The Prairie Astronomer

April 2018 Volume 59, Issue #4

Formations in Context (or, what is it?)

Night Sky Network

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

NEXT PAC MEETING: April 24, 7:30pm at Hyde Observatory

PROGRAM

The April program will be a video review of several star parties in the United States.

FUTURE PROGRAMS

May: Club dinner
June: Solar Star Party
July: To be announced
August: NSP Review
October: Club Viewing Night
November: How to Buy a Telescope
December: To be announced

Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy.
Order online from Amazon or lulu.com.

CONTENTS

4 Meeting Minutes
5 Observing Awards
6 Pete Schultz
7 Observatory Update
9 May Observing
10 Mars
11 Focus on Corvus
12 Saturn
14 From the Archives

Cover: This image from NASA's Mars Reconnaissance Orbiter is a close-up of a trough, along with channels draining into the depression. Some HiRISE images show strange-looking formations. Sometimes it helps to look at Context Camera images to understand the circumstances of a scene -- like this cutout from CTX 033783_1509 -- which here shows an impact crater with a central peak, and a collapse depression with concentric troughs just north of that peak.

EVENTS

PAC meeting
Tuesday April 24, 2018, 7:30pm
To be announced

PAC Meeting
Tuesday May 29, 2018, 7:30pm
Club Dinner

PAC Meeting
Tuesday June 26, 2018, 7:30pm

PAC meeting
Tuesday June 26, 2018, 7:30pm

2018 STAR PARTY DATES

Photo by Brian Sivill

	Star Party Date	Star Party Date
January	Jan 12th	**Jan 19th**
February	Feb 9th	**Feb 16th**
March	Mar 9th	**Mar 16th**
April	Apr 6th	**Apr 13th**
May	May 4th	**May 11th**
June	Jun 8th	**Jun 15th**
July	Jul 6th	**Jul 13th**
August	Aug 3rd	**Aug 10th**
NSP	**Aug 5th -10th**	
September	**Sep 7th**	Sep 14th
October	**Oct 5th**	Oct 12th
November	Nov 2nd	**Nov 9th**
December	Nov 30th	**Dec 7th**

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

PAC E-MAIL:

info@prairieastronomyclub.org

PAC-LIST:

Subscribe through GoogleGroups.
To post messages to the list, send to the address:

pac-list@googlegroups.com

ADDRESS

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WEBSITES

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https://nightsky.jpl.nasa.gov
www.hydeobservatory.info
www.nebraskastarparty.org
www.OmahaAstro.com
Panhandleastronomyclub.com
www.universetoday.com/
www.planetary.org/home/
http://www.darksky.org/

Night Sky Network

Meeting Minutes

President Jim Kvasnicka called the meeting to order at 7:35 p.m.

Jim covered upcoming star parties, April 6 and 13.
There is an outreach request from Camp Summergold, a summer camp for girls ages 11-17 in Aurora, either June 6 or 7. They want several club members to bring telescopes for observing. The dates are in the middle of the week, Wednesday or Thursday, and darkness descends late on those dates, so it could be a long night. If you are interested, let Mike Kearns know.

ALCON (Astronomical League [national] Convention) this year is in Minneapolis July 11-14, and NSP (Nebraska Star Party) is August 5-10 at Merritt Reservoir near Valentine.

Following his monthly observing report, Jim presented two Astronomical League observing awards. Bob Kacvinsky and Jim Kvasnicka both earned their Master Observing Awards. To earn these awards, AL members must complete 10 observing programs, five of which must be: Messier, Binocular Messier, Lunar, Double Star and Herschel 400 programs. In addition to the required five, Bob completed Globular Cluster, Caldwell, Two-in the View, Bright Nebula and Asterism programs. Jim's electives were Globular Cluster, Urban, Binocular Deep Sky, Caldwell and Sketching programs. Their certificates were numbered 206 and 207, so these awards go to a very elite group of accomplished amateur astronomers.

The League offers nearly 50 observing programs for all levels of amateurs, beginners to advanced. PAC members, who are automatically AL members, can take their pick of programs on the Astronomical League website, and get assistance from experienced members like Bob and Jim.

We have not elected a Program Chairman, so if you are interested in presenting a program at a future meeting, or have a suggestion for one, let a board member know.

Treasurer John Reinert presented the results of the required annual internal audit. He announced that the books balanced and copies of the year-end balances and monthly expenditures were circulated for consideration. John noted that the club had spent about $65 on Facebook advertising to reach people about club events, and that we had received $43.63 from Amazon Smile, a program that earns a donation to the club as a percentage of member purchases on Amazon.

Members were reminded that if you want to be on the PAC list, have changed email addresses or have not received any email from the club for a long time, notify Mark Dahmke, mark@dahmke.com, and he will make sure that your current address is in the list.

Motion to accept the audit was passed.

Brian Sivill noted that Branched Oak Observatory is in the process of getting a bid for the concrete pad, and that the club's $2,000 donation would probably be supplemented with funds from other sources to construct a somewhat larger pad than originally envisioned. The pad would still be named for PAC.

The business meeting was adjourned at 7:55. The originally announced program on star parties was replaced by a live presentation from one of PAC's founding members, Pete Schultz, who went on to a career in planetary geology and is one of the leading experts in impact cratering on planetary bodies. He served as Director of the Lunar and Planetary Institute Planetary Image Facility, and is currently a Professor at Brown University, and Director of both the Northeast Planetary Data Center and the NASA/Rhode Island University Space Grant Consortium. His talk dealt with his latest research and theories on the formation of Maria lava basins on the moon.

Observing Awards

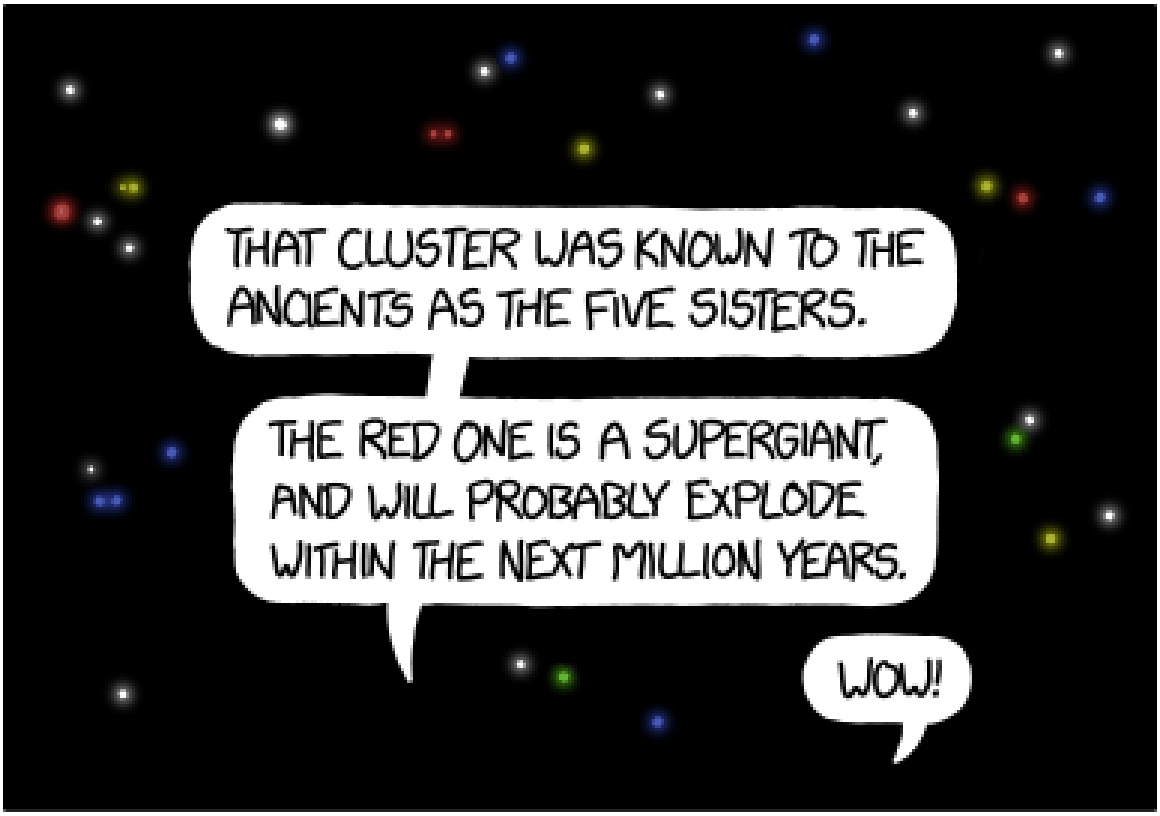
Congratulations to Bob Kacvinsky and Jim Kvasnicka for receiving their Master Observing Awards.

To earn the Master Observing Award you must complete ten observing programs. Five of the ten must include the Messier Program, Binocular Messier Program, Double Star Program, Lunar Program, and the Herschel 400 Program.

Besides these five programs Bob completed the Globular Cluster Program, Caldwell Program, Two in the View Program, Bright Nebula Program, and the Asterism Program.

Jim's additional five programs were the Globular Cluster Program, Urban Observing Program, Deep Sky Binocular Program, Caldwell Program, and the Sketching Program.

Bob and Jim are the first PAC members to receive the Master Observing Award.



THERE ARE TOO MANY STATUS LEDS IN MY ROOM. xkcd.com

A Surprise Visit (and Program!) From a Founding Member of PAC

I think it was Brett Boller who said after the meeting, *"This is why you shouldn't miss PAC meetings!"*

The originally announced program on star parties was replaced by a live presentation from one of PAC's founding members, Pete Schultz. His talk dealt with his latest research and theories on the formation of Maria lava basins on the moon.

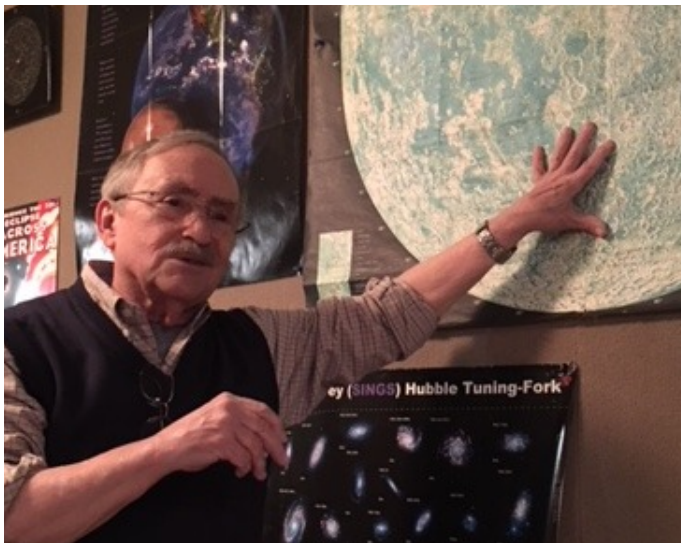
After graduating from Lincoln Southeast, Pete got his B.A. from Carleton College in 1966, and his Ph.D. in Astronomy at the University of Texas at Austin in 1972. After working as a research associate at the

NASA Ames Research Center, and a Staff Scientist at The Lunar and Planetary Institute, he became an Associate Professor in the Department of Geological Sciences at Brown University in 1984 and was promoted to full Professor in 1994.

In addition to his research and teaching responsibilities at Brown, he has served as Director of the Lunar and Planetary Institute Planetary Image Facility, and is currently the Director for both the Northeast Planetary Data Center and the NASA/Rhode Island University Space Grant Consortium.

He has done extensive research on cratering and was a principle researcher on NASA's Deep Impact probe which impacted on Comet Tempel 1 in 2005 and the 2009 LCROSS probe which

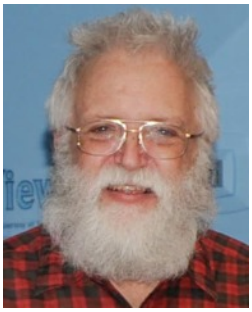
impacted on the Moon. He has also been interviewed for various science programs on the Discovery Channel and National Geographic and NOVA on PBS.



Right: Pete Schultz and the 10" Newtonian he built. This photo was taken in 1961 while Pete was at Lincoln Southeast. Rick Johnson built the electronics for this scope, including the control box Pete is holding. Rick built several more for himself and other club members. Back then everything was 120VAC. Pete's included slow motion controls.

Observatory Update: IC 0311 - a Very Weird Galaxy

Rick Johnson



IC 311 is a very strange edge on? galaxy on the south-southeast edge of the Perseus Galaxy Cluster, Abell 426. It is located about 190 million light-years away. The cluster has an average distance of 240 million light-years so it isn't likely a member of the cluster. What drew my interest to this galaxy is that it appears to be an edge on spiral galaxy seen very close to perfectly edge on. The dust lane bisects the galaxy perfectly. But then there's a second dust lane below the linear one. This one is curved and appears to be in two parts. There's a sudden jog a bit right of the vertical axis where this second dust lane jumps north a bit on the western (right) side. The lane seems tilted with respect to the galaxy itself and the dust lane running directly through the core. Is this second dust lane due to something IC 311 is digesting? I found absolutely nothing on it other than a comment in one paper that it exists. But that doesn't mention the sudden break offsetting the northern and southern parts by about the dust lanes diameter. I measure its diameter at about 90 thousand light-years so it is a respectable spiral. There is some disagreement as to classification. NED says S? while Seligman says Sb? pec. I much prefer Seligman's take on it. That second dust lane where

Full image at 1" per pixel

none should be certainly is peculiar. It was discovered by Lewis Swift on October 10, 1888.

Apparently, it isn't strange enough to have been investigated. Being near the Zone of Avoidance the entire field is poorly researched. While the SDSS has covered this area the data isn't in NED as yet so I didn't pick it up. A high-resolution image from the survey that shows the discontinuity of the second unexpected dust lane can be seen here. Could it be two superimposed galaxies? If so no one has suggested this that I found.

No other galaxy in the image had redshift data. Many aren't in either NED or SIMBAD. Two I especially wanted to find information on fell into that category. They could be two interacting galaxies or more likely two very different galaxies seen along the same line of sight from our position in the universe. There's a somewhat red star-like object between them that's much fainter than either yet that did make it into NED's database. I doubt it is related to either of the other two and none had distance data of course. I've marked the two unknowns each with a question mark in the annotated image.

May Observing: What to View

Jim Kvasnicka

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

Planets

Venus: Shines at magnitude -3.9, setting 2½ hours after the Sun.
Jupiter: At opposition on May 8th. It shines at magnitude -2.5 with a disk 44" wide.
Saturn: Rises about midnight to start the month and two hours earlier to end May.
Mars: Increasing in brightness and size as it approaches opposition in July, the closest opposition in 15 years.
Neptune: Visible in the morning twilight.
Uranus and Mercury: Not visible

Messier List

M49: Galaxy in Virgo.
M51: The Whirlpool Galaxy in Canes Venatici.
M61: Galaxy in Virgo.
M63: The Sunflower Galaxy in Canes Venatici.
M64: The Black Eye Galaxy in Coma Berenices.
M85: Galaxy in Coma Berenices.
M94: Galaxy in Canes Venatici.
M101: The Pinwheel Galaxy in Ursa Major.
M102: Galaxy in Draco.
M104: The Sombrero Galaxy in Virgo.

Last Month: M40, M65, M66, M95, M96, M105, M106, M108, M109
Next Month: M58, M59, M60, M84, M86, M87, M88, M89, M90, M91, M98, M99, M100

NGC and other Deep Sky Objects

NGC 4064: Oval shaped galaxy in Coma Berenices.
NGC 4179: Elongated galaxy in Virgo.
NGC 4244: The Silver Needle Galaxy in Canes Venatici.
NGC 4274: Elongated galaxy in Coma Berenices.

Double Star Program List

Kappa Bootis: Yellow and blue pair.
Iota Bootis: Yellow and dim blue stars.
Pi Bootis: Pair of white stars.
Epsilon Bootis: Yellow primary with a greenish yellow secondary.
Xi Bootis: Yellow pair.
Delta Bootis: Yellow and blue-white stars.
Mu Bootis: Yellow pair.
Zeta Corona Borealis: Light blue and greenish yellow stars.

Challenge Object

NGC 4782 and NGC 4783: The two interaction galaxies in Corvus form a figure 8.

What's It Like Inside Mars?

Jessica Stoller-Conrad

This article is provided by NASA Space Place.
With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.
Visit spaceplace.nasa.gov to explore space and Earth science!

Mars is Earth's neighbor in the solar system. NASA's robotic explorers have visited our neighbor quite a few times. By orbiting, landing and roving on the Red Planet, we've learned so much about Martian canyons, volcanoes, rocks and soil. However, we still don't know exactly what Mars is like on the *inside*. This information could give scientists some really important clues about how Mars and the rest of our solar system formed.

This spring, NASA is launching a new mission to study the inside of Mars. It's called Mars InSight. InSight—short for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport—is a lander. When InSight lands on Mars later this year, it won't drive around on the surface of Mars like a rover does. Instead, InSight will land, place instruments on the ground nearby and begin collecting information.

Just like a doctor uses instruments to understand what's going on inside your body, InSight will use three science instruments to figure out what's going on inside Mars.

One of these instruments is called a seismometer. On Earth, scientists use seismometers to study the vibrations that happen during earthquakes. InSight's seismometer will measure the vibrations of earthquakes on Mars—known as marsquakes. We know that on Earth, different materials vibrate in different ways. By studying the vibrations from marsquakes, scientists hope to figure out what materials are found inside Mars.

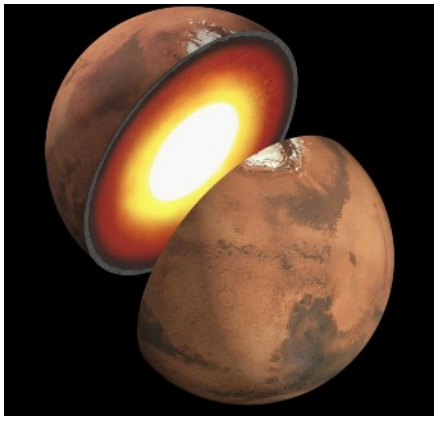
InSight will also carry a heat probe that will take the temperature on Mars. The heat probe will dig almost 16 feet below Mars' surface. After it burrows into the ground, the heat probe will measure the heat coming from the interior of Mars. These measurements can also help us understand where Mars' heat comes from in the first place. This information will help scientists figure out how Mars formed and if it's made from the same stuff as Earth and the Moon.

Scientists know that the very center of Mars, called the core, is made of iron. But what else is in there? InSight has an instrument called the Rotation and Interior Structure Experiment, or RISE, that will hopefully help us to find out.

Although the InSight lander stays in one spot on Mars, Mars wobbles around as it orbits the Sun. RISE will keep track of InSight's location so that scientists will have a way to measure these wobbles. This information will help determine what materials are in Mars' core and whether the core is liquid or solid.

InSight will collect tons of information about what Mars is like under the surface. One day, these new details from InSight will help us understand more about how planets like Mars—and our home, Earth—came to be.

For more information about earthquakes and marsquakes, visit: https://spaceplace.nasa.gov/earthquakes



Caption: An artist's illustration showing a possible inner structure of Mars. Image credit: NASA/JPL-Caltech

Focus on Constellations: Corvus

Jim Kvasnicka

Corvus the Crow is a distinctive trapezoid shape of 3rd magnitude stars just southwest of Spica in Virgo. Corvus is a small constellation covering just 184 square degrees of sky making it the 70th largest constellation. Despite being so small it contains some interesting objects for an off-Milky Way area, including a couple of attractive double stars, a bright planetary nebula, and several rather bright galaxies. Its most notable object is NGC 4038-39, the Ring Tail Galaxy.

Showpiece Objects

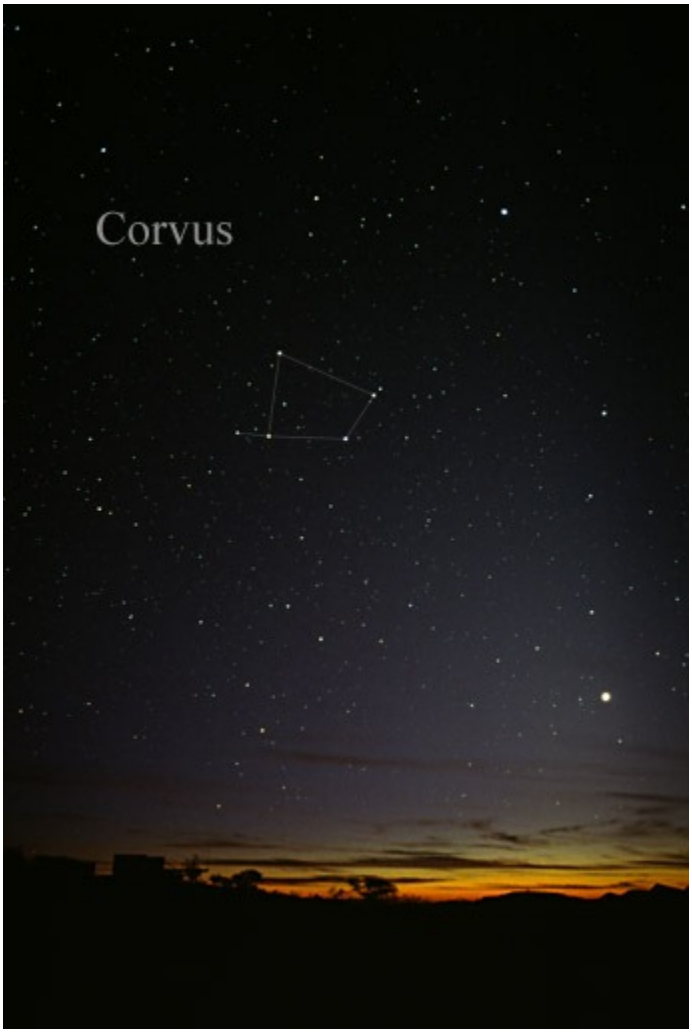
Galaxies: NGC 4027, NGC 4038-39, NGC 4782-83
Planetary Nebulae: NGC 4361
Double Stars: Delta Corvi, Σ1669

Mythology

In mythology Corvus is associated with Crater and Hydra. Apollo sent his pet raven down to Earth to bring him a cup of fresh water. On arriving at the spring the raven saw a fig tree that was just beginning to bear fruit. The raven thought, does it matter if I wait a couple of days until the fruit ripens. The raven waited until the fruit ripened and ate all the fruit. He then filled the cup with fresh water but realized that his master would be angry for the long delay. The raven saw a water serpent nearby and grabbed it in his claws. With the water cup in his mouth and the serpent in his claws he flew back to Apollo. Corvus said he was delayed because of the Snake. Apollo was not taken in with the bird's lie and flung him, the cup, and the serpent into the night sky. We see them today as Corvus, Crater, and Hydra.

Number of Objects Magnitude 12.0 and Brighter

Galaxies: 10
Globular Clusters: 0
Open Clusters: 0
Planetary Nebulae: 1
Dark Nebulae: 0
Bright Nebulae: 0
SNREM: 0



Till Credner - Own work: AlltheSky.com 3.0

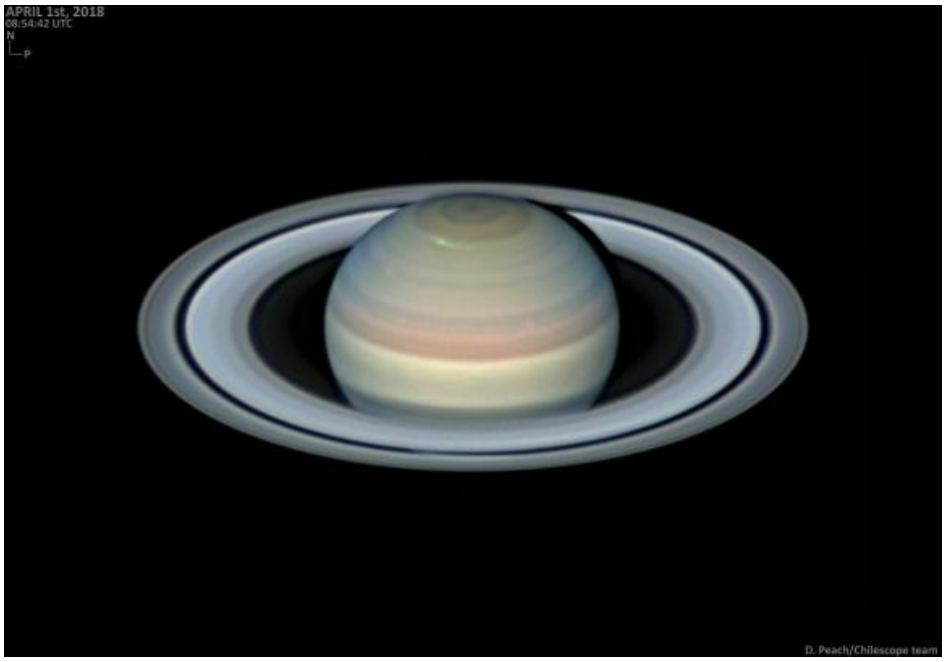
Is a New Saturn Storm Emerging?

David Dickinson, Universe Today

Are you following the planets this season? The planetary action is about to heat up, as Jupiter, Saturn and Mars all head towards fine oppositions over the next few months.

Spying the Storms of Saturn

Astrophotographer Damian Peach raised the alarm on Twitter this past week of a possible bright storm emerging of the planet Saturn. The spot was noticeable even with the naked eye and in the raw video Peach captured, a sure sign that the storm was a biggie.



The tell-tale white notch of a new storm system emerging on Saturn on April 1st. Image credit and copyright: Damian Peach.

Though outbursts of clusters of white spots on the surface of Saturn aren't uncommon, it's rare to see one emerge at such a high latitude. The storm had faded considerably the next observing session Peach performed on April 5th, though observers should remain vigilant.

It's sad to think: Cassini and our eyes in the outer solar system are no more… and the situation will probably remain this way for some years to come. Juno also wraps up its mission at Jupiter (pending extension) this year, and New Horizons visits its final destination Ultima Thule (neé 2014 MU69) on New Year's Day 2019, though it'll likely continue to chronicle its journey through the outer realms of the solar system, much like the Voyager 1, 2 and Pioneer 10, 11 missions, also bound to orbit the galaxy, mute testaments to human civilization. But even though proposals for Europa Clipper, a nuclear-powered quad-copter for Saturn's moon Titan, and a Uranus and/or Neptune Orbiter are all on the drawing board, the "gap decade" of outer solar system exploration will indeed come to pass and soon.

But dedicated amateur astronomers continue to monitor the outer solar system for changes. This month sees Saturn rising around 1:30 AM local and transiting highest to the south for northern hemisphere observers at 6:00 AM local, just before sunrise. Saturn crosses the constellation Sagittarius in 2018, bottoming out at its most southerly point this year for its 29 year path around the Sun. Saturn currently shines at +0.4 magnitude, extending 40" across (including rings) as it heads towards a fine opposition on June 27th. After opposition, Saturn formally crosses into the dusk sky. The amazing rings are an automatic draw, but last week's storm admonishes us not to forget to check out the saffron-colored disk of Saturn itself as well. For example, I've always wondered: why didn't we see the hexagon before? It's right there festooning the northern

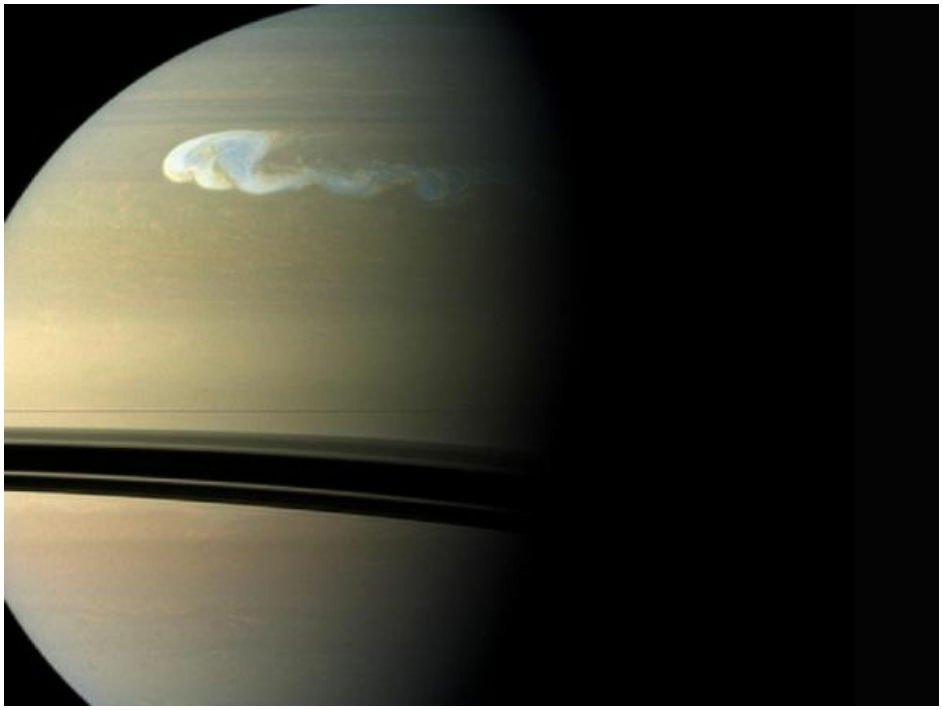
hemisphere cap, plain as day in modern amateur images… to be sure, we're in a modern renaissance of planetary astrophotography today, what with image stacking and processing, but surely eagle-eyed observers of yore could've easily picked this feature out.

And the view is changing as well, as Saturn's rings reached a maximum tilt in respect to our line of sight of 27 degrees in 2017, and now head back towards edge-on again in 2025. And be sure to check out Saturn's retinue of moons, half a dozen of which are easily visible in a telescope at even low power.

Finally, here's another elemental mystery poised by Saturn related to the current storm, one that Cassini sought to solve in its final days: how fast does Saturn rotate, exactly? The usual rough guesstimate quoted is usually around 10.5 hours, but we've yet to pin down this fundamental value with any degree of precession.

One thing's definitely for sure: we need to go back. In the meantime, we can enjoy the early morning views of the most glorious of the planets in our Solar System.

A storm subsiding? The followup view a few days later on April 5th. Image credit and copyright: Damian Peach.



Catching a storm on Saturn, Cassini style. Credit: NASA/JPL-Caltech/SSI

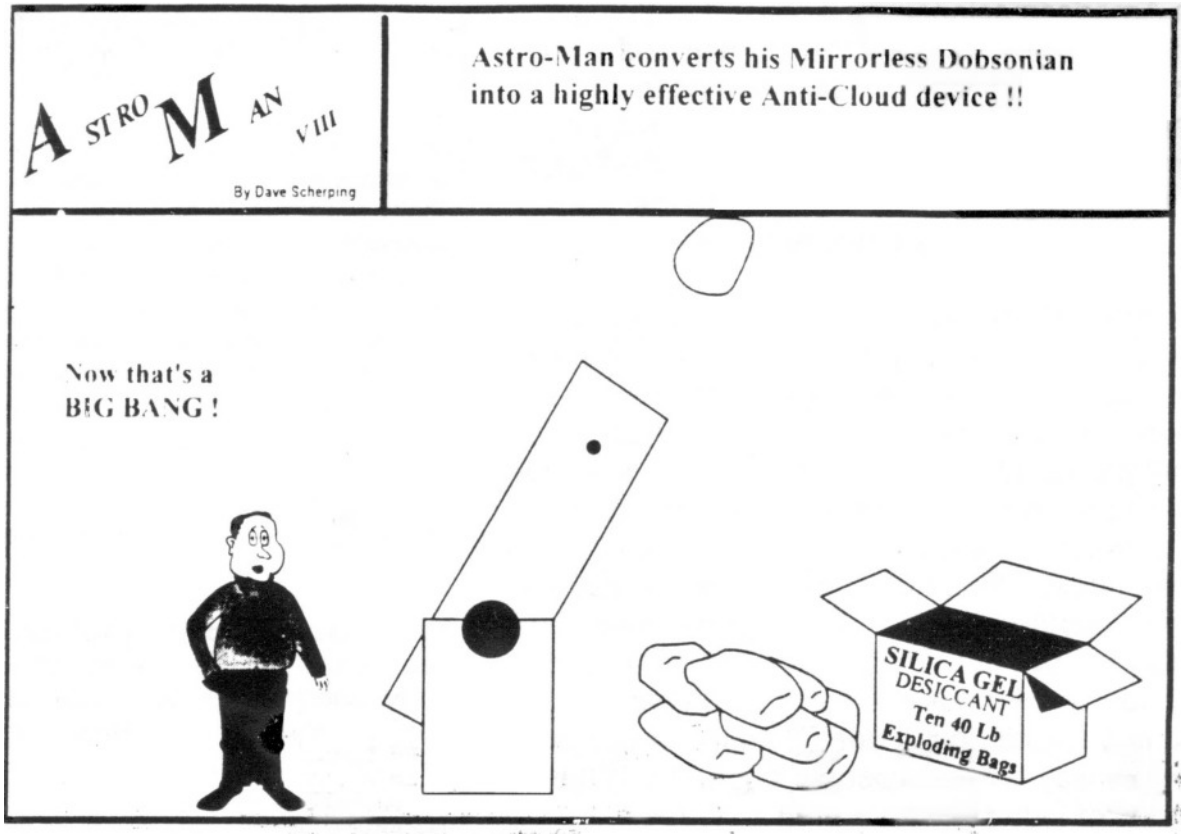
From the Archives: April, 1969

The Prairie Astronomy Club will hold its first star party of 1969, on May 9, at Hickman, Nebraska. As usual, this star party has been well planned and well publicized, but also, as usual, the attendance will be poor. It is always the same five or six club members who plan these events and the same five or six who attend them.

This is an unfortunate situation because the most obviously educational thing done by the club is the teaching of the sky and how to use a telescope to its more inexperienced members. Younger members need this sort of encouragment if their interest in astronomy is to grow and become stronger.

But the problem is not limited to the younger members of the club alone. The older men, the founders of the club, the ones who have made the club what it is today are noticibly absent from most-if not all-star parties. They need to find out just what has been happening in the last few years and exactly what they have forgotten. Maybe in this way the interest which they once had in astronomy could be reborn at a time as important as this one when Lincoln has the opportunity to host the 1970 Mid-States Regional Convention of the Astronomical League and all help will be needed.

Once again, anyone who needs transportation to the star party should contact Monte Cole; 488-1652, or Ed Woerner; 466-9234.



Dave Scherping, 1995

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: David Pennington
10 inch Meade Dobsonian: Lee Taylor
13 inch Truss Dobsonian: Available

CLUB APPAREL

Order club apparel from cafepress.com:

Shop through Amazon Smile to automatically donate to PAC:

CLUB OFFICERS

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