecue.

Jason announced August 4-9 Nebraska Star Party at Merritt Reservoir. Pre-registration early bird deadline July 1st.

Treasurer report was provided by Bob Kacvinsky. Audit was completed by Bob Leavitt and Jim Kvasnicka. Audit was passed around to members. Signed by Jason Noelle.

MSRAL conference recap was provided by Jack Dunn. Held at Mahoney State Park. Approximately 69 participants. 10 PAC members in attendance. Jack noted location was very positive. Next year conference will be in St. Louis.

Other business: Jack Dunn noted death of June Moore, wife of Carroll Moore, a significant supporter of Hyde. Suggested that PAC or Hyde may do something in honor.

Observing report provided by Jim Kvasnicka. May 3 no star party. May 10 7 members attended. Star parties for May 31 and June 7 announced. Noted that the current issue of The Reflector provides questions about amateur astronomy that PAC may want to consider, including discussion of potential demise of the hobby.

Summary of audit report for 2012:

| | |
|---|---|
| Starting balance: | $39,191.36 |
| CD/Savings starting balance: | $36,702.38 |
| Interest income: | $612.97 |
| CD/Savings ending balance: | $37,315.35 |
| Checking starting balance: | $2,488.98 |
| Income: | $1,754.32 |
| Expenses: | $1,907.80 |
| Checking ending balance: | $2,335.41 |
| Ending balance: | $39,650.76 |

## Remembering June and Carroll Moore—Jack Dunn

Elsewhere in this newsletter is information on the passing of June Moore.

I would like to make sure those newer club members know of the importance of Carroll Moore to PAC and Hyde. Carroll essentially founded PAC with the help of some kids of the time, Rick Johnson and Pete Schultz among them. Plus there was Jess Williams. But it was Carroll who gave it a place to meet and brought everyone together.

Then as the bicentennial and Halley's Comet

approached, Carroll got the idea of a public observatory. He formed the committee and it was his persistence that found the Hydes who funded it. June was always at his side and matched his sense of humor. I remember her as a volunteer at the state museum (Carroll became part of the early Friends of the Museum).

Read Mark Dahmke's book for more details about Carroll and PAC history.

So, when you come to Hyde for our club meeting, pause and note the bench out front funded by June in Carroll's name. The Hyde Supervisors hope to add one next to it in honor of June. Without the Moores there would be no Hyde Observatory and probably no PAC.


Pete Schultz and Rick Johnson

## ANNUAL MEMBERSHIP

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, contact Ben Rush. If you keep a scope for more than a week, please check in once a week, to verify the location of the telescope and how long you plan to use it. The checkout time limit will be two weeks, but can be extended if no one else has requested use of a club scope.

100mm Orion refractor: Available

10 inch Meade Dobsonian: Available

13 inch Truss Dobsonian: Available

## 2013 PAC Star Party Dates

Dates in bold are closest to the new moon

January: 4, **11**
February: 1, **8**
March: 1, **8**
April: 5 , **12**
May 3, **10**
June: May 31, **June 7**
July: June 28, **July 5**
**NSP August 4-9**
August: 2, **9**
September: Aug 30, **Sept 6**
October: Sept 27, **Oct 4**
November: Oct 25, **Nov 1**
December: Nov 29, **Dec 6** and 27

### PAC E-Mail:

info@prairieastronomyclub.org

### PAC-LIST:

To subscribe send a request to PAC. To post messages to the list, send to the address:

pac-list@prairieastronomyclub.org

# Events

PAC Meeting
Tuesday June 25th, 2013
@Hyde Observatory

PAC Meeting
Tuesday July 30th, 2013
@Hyde Observatory

Nebraska Star Party
August 4-9

PAC Meeting
Tuesday August 27th, 2013 @Hyde Observatory

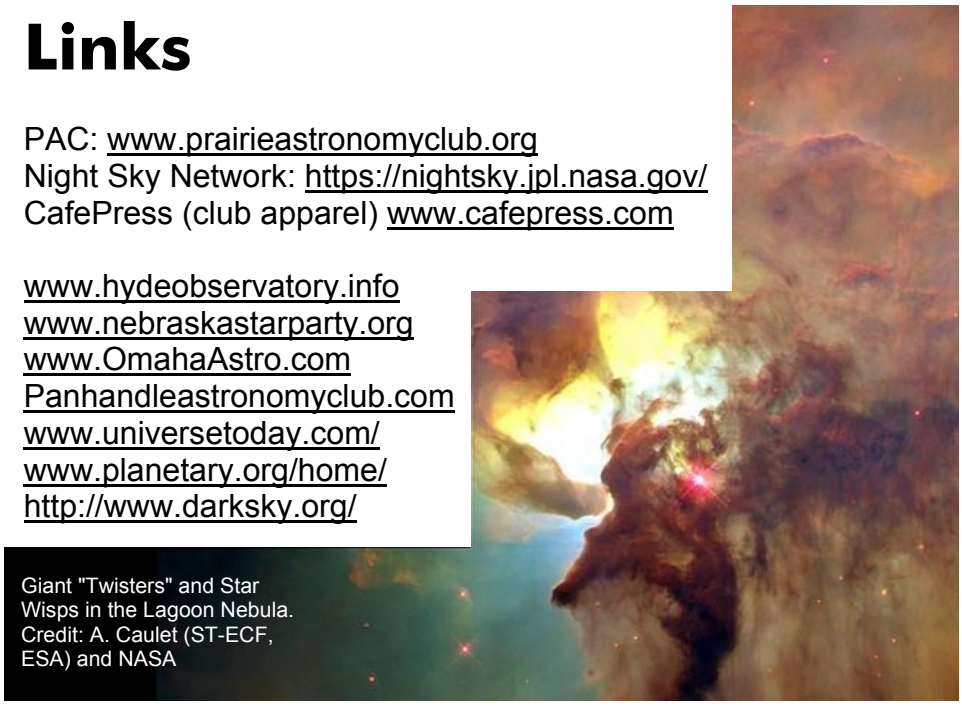
PAC Meeting
Tuesday Sept 24th, 2013
@Hyde Observatory

Newsletter submission deadline
July 15, 2013

# Links

PAC: www.prairieastronomyclub.org
Night Sky Network: https://nightsky.jpl.nasa.gov/
CafePress (club apparel) www.cafepress.com

www.hydeobservatory.info
www.nebraskastarparty.org
www.OmahaAstro.com
Panhandleastronomyclub.com
www.universetoday.com/
www.planetary.org/home/
http://www.darksky.org/



Giant "Twisters" and Star Wisps in the Lagoon Nebula. Credit: A. Caulet (ST-ECF, ESA) and NASA

## July Observing: What to View—Jim Kvasnicka

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

**Planets**

**Venus:** Low in the WNW at magnitude -3.9, sets 1½ hours after the Sun.
**Mercury:** Is in inferior conjunction with the Sun on July 9th.
**Jupiter:** Very low in the east and difficult to see before the sunrise.
**Saturn:** Saturn fades in July to magnitude 0.6 halfway up the SSW sky.
**Uranus/Neptune:** In Pisces and Aquarius at dawn.
**Mars:** Rises about a ½ hour before the Sun in the ENE at magnitude 1.5.

**Messier List**

**M3:** Class VI globular cluster in Canes Venatici.
**M4:** Class IX globular cluster in Scorpius.
**M5:** Class V globular cluster in Serpens Caput.
**M53**: Class V globular cluster in Coma Berenices.
**M68:** Class X globular cluster in Hydra.
**M80:** Class II globular cluster in Scorpius.
**M83:** Galaxy in Hydra.
**Last Month:** M58, M59, M60, M84, M86, M87, M88, M89, M90, M91, M99, M99, M100
**Next Month:** M6, M7, M8, M9, M10, M12, M19, M20, M21, M23, M62, M107

**NGC and Other Deep Sky Objects**

**NGC 6229:** Class IV globular cluster in Hercules.
**NGC 6231:** Open cluster in Scorpius.
**NGC 6369:** Little Ghost Nebula in Ophiuchus.
**NGC 6543:** Cat's Eye Nebula in Draco.
**NGC 6633:** Large open cluster in Ophiuchus.

**Double Star Program List**

**Nu Draconis:** Equal pair of white stars.
**Psi Draconis:** Light yellow pair.
**40/41 Draconis:** Equal pair of light yellow stars.
**Xi Scorpii:** Yellow and light blue stars.
**Struve 1999:** Two yellow-orange stars in Scorpius.
**Beta Scorpii:** Blue-white primary with a light blue secondary.
**Nu Scorpii:** Yellow primary with a light blue secondary.
**Delta Serpentis:** Pale yellow pair.
**Theta Serpentis:** Blue-white pair.

**Challenge Object**

**NGC 6717 (Palomar 9):** Class VIII globular cluster in Sagittarius.

June Moore at Hyde 25th Anniversary, 2002

June Moore of Lincoln, and Rochester, N.Y., died on May 21, 2013, one day after her 94th birthday. At her side was her son, Dr. Gerald F. Moore, Omaha, and daughter, Barbara Moore, Rochester, N.Y. She was predeceased by her husband, Carroll. Well-loved by family and friends, June was best known for her sense of humor and sincere interest in people. For the past five years, June resided with her daughter in Rochester. Previous to that she lived in Lincoln where she spent her career as a Lincoln Public Schools music teacher, conductor of the Lincoln Youth Symphony and member of the Lincoln Symphony Orchestra.

After retirement she worked as a vacation guide for the Nebraska interstate and volunteered in the offices of The Family Resource Center at White Hall and at First United Methodist Church. June's passion was travel, from short road trips that always included a picnic, to many overseas trips, often to view a solar eclipse with her astronomer husband Carroll L. Moore.

Carroll was a longtime Nebraska Wesleyan professor of astronomy and geology. PAC and Hyde Observatory would not exist except for the efforts of Carroll. After Carroll passed, June funded the bench out front of Hyde Observatory dedicated in Carroll's memory. She liked to visit that bench often.

# Open Clusters—Jim Kvasnicka

Open clusters come in a variety of sizes, star numbers, concentrations, and textures. Some open clusters such as M11 in Scutum are nearly as populous and concentrated as Class XI and XII globular clusters. Others are little more than an enhancement of the background star field.

Open clusters can be found in almost every direction of the sky. However, of the more than a thousand open clusters that have been catalogued in our galaxy, only a handful can be found more than 20º - 25º off the galactic equator. Certain directions in the Milky Way are especially rich in open clusters, specifically towards Cassiopeia, Monoceros, and Puppis. These are relatively dust free windows in which we can see thousands of light years along the plane of our Milky Way.

Open clusters are not as old as globular clusters. The oldest known open clusters in our galaxy are only about as old as the youngest globular clusters. Our galaxy is still making open clusters but the formation of globular clusters is long past because the conditions that favored the formation of globular clusters no longer exist.

The diameter of open clusters range from the smallest being just six light years to the largest such as the Double Cluster being 60 – 70 light years.

Open clusters are classified using the Trumpler Classification, which is a three part code using concentration, range of brightness, and the degree of richness. You will see it listed as Tr Type.

**Trumpler Classification**

**Concentration**

I. Detached, strong concentration toward the center.
II. Detached, weak concentration.
III. Detached, no concentration.
IV. Not well detached from surrounding stars.

**Range in Brightness**

1. Small range in brightness.
2. Moderate range in brightness.
3. Large range in brightness.

**Richness**

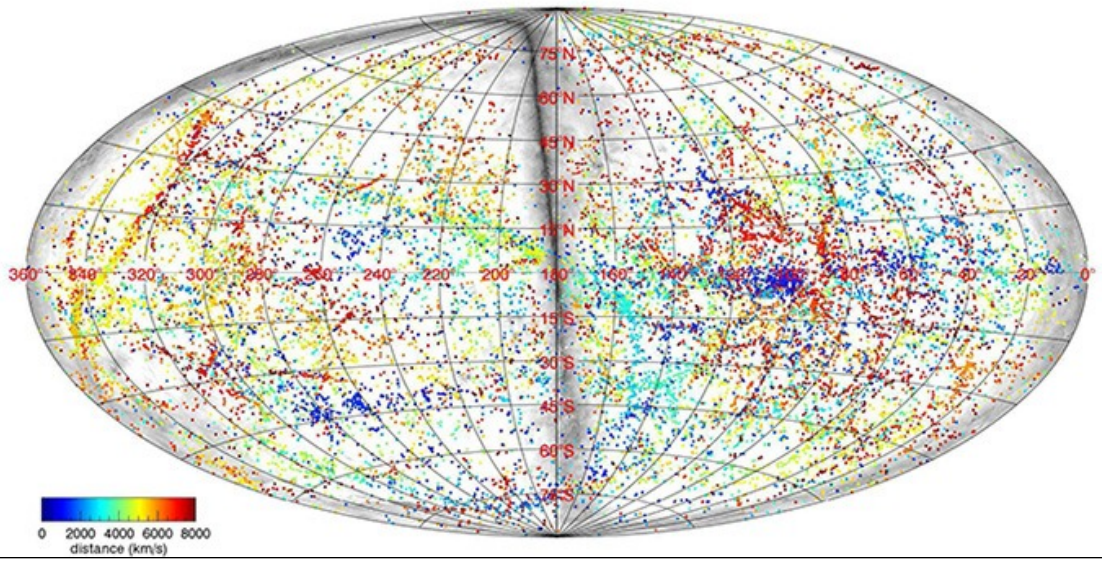
p – Poor, less than 50 stars.
m – Moderate, 50 – 100 stars.
r – Rich, more than 100 stars.
n – Nebulosity is associated with the cluster.

You would combine the three classification codes for the Tr Type.
Example: M41 in Canis Major - Tr Type II 3 m.

If you are interested the Astronomical League does offer an Open Cluster Program. The program consists of 125 open clusters. To observe all 125 requires a 15” telescope. You can talk with me if you are interested in starting the Open Cluster Program.

New Video Map Shows Large-Scale Cosmic Structure out to 300 million Light Years

Read more



## **My First PAC Star Party—**Rick Brown

On Friday, May 10, I attended my very first PAC Star Party since joining the club last summer. By my count, about seven members showed up. The day started out completely overcast, so prospects for a good night of viewing initially seemed grim; but by good fortune, the sky was completely clear by the time we got there around sunset.

If you've been to the viewing site, you know that it offers a horizon-to-horizon view in almost every direction, and Jason quickly took advantage of that by seeking out the new moon, which was setting at just about the time we got there.

It was a very new moon, just under a day old, and a mere 11 degrees from the sun (not much wider than your fist held out at arm's length). To put it into more perspective, this was only 22 hours after a solar eclipse! The moon was certainly not visible to (my) naked eye, but somehow Jason located it in his Dobsonian, and there it was, the crescent no more than a thin white thread against an orange background.

Venus and Jupiter, low in the west, were among the first objects to pop into easy view, so I set my sights on them. Venus is not much to look at right now, as it is practically on the far side of the sun, and its little disk is only about 10 arc seconds across (only about 1/200th the diameter of the moon). As most of you know, Venus' apparent size changes dramatically as it swings around to "our" side of the sun; at that time it will look about 6 times bigger than it does now, and will appear as a crescent. But that will have to wait until December or so.

Jupiter was its usual impressive self. Its disk was 33 arc seconds across, and by coincidence all four of its big moons were laid out on the same side of the planet that night, in a nearly straight line.

As the sky darkened, we were all anxious to take a look at Saturn, which is not far from opposition right now, and is therefore about as close to the earth as it gets. The planet itself was about 19 arc seconds across, and with the rings it spanned about 42 arc seconds. The rings are currently tilted at a respectable 18 degrees, making them a remarkable sight.

At 5 inches of aperture, mine was the "little" telescope in the bunch, and Saturn and its moons make a good test for it. At times when the seeing cleared up for a few seconds, I thought I could make out the dark Cassini Division that separates the two brightest rings; but the effect was so fleeting that I was never quite sure it wasn't my imagination. My other challenge was to spot Rhea, Saturn's second brightest moon (magnitude 9.8). In the light-polluted skies of Lincoln, I can rarely see Rhea in my 5-inch; but the skies at the PAC viewing site are considerably darker, and Rhea popped out easily. It's also worth noting that, in the other members's considerably larger scopes, I could also easily spot Tethys, Saturn's third-brightest (mag. 10.3); and could probably have identified other moons if I'd known where to look.

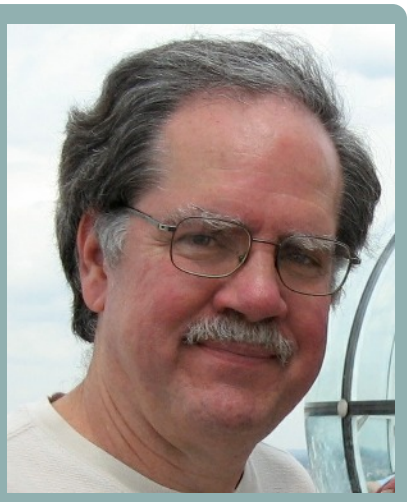
One nice feature of a dark sky is that you can actually see all those constellations that are in your star chart. If you've grown up under light-polluted skies, it's worth taking a trip out to the viewing site for that reason alone. And of course, it makes it easier to find and appreciate all the deep sky objects out there. I was able to spot a few Messier objects that I'm never quite able to find in my 5-inch when I'm "in town." In fact, I saw so many that I lost track after a while.

Bob Kacvinsky commanded attention with his 16-inch Dobsonian, which offered some spectacular views. The ones that stood out most in my mind were NGC 2392, "The Eskimo," a blue planetary nebula with a prominent central star; and M13, the Hercules Cluster, with its thousands of distinct stars, which drew "oohs" and "aahs" from all who attended.

## **My First PAC Star Party,** continued

This being my first time, I came to the star party a bit ill prepared. From this experience, I'll know to bring the following things next time:

- A red flashlight. I knew it would be dark out there, but I wasn't prepared for the all the stumbling around when it was time to pack up. I'm lucky I didn't drop a lens cap on the ground, or it would probably still be out there.
- A star chart of some sort. I was prepared for Jupiter and Saturn, but not for all the deep sky objects that I ended up seeing.
- A notebook. I saw too many things to remember, and later wished I could have written them down.
- A bag of Nacho Cheese Doritos. Mike Kearns shared his, and boy, did they hit the spot.



I grew up in Los Angeles, where I vaguely remember occasionally seeing the Milky Way in the 1960's before light pollution made that impossible. Some of my fondest childhood memories are of the Griffith Observatory, where I got my first glimpse of Saturn's rings. I've been hooked on astronomy ever since. I got my first telescope (a 2.5-inch refractor) at 16, and pointing it at what I thought was a bright star, I "independently discovered" the moons of Jupiter! After getting my Bachelor's degree in Physics and working in aerospace in southern California for a while, my family and I relocated to the darker skies and quieter lifestyle of Nebraska in 1993. (The fact that the path of the 2017 eclipse passes through Lincoln did not affect that decision. I promise.) I now work as a software engineer for an education company here in Lincoln. My wife Sandy and I are empty-nesters, with a daughter in New York City, and a son, daughter-in-law and grandson in Lincoln.

## **The Rings of Saturn and Their Divisions—**Dave Knisely

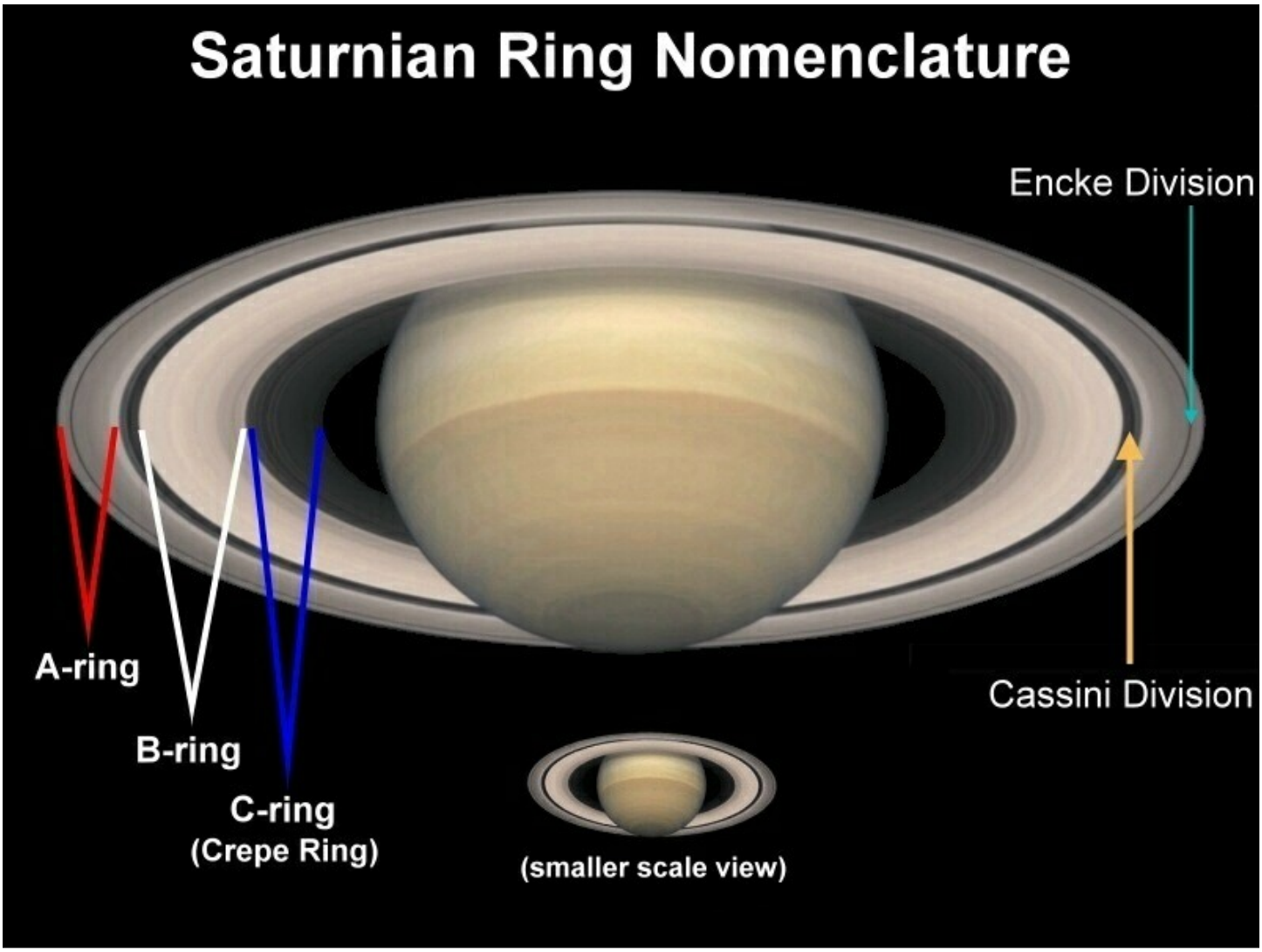
**(some observational experiments)**

Nearly every amateur astronomer has seen Saturn's rings, but not all are aware of what aperture it takes to view their various details. The rings themselves can be glimpsed in binoculars as an elongation of the image, and at about 20x, begin to show their true ring form. Even in a small telescope at 30x, the rings are unmistakable. However, there are a few details in the rings which can be seen with larger apertures, such as the C, or "Crepe" ring, and the two prominent divisions, the Cassini and Encke Divisions. The Crepe ring is the innermost and darkest of the three main rings, and can be glimpsed in fairly small telescopes as a narrow band across the planet's disk when the ring tilt is high. However, it often takes a 3.5 inch or larger aperture and powers over 150x to begin to easily show that dim ring well against the black background of space. At high tilt angles, I have seen it fairly easily in a ten inch, although it isn't very bright. In a 12.5 inch Portaball, the faintly grayish Crepe ring was rather obvious, hugging the inside of the B-ring. One problem which newer observers run into is that with small telescopes, the darker inner band-like edge of the B-ring is sometimes mistaken for the Crepe ring. The B-ring is the brightest ring overall, but shows some interesting variations in brightness across its width. The inner half appears somewhat darker, and occasionally has shown vague patchiness along the inside of the

leading ansa, with the degree of darkness being slightly different between the leading and following asae. The A-ring is the outer ring, and while bright, is somewhat darker than the B-ring.

Cassini's Division, which separates rings A and B is another subject. It is a black band somewhere around 4220 to 4700 km in overall width with a diffuse outer edge and a 3000 km wide darker inner segment. The division can just be glimpsed in moderate apertures at powers of around 65x if the seeing is good, but it best observed at magnifications over 100x. It was discovered in a 2.5 inch (63.5mm) telescope, but I often wondered exactly what minimum aperture is required to actually view it. The division's angular width varies from about 0.59 arc seconds near mean superior conjunction to as large as 0.73 arc seconds near mean opposition, and its outermost edge is at best only 2.35 arc seconds from the outer edge of the A-ring (mean opposition). Simple linear or arc-like features are often visible at apertures smaller than that needed to actually "resolve" the feature's true width. Thus, the division is visible even though its angular width is a little less than 1/3rd of the resolution of the 2.5 inch aperture it was first observed with.

However, three problems crop up when we talk about actually seeing the Cassini Division. The first is familiarity. Most of us know what it looks like and how far out it is, so we might tend to "think" we see it when we actually don't. It would be fairer to have someone who has never seen the rings do the experiment. The second problem is the ring contrast between the brighter B-ring and the somewhat darker A-ring. The A-ring is between 30% and 50% fainter than the B-ring, and has a drop off in brightness with distance from Saturn, mostly in its outer half. This tends to



reinforce the perception that there is a dividing line between the A and B rings, especially at low power and smaller apertures. A third consideration is the location of the Cassini Division. It is near enough to the outer edge of the A-ring that a telescope would have to have enough resolving power in order to separate it from the darkness at the outer edge of the A-ring. Treating the division and the outer edge of the A-ring as "parallel lines" is somewhat more realistic here than just using one of the standard resolution criteria. To quote Sidgwick (from AMATEUR ASTRONOMER'S HANDBOOK, 3rd edition c. 1980, Dover, Section 2 (Telescopic Function:

Resolution), p. 50) where R' is Dawes Limit (4.56/D):

"C. PARALLEL LINES ON A LIGHT GROUND

(i) W. H. Pickering: minimum separation for resolution with a 10-in reflector was 0".63 (1.4R'},

(ii) A similar performance was given by the Arequipa 15-in, which resolved a pair of parallel lines when their separation was increased past 0".42 (1.4R', in good seeing. Slight atmospheric deterioration immediately raised the threshold to about 2R'. At less than 0".42 the lines appeared as a grey band of width about 1-1/2 times their separation.

(iii) Resolution of the lines at 12" arc with 0.4 in OG (1.1R'). See also sections 2.3, 24.6, 26.7, 26.9"

Using the last line of that quotation (1.1R'), the 2.35 arc second separation between the Cassini division's outer edge and the outer rim of the A-ring at mean opposition means that, from the limits of diffraction optics, at least a two inch aperture would probably be required to clearly resolve or separate it from the darkness of space at the outer edge of the ring system. At smaller apertures, the division would tend to just blend into the darker color of the A-ring, rather than forming a distinct dark gap. The division exists of course, but at what point does it become visible as a curving arc, and not just as a contrast effect?

To answer this, I used my off-axis variable aperture mask I built for my ten inch f/5.6 Newtonian to judge double star resolution. This mask provides me with 94mm, 80mm, 70mm, 60mm, and 50mm clear apertures, and I put on one additional mask to get 40mm and 30mm apertures. This way, I could stop down the scope in well-defined steps to see at which point the division would become invisible. I primarily used 176x and 141x for my tests, although I did try 235x and 101x as well. I did the tests in October in both 1999 and 2000 on nights when seeing was better than one arc second. I started with the widest opening 94mm (3.7 inches), which, at 141x and 176x, showed Saturn nicely and the Cassini Division much of the way around the planet. Even the main belt across the planet was easily visible, as well as the faint Crepe ring.

Stopping down caused a drop in the brightness and in the ease of detail visibility, but Cassini's Division could still be seen down to 60mm, where it was still fairly traceable along a wide arc of each ansa. At 50mm, the actual division was becoming more difficult and was not very well shown, detectable mainly at the bend of each ansa. The outer half of the ring system looked somewhat darker as the division started to blend in a bit with the A-ring. At 101x, the division was not visible at 50mm aperture. At 40mm, I could no longer see a clear dark division between the rings, although the A and B-rings could still be seen as separate features with differing brightness and borders. Interestingly enough, even the 40mm aperture was still showing the main belt on the planet's disk. At 30mm of aperture, the A and B rings began to merge somewhat, with no clear signs of any division, and the only visible ring detail being a somewhat darker outer edge. I tried the same variable aperture sequence at 235x, but again, at 40mm, Cassini's division was not visible. To be realistic, while 50mm may allow "detection" of the division at high ring tilt, in general, 60mm seems to be about the minimum to clearly and easily show Cassini's Division.

The Encke Division is a considerably more difficult target. It is a much narrower division, located near the outer edge of the A-ring. One problem is that again, an albedo feature causes a contrast effect which can mimic the presence of a true division. The brightness of the A-ring shows a peak intensity just outside the Cassini division in

a sort of brighter "ringlet". Farther out, the brightness shows a marked fall off, beginning about halfway out from the inner edge of the A-ring and continuing to its outer edge. This brightness falloff combined with the brighter inner "ringlet" can give the impression that there is a diffuse division about in the middle of the A-ring, especially at moderate powers where the image scale is not extremely high. Some amateurs have referred to this illusionary "feature" as, "the Encke Minimum", although this name is not official. Many observers prior to the Voyager probes (including Encke himself) apparently mistook the brightness falloff/contrast effect as a division and repeatedly reported it nearly in the middle of the A-ring (a few even drew 2 divisions there!). Others have had seeing cause doubling effects which can make ring edges look like additional divisions. The Voyager and HST images show one significant but narrow division in the A-ring near its outer edge *not* near the middle of that ring. That narrow gap has since been "officially" named the Encke Division by the IAU, even though it was first sketched well by James Keeler in 1888.

The true Encke division is located about 80 percent of the way from the outer edge of the Cassini division to the outer edge of the A-ring, or about 133,706 km from the center of the planet and but only 3,074 km from the A-ring's outer rim. At mean opposition, this is only 0.496 arc seconds in from the A-ring's outer edge, so if a telescope is to be able to separate the gap from the edge of the ring, it must have more than this resolving power if not a bit more. To quote Sidgwick again, we could use the 1.1R' figure and come out to a minimum required aperture of about 10 inches for the division to be resolved from the otuer edge of the A-ring.

To check on the division's true width, I took a recent Hubble Space Telescope image of the planet as well as a large-scale Voyager image print of the entire ring system. Using the known diameter of the visible ring system, I came up with an image scale, and then determined the approximate width of the division. At most, the gap appeared to be 400 km wide, and a few books have even indicated smaller values (325 km from ASTROPHYSICAL DATA: Planets and Stars, K. R. Lang). In any case, using the largest value of 400 km, and a 0.5 arc second separation from the outer edge of the A-ring, I again came to the "ballpark" estimate that it would probably take a telescope of about 10 inches to have much of a chance of seeing the division with any certainty. This conclusion is based on the fact that, if the gap was to be resolved or "separated" from the outer edge of the A-ring, the telescope would need to have better than a 0.5 arc second "parallel line" resolution (1.1R'), and this favors a telescope with an aperture 10 inch or larger aperture.

Bearing this in mind, in October, I began to look for the division. I got two or three outstanding nights when it was just barely visible with the ten inch at 440x as a fine low contrast and very narrow arc near the outer edge of each ansae. One evening in particular, I could glimpse it at 353x and see it a bit better around each side of the rings at 440x. However, the fine narrow appearance of this gap and the powers needed to get the image scale up to where the gap would be visible makes me think that my estimate of 10 inches minimum aperture for visibility was fairly accurate. Magnifications of well over 300x and very steady seeing are necessary to have much of a chance of seeing the division and not just the illusion of the "Encke Minimum". I have some doubts that at apertures significantly under ten inches would allow viewing of the Encke Gap, but perhaps a quality 9 inch refractor might be able to show hints of it near maximum ring tilt and at a very close opposition.

The season for noctilucent “night-shining” clouds is arriving in the northern hemisphere, when wispy, glowing tendrils of high-altitude ice crystals may be seen around the upper latitudes, shining long after the Sun has set. Found about 83 km (51 miles) up, noctilucent clouds (also called polar mesospheric clouds) are the highest cloud formations in the atmosphere. They’ve been associated with rocket launches and space shuttle re-entries and are now thought to also be associated with meteor activity… and for some reason, this year they showed up a week early.— *Jason Major, Universe Today*

# The Nebraska Star Party

August 4th Through 9th, 2013
Merritt Reservoir, 27 Miles South of Valentine, NE


Photo Credit: Fred Hultstrand History in Pictures Collection, NDSU, Fargo, ND. Design by Mark Dahmke.

Plan now to sail off on your own voyage of discovery this summer with us! The astronomical views from Merritt Reservoir's Snake Campground are fabulous, and there are plenty of recreational opportunities to keep the entire family entertained all week long at the 20th annual Nebraska Star Party.

For newcomers, NSP is the perfect place to become acquainted with the wonders of the heavens which can't be seen from cities. Our unique Beginner's Field School will show you how fun it is to explore the sky here, as well as in your own back yard when you return home, with or without a telescope.

Youngsters will enjoy the experience of camping beneath the stars as well as the special kid's activity program midweek in which they can have fun with pop bottle rocketry, solar viewing, crater study, celestial mechanics, and construction projects such as UV bead bracelets, an astrolabe, a planisphere, a spectroscope, or even a telescope.

Seasoned observers will find NSP enjoyable as well. There are observing challenges, an astro photo contest, and a fantastic light pollution-free sweep of the summer night sky, with naked-eye limiting magnitude (that is, the faintest objects visible to the naked eye) approaching magnitude 7.5 to 8!

Apart from the starry central attraction, the remote sandhills of north-central Nebraska offer a vacation full of western and natural history as well. Short day trips will take you to historical sites important to the settlement of the west. The spring-fed water and sugar sand beaches of Merritt Reservoir offer swimming, boating, and fishing. Valentine national Wildlife Refuge provides a window into the ecology of the prairie, while the nearby Niobrara River affords a cooling tube float or canoe trip through the surrounding cattle and buffalo ranching country.

Whether you've been to NSP many times before, or you don't even know what a star party is, you'll be treated like a cherished old friend. Plan now to join us this summer for an unforgettable – and economical – vacation! You don't even need a telescope to attend. **Be sure to register before July 1st, 2013 to save $10 per adult on registration costs.**

Featuring former Nebraska Astronaut Clayton Anderson as the keynote speaker

# THE *Prairie Astronomy Club*

## Amateur Astronomy — A Hobby as Big as the Universe




The Prairie Astronomer
c/o The Prairie Astronomy Club, Inc.
P.O. Box 5585
Lincoln, NE 68505-0585


FIRST CLASS MAIL

**Next PAC Meeting**
**TUESDAY**
**June 25, 2013**
**7:30 PM**
**Hyde Observatory**