

The Prairie Astronomer

November 2016 Volume 57, Issue #11

***November
Program: How to
Buy a Telescope***



**Cover: Occator
on Ceres' Limb**



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

NEXT PAC MEETING: November 29, 7:30pm

At Hyde Observatory

PROGRAM

PAC's annual "How to Buy a Telescope" - hands-on program. Members are encouraged to bring their telescope, so we will have a variety of scopes on hand to demonstrate to those attending the meeting. We've run ads on Facebook and sent announcements to the media.

FUTURE PROGRAMS

December: PAC Holiday Gathering, "The Thirty Meter Telescope" by Larry Stepp @ Mueller Planetarium

January: How to Use Your Telescope

CONTENTS

- 4 Meeting Minutes
- 5 Boller-Sivill Observatory Report
- 6 Astrophotography
- 8 Saturn
- 9 Observatory Update
- 11 Pluto
- 13 December Observing
- 14 Focus on Constellations
- 15 Planetary Nebulae
- 17 From the Archives
- 18 Club Information



Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy.

Order online from [Amazon](https://www.amazon.com) or [lulu.com](https://www.lulu.com).

EVENTS



Dedication of Earl Moser Sundial at Hyde
November 26, 2016, 2pm

PAC Meeting
Tuesday November 29, 2016, 7:30pm
Hyde Observatory

PAC Meeting
Tuesday December 27, 2016, 6:30pm
Mueller Planetarium

PAC Meeting
Tuesday January 31, 2016, 7:30pm
Hyde Observatory

Newsletter submission deadline December 17

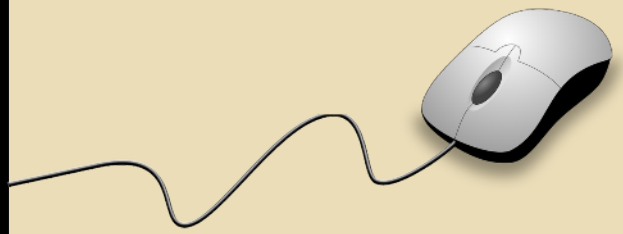
2017 STAR PARTY DATES



Photo by Brian Sivill

	Star Party Date	Star Party Date	Lunar Party Date
January	Jan 20th	Jan 27th	
February	Jan 17th	Feb 24th	
March	Mar 17th	Mar 24th	
April	Apr 21st	Apr 28th	
May	May 19th	May 26th	May 5th
June	Jun 16th	Jun 23rd	Jun 30th
July	Jul 14th	Jul 21st	
NSP	July 23rd - July 28th		
August	Aug 18th	Aug 25th	
September	Sep 15th	Sep 22nd	Sep 1st
October	Oct 13th	Oct 20th	
November	Nov 10th	Nov 17th	
December	Dec 15th	Dec 22nd	

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

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

WEBSITES

- www.prairieastronomyclub.org
- <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

PAC Meeting Minutes

Prairie Astronomy Club Minutes for the meeting of October 25, 2016

President Jim Kvasnicka called the meeting to order. 15 members, no guests. Jim reviewed the upcoming events for the club, as well as benefits and dues for the club. Jim then provided his observing report for November, with a review of the constellation, Cassiopeia.

Nominations for club officers. From the September meeting, we have the following nominations for club officers:

Brett Boller for Vice President and John Reinert for Treasurer. Lee Thomas has expressed willingness to serve as secretary. There was quite a lot of discussion on who and how to nominate officers. After much discussion, the officers elected are:

President: Jim Kvasnicka
Vice Pres: Brett Boller
2nd VP: Mark Dahmke
Secretary: Lee Thomas
Treasurer: John Reinert

Jim had some topics of discussion for the general

membership. He mentioned his dedication to attending meetings. He asked the club for input on attendance at meetings, star parties and club functions. Several ideas were discussed at length. Brian Sivill defined our problems and challenges well, and expressed a willingness to help address these issues. Several ideas were discussed. With this discussion, the meeting was adjourned.

Respectfully submitted by, Lee Taylor

Observing Awards

Congratulations to 10 year old Elizabeth Luther for completing the Sky Puppy Observing Program. Elizabeth had to draw 15 constellations and identify them in the night sky. She has to identify and describe any major stars or

naked eye objects in those constellations. Elizabeth had to use binoculars to locate and identify 5 deep sky objects from a provided list. She was required to find the North Star, describe the Milky Way, and make a rough sketch of a lunar

crater. Besides all of this Elizabeth provided excellent observing logs. Congratulations again to Elizabeth on her first observing award.

Cover Photo: Occator on Ceres' Limb

This image of the limb of dwarf planet Ceres shows a section of the northern hemisphere. Prominently featured is Occator Crater, home of Ceres' intriguing brightest areas.

At 57 miles (92 kilometers) wide and 2.5 miles (4 kilometers) deep, Occator displays evidence of recent geologic activity. The latest research suggests that the bright material in this crater is comprised of salts left behind after a briny liquid emerged from below, froze and then

sublimated, meaning it turned from ice into vapor.

Dawn took this image on Oct. 17 from its second extended-mission science orbit (XMO2), at a distance of about 920 miles (1,480 kilometers) above the surface. The image resolution is about 460 feet (140 meters) per pixel.

Dawn's mission is managed by JPL for NASA's Science Mission Directorate in Washington. Dawn is a project of the directorate's Discovery Program, managed by NASA's Marshall

Space Flight Center in Huntsville, Alabama. UCLA is responsible for overall Dawn mission science. Orbital ATK, Inc., in Dulles, Virginia, designed and built the spacecraft. The German Aerospace Center, the Max Planck Institute for Solar System Research, the Italian Space Agency and the Italian National Astrophysical Institute are international partners on the mission team. For a complete list of mission participants, see <http://dawn.jpl.nasa.gov/miss>

Boller-Sivill Observatory - Construction Update

Brian Sivill and Brett Boller

Progress on BSO slowed quite a bit this month due to personal events and Husker football games. I finished up illuminating the outside stairs with red LEDs, Brett procured some decent marker boards and tack boards, and hung one of the marker boards. Brett also got a great buy on some floor tile destined for the control room.

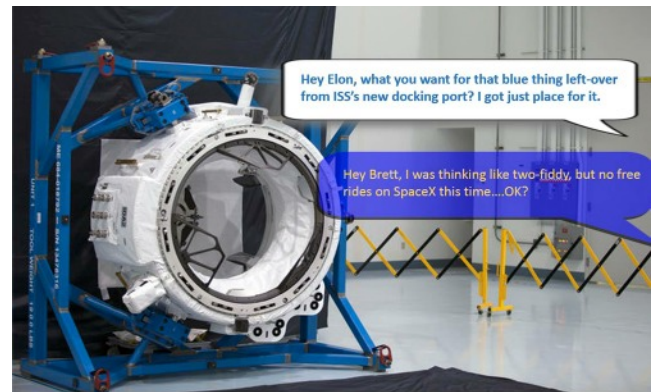
The big story this month is the flurry of progress being made on BOO's 16 foot dome building. Michael Sibbersen and Matt Anderson have relentlessly worked this month on erect-

ing a basic structure, and have much to show for their efforts. A small contingent of volunteers have helped: Brett Boller, Doug Buhrman - who has contributed more labor and resources than anyone though possible, Jeff Guettler from OAS, John Reinert from PAC, and B.O.O.'s newest and most enthusiastic Associate, Bryan Schaff - who is also a former PAC member/officer.

The building for the 16 foot dome could easily have side-walls by the time this newsletter goes out.

Concrete left-over from pouring the footings and telescope base of the 16 foot dome building made for a very nice cement pad in front of Boller-Sivill roll-off, so we have that to show! Also, we had a nicely attended PAC-only Star Party on November 19. Skies were clear and weather was cold, but we all had a nice time, thanks to those who attended.

Brian Sivill
For Boller-Sivill Observatory,
Branched Oak Observatory



Astrophotography



Above left: Moon, November 14 at 8:37pm HT, 1/80 sec at 600mm. Right: Moonset, November 15, 7:21am HT. Below, Moonset, November 15, by Mark Dahmke. Panasonic Lumix GX8 with Nikon 28-300 VR lens at 100mm.



Branched Oak Observatory

Boller-Sivill Observatory

M42, Great Orion Nebula Nov 19, 2016

150mm Skywatcher APO / Nikon D7200

Brian Sivill, Brett Boller



Branched Oak Observatory

Boller-Sivill Observatory

M31, Andromeda Galaxy Nov 19, 2016

150mm Skywatcher APO / Nikon D7200

Brian Sivill, Brett Boller



Saturn's 'Watercolor' Swirls

Saturn's north polar region displays its beautiful bands and swirls, which somewhat resemble the brushwork in a watercolor painting.

Each latitudinal band represents air flowing at different speeds, and clouds at different heights, compared to neighboring bands. Where they meet and flow past each other, the bands' interactions produce many eddies and swirls.

The northern polar region of Saturn is dominated by the famous hexagon shape (see PIA11682) which itself circumscribes the northern polar vortex -- seen as a dark spot at the planet's pole in the above image-- which is understood to be the eye of a

hurricane-like storm (PIA14946).

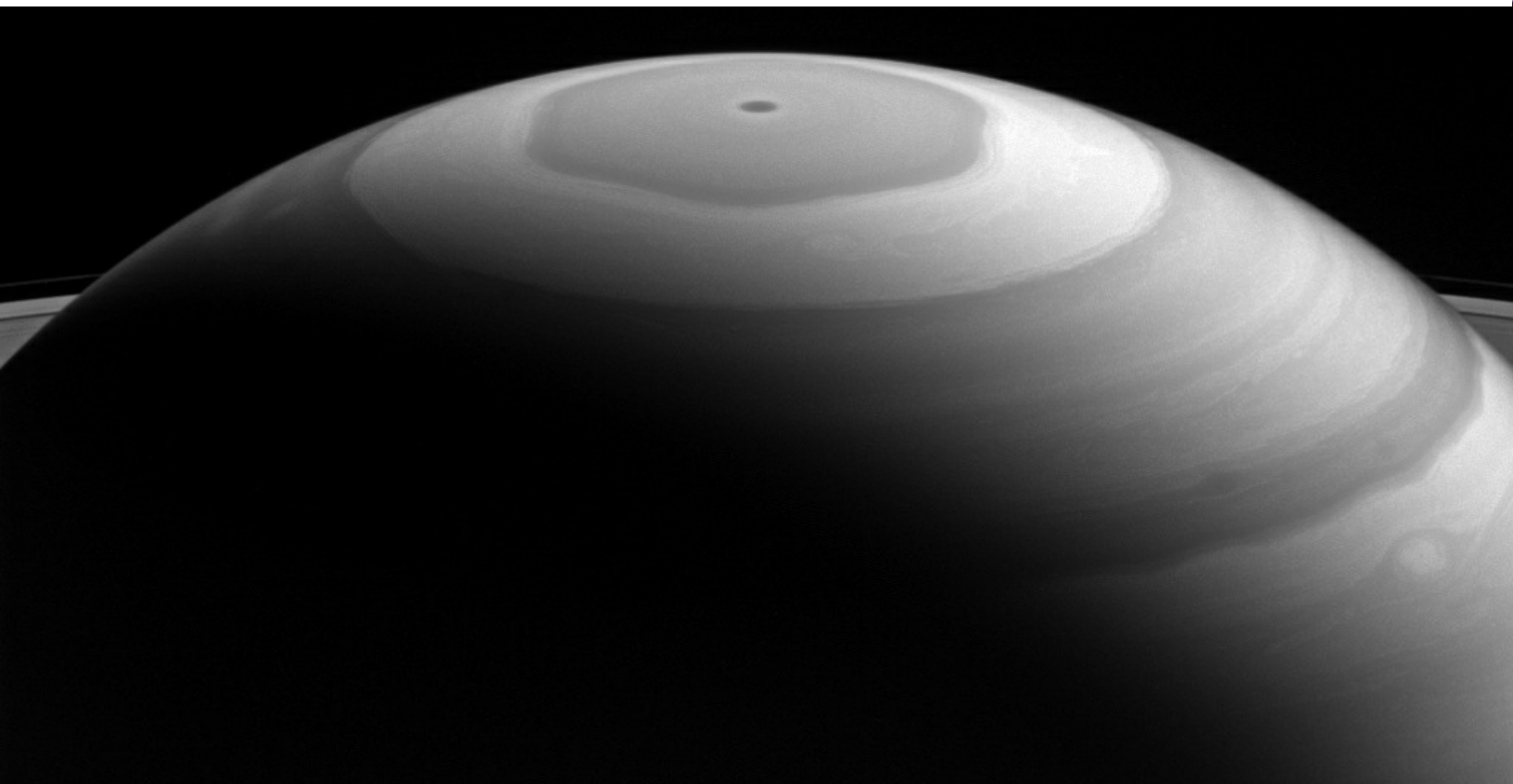
This view looks toward the sunlit side of the rings from about 20 degrees above the ring plane. The image was taken with the Cassini spacecraft wide-angle camera on Sept. 5, 2016 using a spectral filter which preferentially admits wavelengths of near-infrared light centered at 728 nanometers.

The view was obtained at a distance of approximately 890,000 miles (1.4 million kilometers) from Saturn. Image scale is 53 miles (86 kilometers) per pixel.

The Cassini mission is a cooperative project of NASA,

ESA (the European Space Agency) and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging operations center is based at the Space Science Institute in Boulder, Colorado.

For more information about the Cassini-Huygens mission visit <http://saturn.jpl.nasa.gov> and <http://www.nasa.gov/cassini>. The Cassini imaging team homepage is at <http://ciclops.org>.



Observatory Update: NGC 6821 Lost in the Stars

Rick Johnson

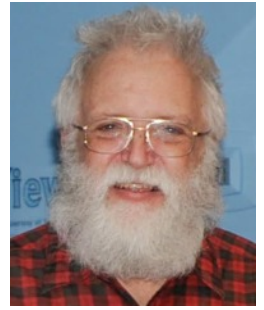
NGC 6821 is a rather disorganized barred spiral galaxy in southern Aquila about 60 million light-years distant both by red shift and Tully-Fisher measurements. It is classified as SB(s)d: HII by NED. The NGC project says SB(rs)Sd. I don't know how to decipher that second "S" unless it is a misprint. Seligman classifies it as SBcd?. They do agree it is a barred spiral and it does show a bar-like structure but I see no nucleus. de Vaucouleurs says in his 1964

"Reference Catalogue of Bright Galaxies" "Bright bar: 0.2 arcmin x 0.06 arcmin. No definite nucleus. Faint asymmetric spiral structure. Poorly resolved." It is sometimes considered a pair with MCG -01-50-001 which is a flat galaxy 2MFGC 15085 just off the right edge of my image. I had intended to use coordinates to pick up both but somehow centered on NGC 6821 instead. That may mean a reshoot in the future.

Being well within the Zone of

Avoidance there's few galaxies in the field with any information on them. I've annotated all with redshift data as well as galaxies that made the LEDA catalog even if they had no redshift information. Due to obscuring dust in our galaxy this image doesn't go very deep.

Being a bit below -06 degrees



every frame contained many geostationary satellites. Many trails overlapped so many times no rejection software could deal with them. Nor could my manual method I use when I

have only 2 frames. Thus I had to resort to cloning to remove them. Since the field is just on the north edge of the belt as seen from my latitude all were in the very bottom of the image.

Since they went through a lot of faint nebulosity this made the cloning all the more difficult. I hope I haven't distorted things too much.



Pluto Has a Subsurface 'Antifreeze' Ocean

Nancy Atkinson, *Universe Today*

The evidence keeps growing for a large subsurface ocean at Pluto, which also provides clues how the iconic 'heart' of Pluto was formed.

We reported in early October that thermal models of Pluto's interior and tectonic evidence suggest an ocean may exist beneath Pluto's heart-shaped Sputnik Planitia. Now, new research on data from the New Horizons mission shows more indications of an ocean just below Pluto's surface that consists of a slushy, viscous liquid, kept warm from Pluto's interior and a hint of anti-freeze.

"As far as we can tell, there's no tidal heating helping to keep the ocean liquid," Francis Nimmo from UC Santa Cruz told *Universe Today*. He is the first author of a paper on the

new findings published today in *Nature*. "The main heat source keeping the ocean liquid is radioactive decay in Pluto's rocky interior, although it certainly helps if there is an 'antifreeze' present."

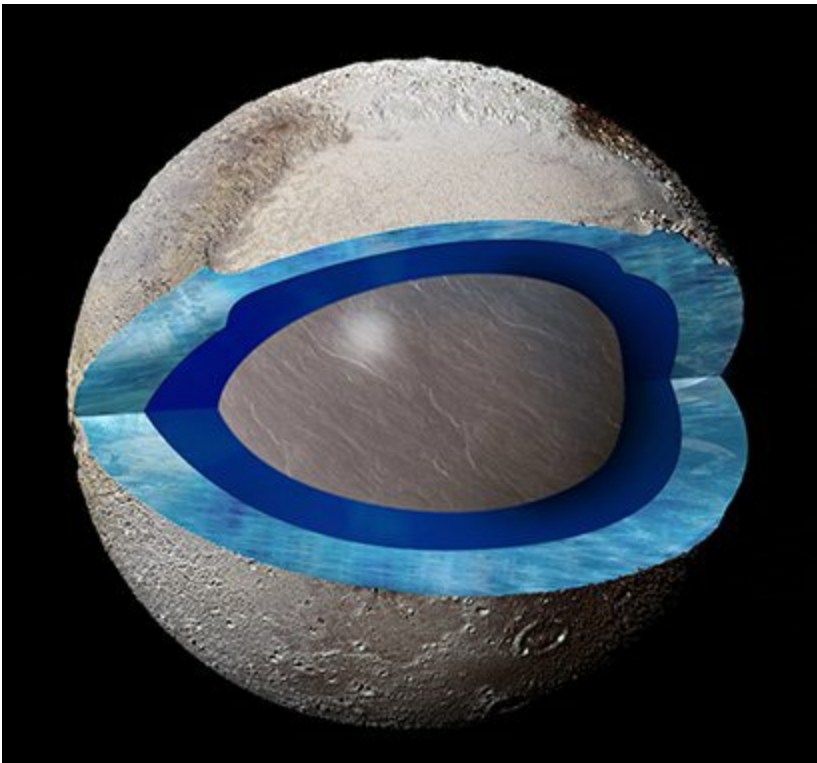
Nimmo said he suspects the ocean is mostly water with ammonia acting as an antifreeze. This subsurface ocean is also bulging, similar to the 'mascons' on the Moon, putting stress on Pluto's icy outer shell, causing fractures consistent with features seen in the New Horizons images.

Another paper also published in *Nature* today from James Keane at the University of Arizona, also shows how a bulging subsurface ocean made Pluto's heart 'heavy,' reorienting Pluto on its axis, so

that Pluto's heart is always pointing away from the moon Charon.

Nimmo said he suspects the ocean is mostly water with ammonia acting as an antifreeze. This subsurface ocean is also bulging, similar to the 'mascons' on the Moon, putting stress on Pluto's icy outer shell, causing fractures consistent with features seen in the New Horizons images.

Another paper also published in *Nature* today from James Keane at the University of Arizona, also shows how a bulging subsurface ocean made Pluto's heart 'heavy,' reorienting Pluto on its axis, so that Pluto's heart is always pointing away from the moon Charon.



This cutaway image of Pluto shows a section through the area of Sputnik Planitia, with dark blue representing a subsurface ocean and light blue for the frozen crust. Artwork by Pam Engebretson, courtesy of UC Santa Cruz.

But Pluto is cold, with temperatures ranging from -387 to -369 Fahrenheit (-233 to -223 Celsius). How could there be an ocean?

“Pluto is small enough that it’s just about almost cooled off but still has a little heat, and it’s about 2 percent the heat budget of the Earth, in terms of how much energy is coming out,” said co-author Richard Binzel, from MIT. “So we calculated Pluto’s size with its interior heat flow, and found that underneath Sputnik Planitia, at those temperatures and pressures, you could have a zone of water-ice that could be at least viscous. It’s not a liquid, flowing ocean, but maybe slushy. And we found this explanation was the only way to put the puzzle together that seems to make any sense.”

The massive basin also appears extremely bright

relative to the rest of the planet, and the data from New Horizons suggest it is filled with frozen nitrogen ice.

Previous research from the the mission showed evidence that the liquid nitrogen may be constantly refreshing, or convecting, as a result of a weak spot at the bottom of the basin, and this weak spot may let heat rise through Pluto’s interior to continuously refresh the ice.

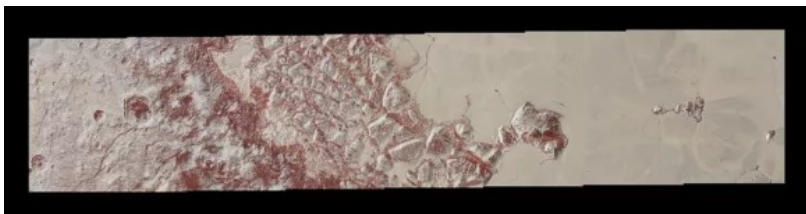
Additionally, the extra weight of an underground ocean could help explain the longstanding question of why Pluto’s heart aligns almost exactly opposite from Charon. Nimmo said this alignment is “suspicious” and that the likelihood of this being just a coincidence is only 5 percent. Therefore, the alignment suggests that extra mass in that location interacted with tidal forces between Pluto

and Charon to reorient Pluto, putting Sputnik Planitia directly opposite the side facing Charon.

A thick, heavy ocean, the new data suggest, may have served as a “gravitational anomaly,” which would factor heavily in Pluto and Charon’s gravitational tug-of-war, the researchers said. Over millions of years, the planet would have spun around, aligning its subsurface ocean and the heart-shaped region above it, almost exactly opposite along the line connecting Pluto and Charon.

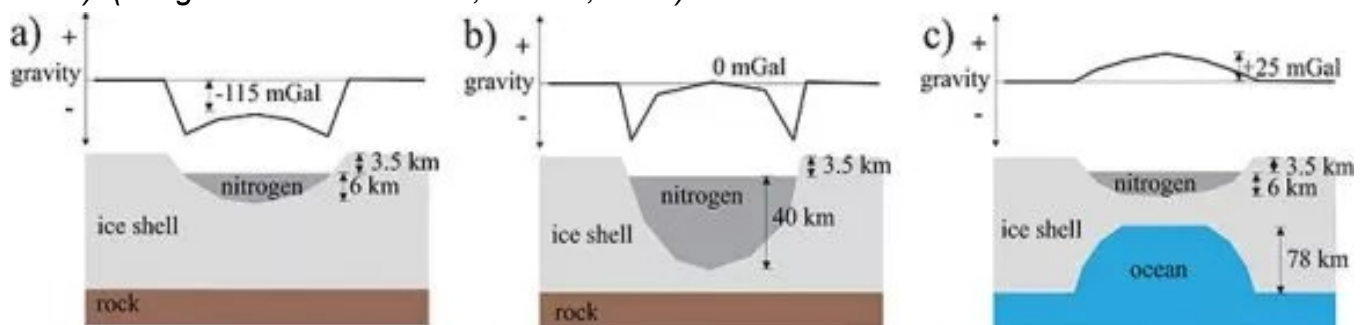
While scientists are still studying the data from New Horizons, it is safe to say that Pluto keeps surprising everyone, even the scientists who know it best.

“Pluto is hard to fathom on so many different levels,” said Binzel.



High-resolution images of Pluto taken by NASA’s New Horizons spacecraft just before closest approach on July 14, 2015, reveal features as small as 270 yards (250 meters) across, from craters to fractures and faulted mountain blocks, to the textured surface of the vast basin informally called Sputnik Planitia. Credit: NASA/JHUAPL/SWRI

Below: These schematic diagrams show how the gravity anomaly at Sputnik Planitia is affected by an uplifted ocean and the thickness of the nitrogen layer. Either a nitrogen layer more than 40 km thick (panel b) or an uplifted ocean (panel c) could result in a present-day positive gravity anomaly at Sputnik Planitia; otherwise, the gravity anomaly will be strongly negative (panel a). (Image from Nimmo et al., Nature, 2016)



December Observing: What to View

Jim Kvasnicka

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

Planets

Venus: At sunset Venus is 34° above the horizon at a brilliant -4.4 magnitude.

Mercury: Low in the southwest at magnitude -0.5.

Mars: Dims from 0.6 to 0.9 magnitude in Capricornus and Aquarius.

Uranus / Neptune: In Pisces and Aquarius. See the October issue of S&T for charts.

Jupiter: Rises by 1:00 am to end December at magnitude -1.9 with a disk 35" wide.

Saturn: Reaches conjunction with the Sun on December 10th and is not visible.

Meteor Showers

Geminids: Peaks the night of December 13-14. The full Moon will hinder the viewing.

Messier List

M2: Class II globular cluster in Aquarius.

M15: Class IV globular cluster in Pegasus.

M29: Open cluster in Cygnus.

M31: The Andromeda Galaxy.

M32: Companion galaxy to M31.

M39: Open cluster in Cygnus.

M110: Companion galaxy to M31.

Last Month: M27, M30, M56, M57, M71, M72, M73

Next Month: M33, M34, M52, M74, M76, M77, M103

NGC and other Deep Sky Objects

NGC 157: Galaxy in Cetus.

NGC 246: Planetary nebula in Cetus.

NGC 247: Faint elongated galaxy in Cetus.

NGC 779: Galaxy in Cetus.

NGC 869/884: The Double Cluster in Perseus.

Double Star Program List

Eta Cassiopeiae: Yellow and rose colored pair.

Sigma Cassiopeiae: Yellow and light blue stars.

Theta Aurigae: Bright white and pale blue stars.

1 Camelopardalis: White and pale blue pair.

32 Camelopardalis: Equal pair of white stars.

Gamma Ceti: Bright white and pale yellow stars.

Chi Tauri: White primary with a pale blue secondary.

118 Tauri: White primary with a yellow secondary.



Challenge Object

Arp 318 Galaxy Group: Group of four galaxies in Cetus in an arc NW-SE. It includes NGC 833, 835, 838, and 839.

The Great American Total Eclipse August 21, 2017



Planning your eclipse trip? Take a look at Fred Espenak's presentation on YouTube:

<https://www.youtube.com/watch?v=K4KnxE6yAul>

Focus on Constellations: Taurus

Jim Kvasnicka

Taurus the Bull covers 797 square degrees of the sky. The Bull's horns extend NE to the stars Beta and Zeta Tauri and its face is the "V" formed by the Hyades Star Cluster. The first magnitude star Aldebaran is one of the Bull's eyes. The constellation is rich in open clusters and diffuse nebulae. It contains the two finest naked-eye open clusters in the Hyades and Pleiades, M45. It also contains the supernova remnant M1, the famous Crab Nebula.

Showpiece Objects

Open Clusters: M45 (Pleiades), Mel 25 (Hyades),
SNREM: M1
Planetary Nebulae: NGC 1514

Mythology

In Greek mythology Taurus is associated with the Bull who abducted Europa, the beautiful daughter of Arenor, King of Sidon. Europa was attracted to a white bull in her father's herd. She adorned the bull with flowers and climbed on the gentle bull's back for a ride. However, the bull was actually Jupiter in disguise who planned from the start to

abduct her. The bull ran off with Europa on his back and went into the sea and swam all the way to Crete.

Number of Objects Magnitude 12.0 and Brighter

Galaxies: 2
Globular Clusters: 0
Open Clusters: 5
Planetary Nebulae: 1
Dark Nebulae: 3
Bright Nebulae: 2
SNREM: 1



Photo: Till Credner - Own work: AlltheSky.com

Dimming Stars, Erupting Plasma, and Beautiful Nebulae

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!

Marcus Woo



Boasting intricate patterns and translucent colors, planetary nebulae are among the most beautiful sights in the universe. How they got their shapes is complicated, but astronomers think they've solved part of the mystery—with giant blobs of plasma shooting through space at half a million miles per hour.

Planetary nebulae are shells of gas and dust blown off from a dying, giant star. Most nebulae aren't spherical, but can have multiple lobes extending from opposite sides—possibly

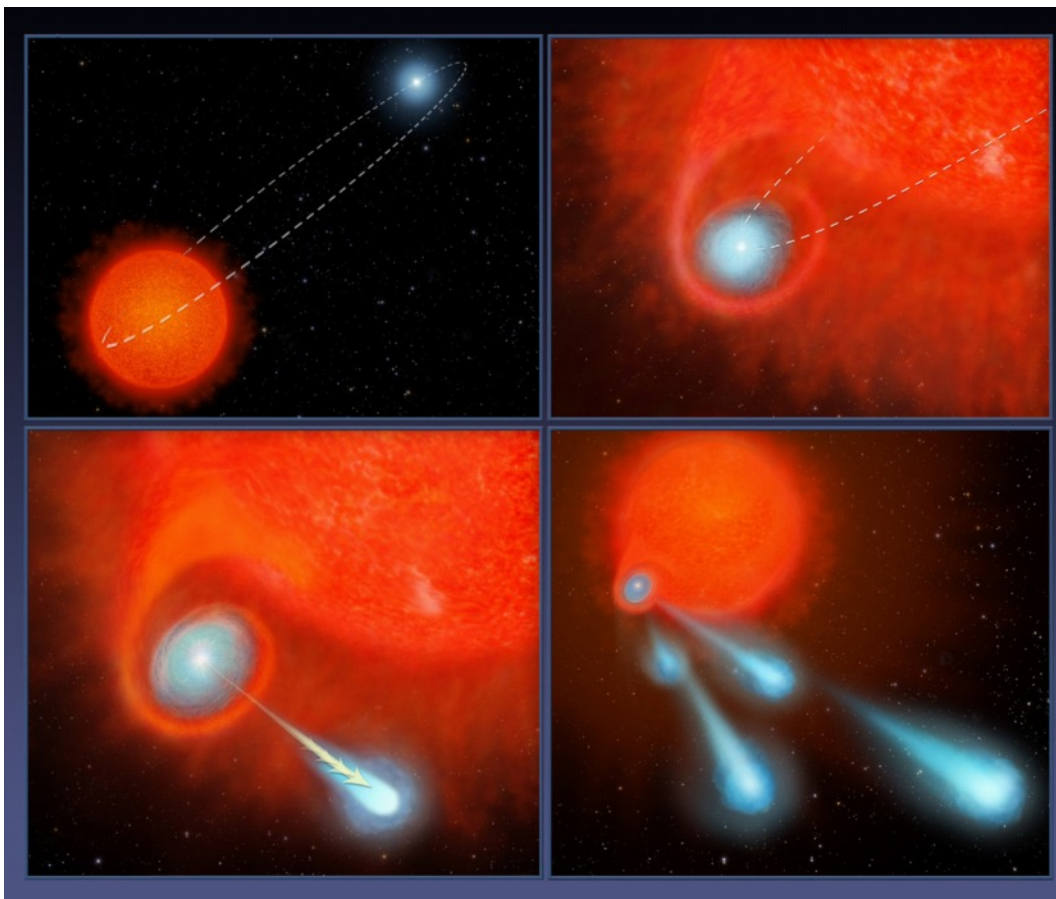
generated by powerful jets erupting from the star.

Using the Hubble Space Telescope, astronomers discovered blobs of plasma that could form some of these lobes. "We're quite excited about this," says Raghvendra Sahai, an astronomer at NASA's Jet Propulsion Laboratory. "Nobody has really been able to come up with a good argument for why we have multipolar nebulae."

Sahai and his team discovered

blobs launching from a red giant star 1,200 light years away, called V Hydrae. The plasma is 17,000 degrees Fahrenheit and spans 40 astronomical units—roughly the distance between the sun and Pluto. The blobs don't erupt continuously, but once every 8.5 years.

The launching pad of these blobs, the researchers propose, is a smaller, unseen star orbiting V Hydrae. The highly elliptical orbit brings the companion star through the



This four-panel graphic illustrates how the binary-star system V Hydrae is launching balls of plasma into space. Image credit: NASA/ESA/STScI

outer layers of the red giant at closest approach. The companion's gravity pulls plasma from the red giant. The material settles into a disk as it spirals into the companion star, whose magnetic field channels the plasma out from its poles, hurling it into space. This happens once per orbit—every 8.5 years—at closest approach.

When the red giant exhausts its fuel, it will shrink and get very hot, producing ultraviolet radiation that will excite the shell of gas blown off from it in the past. This shell, with cavities carved in it by the

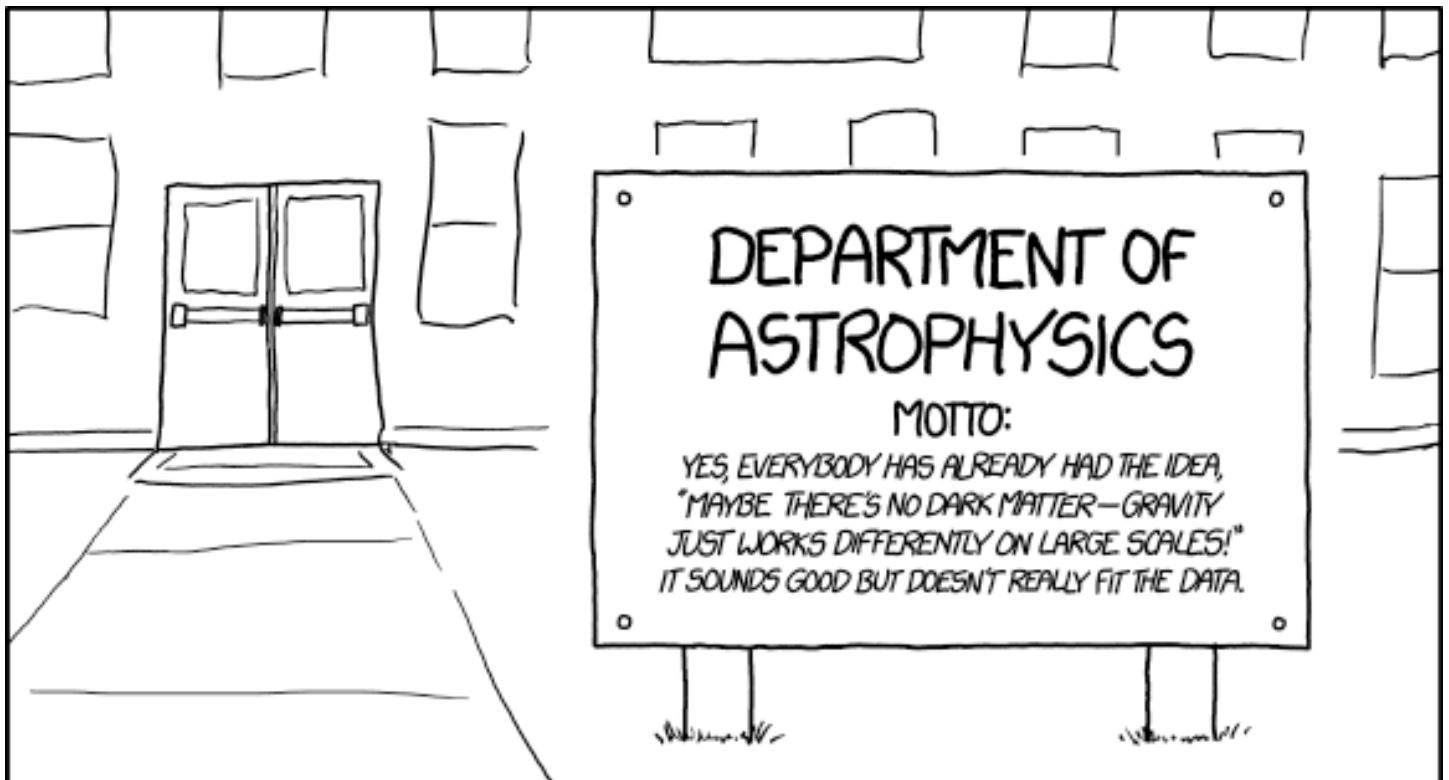
cannon-balls that continue to be launched every 8.5 years, will thus become visible as a beautiful bipolar or multipolar planetary nebula.

The astronomers also discovered that the companion's disk appears to wobble, flinging the cannonballs in one direction during one orbit, and a slightly different one in the next. As a result, every other orbit, the flying blobs block starlight from the red giant, which explains why V Hydrae dims every 17 years. For decades, amateur astronomers have been

monitoring this variability, making V Hydrae one of the most well-studied stars.

Because the star fires plasma in the same few directions repeatedly, the blobs would create multiple lobes in the nebula—and a pretty sight for future astronomers.

If you'd like to teach kids about how our sun compares to other stars, please visit the NASA Space Place:
<http://spaceplace.nasa.gov/sun-compare/en/>



xkcd.com

From the Archives: November, 1973

November 27, 1973

11-73

Phone 489-1708

**** THE PRAIRIE ASTRONOMER ****

This month our meeting will be held as usual at 7:30 p.m. in the Olin Hall of Science on the Nebraska Wesleyan campus. Larry Stepp will present this month's program. There will also be a drawing for a door prize, so be there as you must be present to win.

- - THE PRESIDENT'S REPORT - -

Brian Rugg and Lee Thomas arrived at my place on Nov. 10 at 5:00 a.m. for a look at the comet and the transit of Mercury. A search of the area in Virgo failed to reveal the elusive comet. Although the skies were clear, the full moon made the search more difficult.

After a cup of coffee, it was time to get set up for the Mercury transit. The three of us went up to the old observing site on the hill near my place. We had a good view of the south-east horizon, some 2 or 3 miles away. The edge of the sun appeared at the horizon at 7:08 a.m., but as more and more of the sun's disc rose it became evident that no transit of Mercury would be seen, as the turbulence in the atmosphere washed out everything.

While packing the telescopes back into the cars we agreed to try again next time, even though we will have to wait to the year 2003 for our next try.

Russ Maag tells me that our friend and former member, Lawrence Pilgram, is the new editor of "Nova News", a publication of the Midland Empire Astronomy Club of St. Joseph Mo. We want to wish the best of luck to Dr. Pilgram in his career in dentistry.

Earl Moser
President

--NOTICE--

Earl Moser will be giving a program on astronomy at the Eastridge Presbyterian Church at 1135 Eastridge Dr. on Dec. 5 at 7:30 in the evening. All who are interested are welcome to attend. Earl will present the Tauris Incident slide show that he gave at one of our meetings several months ago.

--OBSERVING REPORT--

Brian Rugg will give his report at the meeting.

--COMET KOHOUTEK NEWS--

According to the Nov. issue of Sky and Telescope comet Kohoutek will not be as bright as was originally predicted. The first reports said a maximum magnitude of -10 would be reached but that has now tamed down some to approx. -3. More discussion will be held at the meeting.

J.B.

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

President	Jim Kvasnicka (402) 423-7390 jim.kvasnicka@yahoo.com
Vice President	Brett Boller
2nd VP (Program Chair)	Mark Dahmke
Secretary	Lee Thomas
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

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.