

# The Prairie Astronomer

September 2017 Volume 58, Issue #9

## Staggering Structure

Saturn's B Ring

### *In this issue:*

*Total Eclipse Observed in Grand Island  
- Larry Stepp*

*Nagin Cox will be the guest  
speaker for Hyde's 40<sup>th</sup> Anniversary*

*NASA/JPL-Caltech/Space Science Institute*



**Night Sky Network**



The Newsletter of the Prairie Astronomy Club

# ***The Prairie Astronomer***

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**NEXT PAC MEETING: September 26, 7:30pm**

## **PROGRAM**

We will play a video of Rick Johnson's program on the history of the Prairie Astronomy Club that was recorded in 2005, as part of Hyde Observatory's 40<sup>th</sup> anniversary commemoration. This video includes lots of good stories and photos. If you haven't seen it, you'll want to, and even if you have seen it, that was over ten years ago!

Also this is an important meeting because we'll nominate officers for the upcoming year. Voting will be in October.

**NOTE: The October meeting will be a week early due to an overlap with Halloween.**

## **FUTURE PROGRAMS**

October: Club viewing night at Hyde  
November: How to Buy a Telescope  
December: Holiday Gathering  
January: How to Use Your Telescope

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**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



PAC meeting  
 Tuesday September 26, 2017, 7:30pm  
 The History of PAC & Hyde Observatory's 40<sup>th</sup> Anniv.

Nagin Cox  
 Saturday September 30, 2017, 7:30pm  
 UNL Student Union

PAC Meeting  
 Tuesday October 24, 2017, 7:30pm  
 Club Observing Night  
 And Election of Club Officers

PAC Meeting  
 Tuesday November 28, 2017, 7:30pm  
 How to Buy a Telescope

## 2017 STAR PARTY DATES



Photo by Brian Sivill

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

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



### PAC E-MAIL:

[info@prairieastronomyclub.org](mailto:info@prairieastronomyclub.org)

### PAC-LIST:

Subscribe through [GoogleGroups](#).  
 To post messages to the list, send to the address:

[pac-list@googlegroups.com](mailto:pac-list@googlegroups.com)

### ADDRESS

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### WEBSITES

- [www.prairieastronomyclub.org](http://www.prairieastronomyclub.org)
- <https://nightsky.jpl.nasa.gov>
- [www.hydeobservatory.info](http://www.hydeobservatory.info)
- [www.nebraskastarparty.org](http://www.nebraskastarparty.org)
- [www.OmahaAstro.com](http://www.OmahaAstro.com)
- [Panhandleastronomyclub.com](http://Panhandleastronomyclub.com)
- [www.universetoday.com/](http://www.universetoday.com/)
- [www.planetary.org/home/](http://www.planetary.org/home/)
- <http://www.darksky.org/>



**Night Sky Network**

# Meeting Minutes

President Jim Kvasnicka called the meeting to order at 7:31 p.m.

Jim noted upcoming star parties.

Requests for PAC help came from:

Homestead Monument for this year's "Howling Homestead," Saturday, October 28, 6:00 p.m., members to set up telescopes for the public.

SAC Museum, "Santa Goes To Space," Saturday, December 2, 10:00 a.m. - 2:00 p.m., asking that PAC set up a booth to hand out information on the club.

Previously, we had planned to have our September meeting coincide with the appearance of Nagin Cox at the Hyde Observatory 40<sup>th</sup> Anniversary,

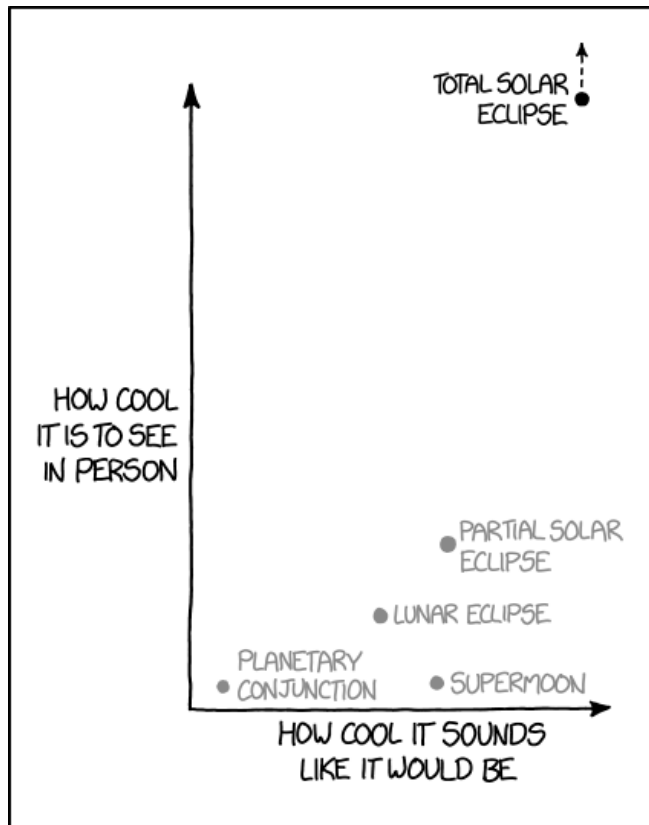
but that has been scheduled for Saturday, September 30<sup>th</sup>, 7:30 p.m., at the UNL Student Union Auditorium. So, it was decided that PAC will have its regular meeting on Tuesday, September 26, with a program to be determined. Astronomy Club members are encouraged to attend Cox's presentation (she is has been a Spacecraft Operations Engineer with NASA/JPL for 20 years, and is currently Mission Lead on the Curiosity Mars Rover.)

Jim noted that nominations for club officers would be made at the September meeting, with the election at the October meeting. Because the last Tuesday of October this year is on Halloween, we decided to move the meeting to October 24. Several incumbent officers have

decided not to run for re-election. Jim again encouraged everyone to consider running for office, especially newer members.

Treasurer John Reinert reported that our present insurance broker will be ceasing operations in about 13 months, so we will have to find another broker. This is for liability insurance for club events. If you know of a broker who could handle this, have them get in touch with John.

Meeting adjourned at 7:47 p.m. for viewing of photographs from NSP and the Great Solar Eclipse of 2017.



xkcd.com

## Observatory Update: ARP284

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Rick Johnson

ARP 284 is a pair of interacting galaxies NGC 7715 and NGC 7714 left to right. Arp classifies these under the heading of "infall and attraction" whatever that means. They are located a bit over 100 million light years away in the constellation of Pisces. NGC 7714 is a starburst galaxy. It has strong H alpha emission though I didn't take it in that light so it's not well seen in my shot. The starburst occurred some 3 to 9 million years ago. Note the odd reddish tidal arm at the lower right that just doesn't seem to fit the rest of the

galaxy. The red color is due to mostly H alpha light so it is one huge area of ionized hydrogen. The companion NGC 7715 has H alpha emission and is not a starburst galaxy. It is classed as an irregular galaxy and is not an edge on spiral as it might appear. 7714 is an SB spiral that has been highly distorted by the interaction. Its core has emission lines that classify it as a LINER galaxy, a type with an active black hole in its nucleus.

The bright star at the upper right is also very interesting. It is

SAO 128268 and is 126 light years away. What is interesting is that it is moving very rapidly through the sky. I was checking the POSS1 plates taken in the 50's at the Hale Observatory on Mt. Palomar when I noticed it wasn't in the same place as it is in my photo. Click [this link](#) to see that plate image. Note the two stars on



[14" LX200R @ f/10, L=4x10' RGB=2x10', STL-11000XM, Paramount ME](#)

either side of it are above it in that photo yet below it in my shot. It is moving upward and a bit to the east at a rate of about 1/3rd of a second of arc per year. In the approximately 50 years between the photos, the motion is quite obvious. Some stars show a high proper motion (movement through the sky) because they are close, Barnard's star is an example, while others do so because they really are moving fast. In this case, it is a little bit of both. NGC 7714 was discovered by John Herschel on September 18, 1830. It's not in either Herschel 400 program. NGC 7715 was discovered by Bindon Stoney on November 4, 1850. An HST image of NGC 1714 is [here](#) but only shows a short piece of the arm that connects the two.

The star just below Arp 284 is one of the very few in all my images that is visible to the naked eye. It shines at magnitude 5.7 which means you can just barely see it on a dark moonless night from a location far from any lights. Averted vision (that is not looking right at it but somewhat to the side) will likely be necessary to see it. So it isn't an easy star to see but it

can be seen. Unfortunately, that makes it so bright it made processing this image very difficult. Most of the scientific papers on the galaxy pair mention their measurements are likely tainted by the glare of the star so even the big boys are bothered by it. It is a spectroscopic double star about 100 light years away known as HD 221950 or 16 Psc. The latter indicates it is a naked eye star, the 16th in Right Ascension order in the constellation of Pisces. These numbers were assigned long ago so precession (a ~26,000 year wobble of the earth's axis) has changed the RA order of the stars in some cases but the original order numbers have been kept.

I've prepared a rather sparse annotated image that has little on the close galaxies but for those in ARP 284 but does show much more distant quasars and a galaxy cluster. Arp made a big deal about quasars around his active galaxies claiming the redshift of them had nothing to do with distance. By his logic, they weren't active massive black holes in distant galaxies but were something ejected from active galaxies. Redshift

somehow related how long ago they were ejected. Higher redshift indicated they were ejected before those with lesser redshift. Somehow this involved electrons that changed with age. I've tried reading several of his books and other books trying to explain his logic and I end up a screaming basket case each time so may have this somewhat scrambled. With all the quasars around this actively interacting pair, he'd have had a field day though all have a rather similar redshift. I've not dug through his books to see if he mentions this one or not. My brain can't handle much more of his ideas.

Arp's image:

[http://ned.ipac.caltech.edu/level/5/Arp/Figures/big\\_arp284.jpeg](http://ned.ipac.caltech.edu/level/5/Arp/Figures/big_arp284.jpeg)

Note: Rick's ARP image will be on page 64 of the October Sky & Telescope.



## Cover Photo: Saturn's B Ring

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September 6, 2017

This view from NASA's Cassini spacecraft shows a wave structure in Saturn's rings known as the Janus 2:1 spiral density wave. Resulting from the same process that creates spiral galaxies, spiral density waves in Saturn's rings are much more tightly wound. In this case, every second wave crest is actually the same spiral arm which has encircled the entire planet multiple times.

This is the only major density wave visible in Saturn's B ring. Most of the B ring is characterized by structures that dominate the areas where density waves might otherwise occur, but this innermost portion of the B ring is different.

The radius from Saturn at which the wave originates (toward lower-right in this image) is 59,796 miles (96,233 kilometers) from the planet. At this location, ring particles orbit Saturn twice for every time the moon Janus orbits once, creating an orbital resonance. The wave propagates outward from the resonance (and away from Saturn), toward upper-left in this view. For reasons researchers do not entirely understand, damping of waves by larger ring structures is very weak at this location, so this wave is seen ringing for hundreds of bright wave crests, unlike density waves in Saturn's A ring.

The image gives the illusion that the ring plane is tilted away from the camera toward upper-left,

but this is not the case. Because of the mechanics of how this kind of wave propagates, the wavelength decreases with distance from the resonance. Thus, the upper-left of the image is just as close to the camera as the lower-right, while the wavelength of the density wave is simply shorter.

This wave is remarkable because Janus, the moon that generates it, is in a strange orbital configuration. Janus and Epimetheus (see "Cruising Past Janus") share practically the same orbit and trade places every four years. Every time one of those orbit swaps takes place, the ring at this location responds, spawning a new crest in the wave. The distance between any pair of crests corresponds to four years' worth of the wave propagating downstream from the resonance, which means the wave seen here encodes many decades' worth of the orbital history of Janus and Epimetheus. According to this interpretation, the part of the wave at the very upper-left of this image corresponds to the positions of Janus and Epimetheus around the time of the Voyager flybys in 1980 and 1981, which is the time at which Janus and Epimetheus were first proven to be two distinct objects (they were first observed in 1966).

Epimetheus also generates waves at this location, but they are swamped by the waves from

Janus, since Janus is the larger of the two moons.

This image was taken on June 4, 2017, with the Cassini spacecraft narrow-angle camera. The image was acquired on the sunlit side of the rings from a distance of 47,000 miles (76,000 kilometers) away from the area pictured. The image scale is 1,730 feet (530 meters) per pixel. The phase angle, or sun-ring-spacecraft angle, is 90 degrees.

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 Caltech 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 <https://saturn.jpl.nasa.gov> and <https://www.nasa.gov/cassini>. The Cassini imaging team homepage is at <http://ciclops.org>.

Credit: NASA/JPL-Caltech/Space Science Institute



# October Observing: What to View

Jim Kvasnicka

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

## Planets

**Jupiter:** Very low in the afterglow of sunset.

**Saturn:** Low in the SW, its rings are at their maximum tilt of 27°.

**Neptune:** In Aquarius.

**Uranus:** In Pisces.

**Venus:** Rises about 2 hours before the Sun.

**Mars:** Look for Mars about 3° below Venus.

**Mercury:** Not visible in October.

**Asteroid 2 Pallas:** Magnitude 8.3 in Eridanus, one of the largest asteroids.

## Messier List

**M11:** The Wild Duck Cluster in Scutum.

**M16:** Open cluster (Eagle Nebula) in Serpens.

**M17:** Omega or Swan Nebula in Sagittarius.

**M18:** Open cluster in Sagittarius.

**M24:** The Small Sagittarius Star Cloud.

**M25:** Open cluster in Sagittarius.

**M26:** Open cluster in Scutum.

**M55:** Class XI globular cluster in Sagittarius.

**M75:** Class I globular cluster in Sagittarius.

**Last Month:** M13, M14, M22, M28, M54, M69, M70, M92

**Next Month:** M27, M30, M56, M57, M71, M72, M73

## NGC and other Deep Sky Objects

**NGC 7006:** Galaxy in Aquarius.

**NGC 7009:** The Saturn Nebula in Aquarius.

**NGC 7293:** The Helix Nebula in Aquarius. Use an OIII filter.

**NGC 7331:** Elongated galaxy in Pegasus.

**NGC 7479:** Galaxy in Pegasus.

**NGC 7814:** Elongated galaxy in Pegasus.



## Double Star Program List

**8 Lacerta:** Four white stars.

**Beta Cephei:** White primary with a blue secondary.

**Struve 2816:** White primary with two blue stars in Cepheus.

**Xi Cephei:** Yellow stars.

**Delta Cephei:** Yellow and pale blue stars.

**Eta Persei:** Yellow and light blue stars.

**Struve 331:** White primary with a blue-white secondary in Perseus.

**Epsilon Pegasi:** Yellow and white stars.

## Challenge Object

**NGC 7463/7464/7465:** Trio of faint galaxies in Pegasus.

# Focus on Constellations: Cepheus

Jim Kvasnicka

## Cepheus

Cepheus, the King is a relatively faint constellation between the more easily recognized Cassiopeia and Cygnus. Its house shaped outline can be readily seen in dark skies. Cepheus has nearly 600 square degrees and is the 27<sup>th</sup> largest constellation. Cepheus lies on the edge of the Milky Way and is rich in clusters, nebulae, and double stars. Cepheus is best seen in the month of October.

## Showpiece Objects

**Planetary Nebulae:** NGC 40  
**Open Clusters:** NGC 6939, NGC 7510  
**Multiple Stars:** Xi Cephei, Delta Cephei  
**Variable Stars:** Mu Cephei (Herschel's Garnet Star)

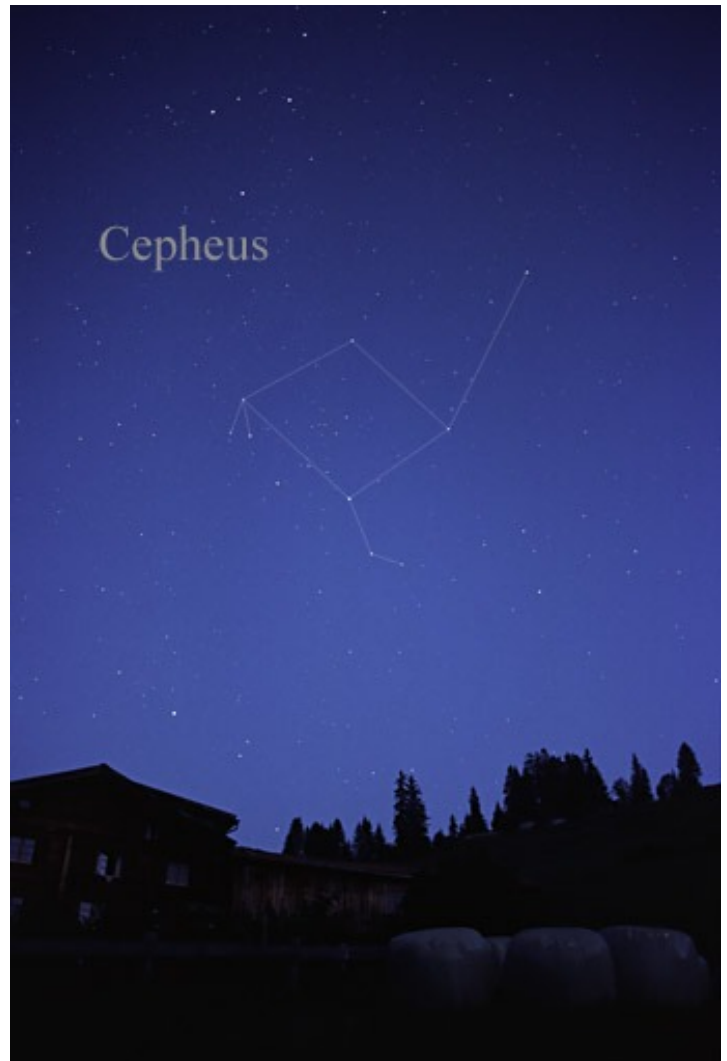
## Mythology

Cepheus, the King of Ethiopia was the husband of Cassiopeia and the father of Andromeda. He allowed his daughter to be chained to the rocks on the sea as a sacrifice to the sea monster

Cetus to save his country. Andromeda was rescued by Perseus riding the winged white horse Pegasus.

## Number of Objects Magnitude 12.0 and Brighter

**Galaxies:** 5  
**Globular Clusters:** 0  
**Open Clusters:** 17  
**Planetary Nebulae:** 1  
**Dark Nebulae:** 0  
**Bright Nebulae:** 3  
**SNREM:** 0



*Photo: Till Credner -  
Own work:  
AlltheSky.com*

# Cassini Says Goodbye

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Teagan Wall



On September 15th, the Cassini spacecraft will have its final mission. It will dive into the planet Saturn, gathering information and sending it back to Earth for as long as possible. As it dives, it will burn up in the atmosphere, much like a meteor. Cassini's original mission was supposed to last four years, but it has now been orbiting Saturn for more than 13 years!

The spacecraft has seen and discovered so many things in that time. In 2010, Cassini saw a massive storm in Saturn's northern hemisphere. During this storm, scientists learned that Saturn's atmosphere has water vapor, which rose to the surface. Cassini also looked at the giant storm at Saturn's north pole. This storm is shaped like a hexagon. NASA used pictures and other data from Cassini to learn how the storm got its six-sided shape.

Cassini also looked at some of Saturn's moons, such as Titan and Enceladus. Titan is Saturn's largest moon. Cassini carried a lander to Titan. The lander, called Huygens, parachuted from Cassini down to the surface of the moon. It turns out, Titan is quite an exciting place! It has seas, rivers, lakes and rain. This means that in some ways, Titan's landscape looks a bit like Earth. However, its seas and

rivers aren't made of water—they're made of a chemical called methane.

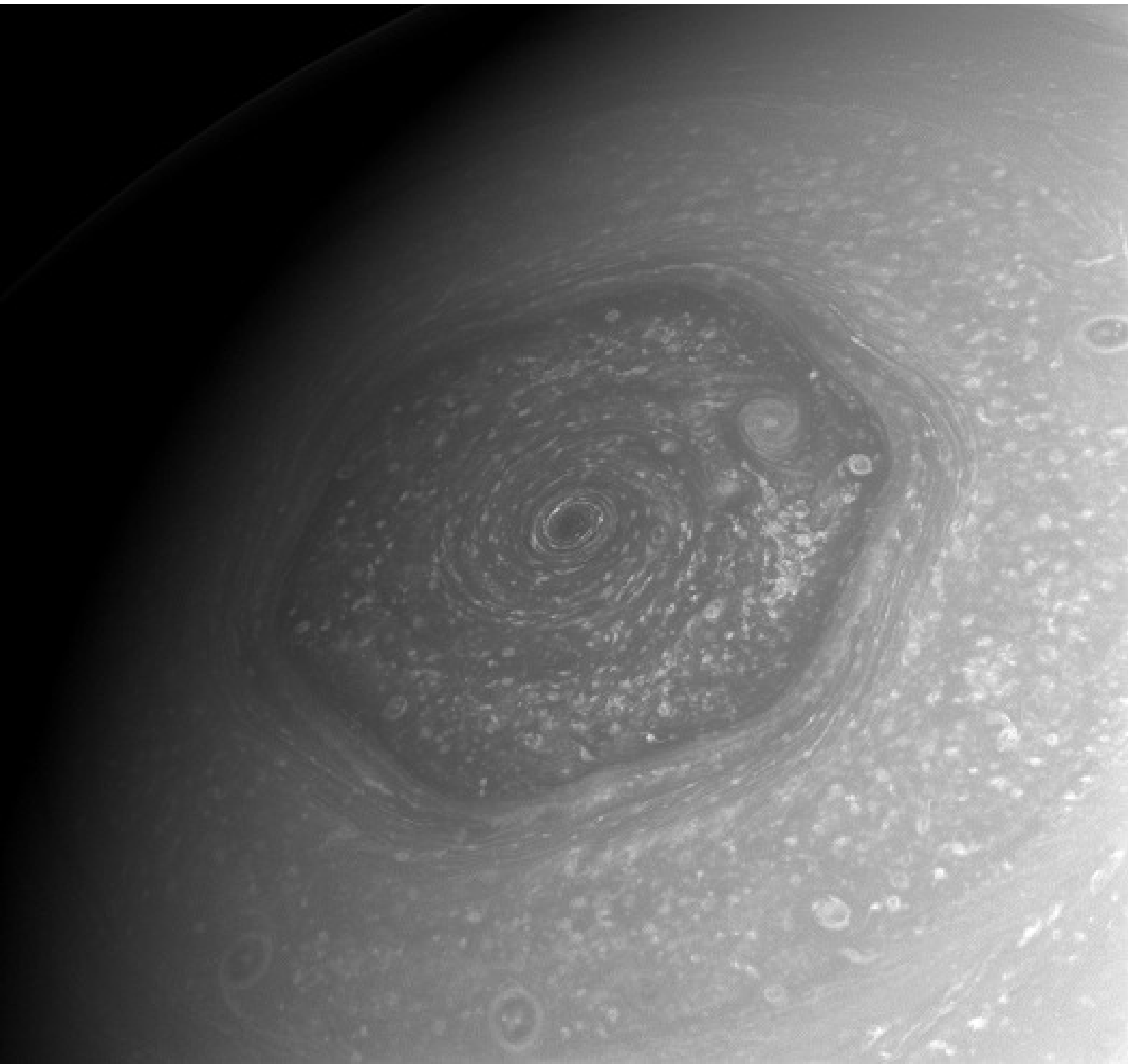
Cassini also helped us learn that Saturn's moon Enceladus is covered in ice. Underneath the ice is a giant liquid ocean that covers the whole moon. Tall geysers from this ocean spray out of cracks in the ice and into space, like a giant sneeze. Cassini flew through one of these geysers. We learned that the ocean is made of very salty water, along with some of the chemicals that living things need.

If there is life on Enceladus, NASA scientists don't want life from Earth getting mixed in. Tiny living things may have hitched a ride on Cassini when it left Earth. If these germs are still alive, and they land on Enceladus, they could grow and spread. We want to protect Enceladus, so that if we find life, we can be sure it didn't come from Earth. This idea is called planetary protection.

Scientists worry that when Cassini runs out of fuel, it could crash into Titan or Enceladus. So years ago, they came up with a plan to prevent that from happening. Cassini will complete its exploration by diving into Saturn—on purpose. The spacecraft will burn up and

become part of the planet it explored. During its final plunge, Cassini will tell us more about Saturn's atmosphere, and protect the moons at the same time. What an exciting way to say goodbye!

To learn more about Saturn, check out NASA Space Place:  
<https://spaceplace.nasa.gov/all-about-saturn>



*Caption: This image of the hexagonal storm on Saturn's north pole was taken by Cassini in 2013. Image credit: NASA/JPL-Caltech/Space Science Institute*

## **Hyde Observatory Celebrates 40 Years with a Special Guest Speaker**

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Hyde Memorial Observatory would like to invite the public to celebrate the 40th Anniversary of the Observatory with special guest, Nagin Cox, Spacecraft Operations Engineer, NASA/Jet Propulsion Laboratory (JPL) on Saturday, September 30, 2017 at 7:30 pm in The University of Nebraska-Lincoln Student Union Auditorium. This event is free. Following the program the public is invited to the Hyde Memorial Observatory on the south side of Holmes Lake for night sky viewing.

Nagin Cox has been a spacecraft operations engineer for over 20 years and has held various leadership and system engineering positions on multiple NASA/JPL interplanetary robotic missions including the Galileo mission to Jupiter, the Mars Exploration Rovers, the Kepler

exoplanet hunter, InSight, and the Mars Curiosity Rover (MSL). Among other projects, Cox is currently a Mission Lead on the Curiosity Rover that landed on Mars in August of 2012 and has been exploring ever since.

Hyde Memorial Observatory opened in 1977. The observatory was made possible by a group of interested citizens led by Carroll Moore and a generous donation from Mrs. Leicester Hyde in honor of her late husband. Today the observatory is run by knowledgeable volunteers, owned by the City of Lincoln, and is operated by the Parks and Recreation Department. All equipment and programs are made possible through donations.

The Hyde Memorial Observatory is open every Saturday year-



round, hours change seasonally. Admission is free. For more information about the observatory, current programs, or the 40th anniversary event call, 402-441-7094, or visit, [hydeobservatory.info](http://hydeobservatory.info).

### ***Nagin Cox***

***Saturday, September 30, 2017 at 7:30 pm in  
The University of Nebraska-Lincoln Student  
Union Auditorium. This event is free.***

# Total Eclipse Observed in Grand Island

Larry Stepp

The 2017 total solar eclipse was my third. In 1970, Ed Woerner, Monte Cole, Roger Severns and I drove to the southern tip of Mexico to photograph the eclipse. I also joined the PAC group that went to North Dakota in 1979. The stories of these two trips are recorded in the club history book: *The Prairie Astronomy Club: Fifty Years of Amateur Astronomy*.

With Lincoln in the path of totality for 2017, I wanted to come back to Nebraska to share it with family members, rather than head to the location with the best weather predictions (as we did in 1970).

I photographed the other two eclipses with a homemade 105 mm f/15 refractor made with a Jaegers lens, on simple non-motorized mounts, using a single-lens reflex camera. This equipment is bulky, however, and I wanted an alternative for 2017. As it happens, I was able to purchase a Celestron AVX equatorial mount and a Televue Renaissance 100mm f/5.5 refractor at an estate sale in Tucson last winter. This summer I purchased a Nikon D5600 DSLR camera, which is an APS format telescope with a detector measuring 15.6 x 23.5 mm. The 550 mm focal length couples well with the camera. The 3.9 micron pixel size corresponds to 1.5 arc seconds resolution, and the sun's image is 5.1 mm diameter.

Modern DSLR cameras have an incredible range of features and capabilities, and they do many things automatically to help make snapshots look great. However, many of those features are not what you want for eclipse photos and you need to figure out how to turn them off. After reading several on-line articles about photographing eclipses and studying the book *Nikon D5600 for Dummies*, I determined the following settings for the camera:

- Manual mode
- Image Quality NEF (RAW) + JPEG fine
- NEF (RAW) recording 14-bit
- Set White Balance to Direct Sunlight
- Active D-Lighting OFF
- Set Release Mode to Continuous Low
- Set Long Exposure Noise Reduction to OFF
- Set Auto Off Timer to LONG
- Set Exposure Delay Mode ON
- Set Auto Bracketing to AE
- Set Remote Control to shutter release
- Liveview touch shutter OFF
- Set Auto Bracketing to AE1.0
- ISO 200

I purchased a sheet of Baader Planetarium AstroSolar Safety film and made a filter that fits over the objective lens using ABS plastic pipe fittings.

A safe finder telescope was created using some more ABS pipe fittings, an old lens from an overhead projector with 20" focal length, and a sheet of white translucent plastic. The lens forms an image of the sun about 5 mm across on the white plastic, and with some experimentation I found that an 18 mm aperture placed behind the lens created a bright enough image without significantly heating the plastic sheet.

Other equipment included a Starizona Power Pack, a Nikon 25395 MC-DC2 Remote Release Cord, 2" extension tube and 2" camera adapter, eclipse glasses, lawn chairs, binoculars, additional camera and tripod, and a piece of lightweight black cloth to put over the camera and my head when focusing, which turned out to be very useful.

Because of all the equipment, Vicki and I decided to drive to Nebraska. We arrived a few days before the eclipse, and stayed with my brother Bob. My oldest son Dave was also able to come to Nebraska to join us for the eclipse.

On our way into Lincoln we checked out three towns





*George Clayton Hall County Park in Grand Island. In the left image Vicki and Dave are sitting in the shade, and the right photo shows the thin cloud cover.*

south and west of Lincoln that were close to the centerline: Fairmont, Wilber and DeWitt. My sentimental favorite was DeWitt, because it was the home of the Vise-Grip tools factory, before they were acquired and the production was moved to China.

However, on the morning of the eclipse all of southern Nebraska was forecast to be cloudy. So we decided to start out early and drive west to see if we could escape the clouds. Vicki, Dave and I headed west on Interstate 80 for a couple of hours. Traffic heading west was heavy but moving well. We got to Grand Island about half an hour before first contact. The clouds were thinning so we decided to stop and find a place to set up.

Grand Island had made arrangements to accommodate eclipse observers at the Stuhr Museum of the Prairie Pioneer, but as we approached on Highway 34 we could see a long line of cars stopped on the highway waiting to get into the

grounds. We decided instead to try the George Clayton Hall County Park just across the Wood River south of Stuhr. It was a lucky choice – the park was a beautiful place with convenient parking, shade, rest rooms and only moderate crowds. This location was 1.7 km north of the centerline, at  $40.87^{\circ}$  N,  $98.37^{\circ}$  W.

We carried everything from the car to a place near a shade tree that had a clear view of the southern sky. I got everything set up with five minutes to spare.

First contact was at 11:34:17 CDT, so at 11:30 I shot a full-sun image through the solar filter, and then took additional images every 5 minutes. The cloud density varied with time. I only had time to do an approximate alignment of the polar axis, so for each shot I recentered the image a bit.

My brothers Bob and John and family friend Tom Zimmer came in a separate car about an hour behind us, and they arrived

about halfway through the partial phase.

In the park perhaps 200 people watched the eclipse, compared to the 6000 to 8000 reported at Stuhr. We were one of four groups that had telescopes or long telephoto lenses; the largest was an 8" Schmidt Cassegrain. Our location was close to the rest room, so many people wandered past during the partial phases and were interested to look at the camera liveview display screen.

The clouds thinned a bit as the eclipse progressed, so conditions were pretty good by the time of totality. Second contact occurred at 12:58:32, at which point the sun was 9 degrees east of the meridian at an altitude of 60 degrees. As the crescent sun thinned I took a last partial phase shot at 12:55, then swung the telescope to the side and removed the solar filter.



*Several small sunspots are visible in the left image of the full sun, taken through the solar filter. The right image shows the camera liveview screen a few minutes before totality – if you look closely you can see haze around the crescent image due to clouds. The solar filter assembly and solar finder scope can be seen.*

A few seconds before second contact I swung the telescope back towards the sun to get diamond ring images, and then proceeded to shoot images every few seconds during totality, varying the exposures from 1/4000 to 1/4 second in increments of two stops (factor of 4). This resulted in 27 images during totality, a sample of which are shown below. The lower right image is full frame; the other three are close-ups of the center of the frame.

Everyone in the park was impressed with totality, with the usual cheering and applauding as the edge of the sun disappeared. The corona was beautiful visually, extending a couple of solar diameters on either side of the sun. Venus was clearly visible, but I was too busy taking photos to spend time looking for other planets

and stars. The 2 minutes 35 seconds of totality seemed very short.

Probably because of the high clouds, it didn't get as dark as I remember in 1970 in southern Mexico, where we were up in the mountains at an altitude of 2400 meters under a perfectly clear sky, but the rapid darkening that occurred when the last sliver of the photosphere disappeared was still dramatic.

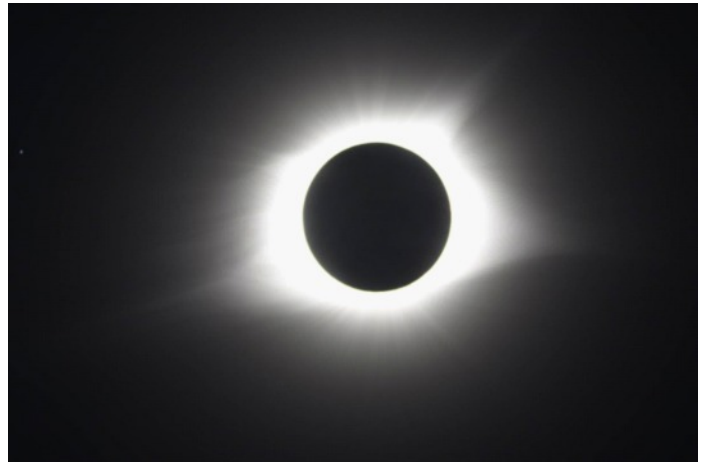
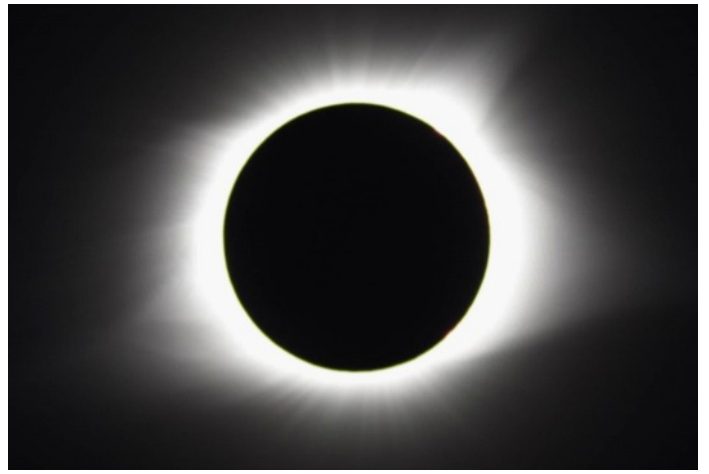
As the sun reappeared I took more diamond ring shots, and then swung the telescope away to put on the solar filter.

Everyone was in a great mood exclaiming about the spectacle they had just seen. People began packing up and heading out, but for completeness I continued to shoot partial phases every 5 minutes until

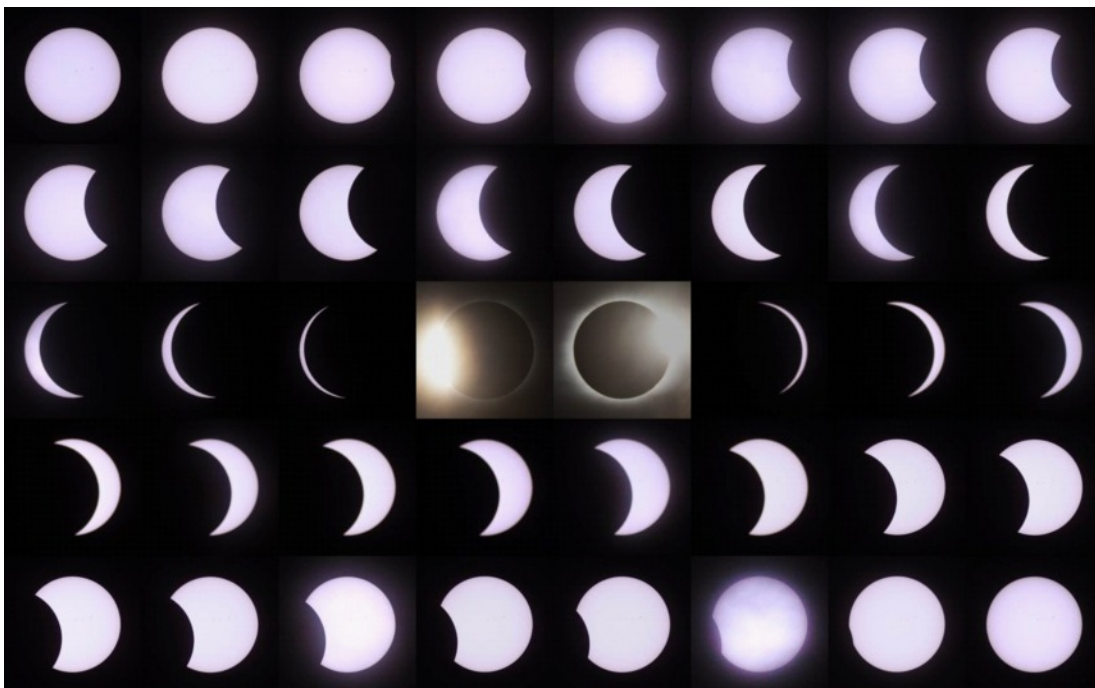
fourth contact. It's always interesting to see how excited people are about the partial phases leading in, but after totality the remaining partial phases seem less exciting.

Heading back to Lincoln after the eclipse the traffic was bumper to bumper and slow, almost as bad as a Los Angeles freeway. It took 3 hours to return the 100 miles to Lincoln, but considering the nearly clear weather in Grand Island, we were glad we made the drive.





*Images from totality. Top left: second contact diamond ring. Top right: a longer exposure from mid-eclipse. Bottom left: a short exposure just before third contact showing several prominences. Bottom right: a full-frame image showing Regulus at the left edge.*



*Montage of partial phase images, taken five minutes apart from 11:30 to 2:35 CDT, through a Baader Planetarium AstroSolar filter. Two unfiltered shots just before second contact and after third contact are also included.*

## Boller-Sivill Observatory Update

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Getting ready for the Star-B-Q. The floor is done and painting is finished. Aligned telescopes. New lighting in control room. Some minor electrical work running new lighting wires.



### Other News:

Election of officers takes place in October each year. Nominations were opened for candidates for the various officer positions. Those nominated were:

President: Doug Bell & Dave Knisely  
Vice President: Doug Bell  
2nd VP: Erik Hubl  
Treasurer: Larry Hancock  
Secretary: Liz Bergstrom

All members are urged to attend the October meeting to cast their votes for the next term officers.

Due to the sale of the Atlas site, a tax return will most likely have to be filed with the IRS. Dave Knisely made a motion that the club consult with an accountant regarding the procedure for this. Motion was seconded by Erik Hubl.

The weather was not clear and it started to rain for the PAC annual picnic which was held 6 September. The picnic was held inside the observatory with 15-20 persons attending. Needless to say there was no observing that night.

Erik Hubl stated that the annual club membership dues of \$50 are now due to the IDA (International Dark Sky Association). The \$50 cost is for clubs of 100 members or less. The IDA proposes ways and means to cut down on light pollution throughout the US. The association sponsors and supports most of the dark sky laws that are passed in the US. A motion was made and passed to continue the club's membership in the IDA.

The club's membership dues to the Astronomical League are now due. Members receive the Reflector newsletter quarterly; can earn certificates for observing from the Messier Club, Binocular Club, Double Star Club, etc. Louis Dorland (a member of OAS & PAC) said that OAS is planning to renew their membership. Lee Thomas moved that PAC renew their membership in the AL with Ron Veys seconding the motion. The motion was passed with one opposed.

John Bruce said that the club membership subscription dues for the Astronomy Magazine are currently \$20. After November 1st the subscription will be \$24. It will pay to renew now during the month of October.

Jack Dunn stated that the Mars Global Surveyor mission reached Mars on 12 September and has already detected magnetic fields on Mars. Also, the Sun is blue in a red sky not as depicted in the color corrected photo in the October issue of S&T of a Martian sunset. There is also a question in scientific circles as to whether or not there should be names on some of the Martian rocks that are observed.

The Cassini mission to Saturn will be launched 13 October. There is controversy among some activists who are very vocal in their opposition to the launch. This is due to the plutonium oxide fuel used for the power plant. These activists want the mission stopped.

### CASSINI MISSION STATUS REPORT

October 16, 1997 11:30 a.m. PDT

Following its spectacular launch into the moonlit sky above Cape Canaveral, FL, at 4:43 a.m. EDT (1:43 a.m. PDT) on Oct. 15, the Cassini spacecraft continues to operate nominally. "The spacecraft is extremely clean and mission operations are proceeding in an excellent manner," said Cassini deputy program manager Ronald Draper.

At one day and nine hours following launch, Cassini is traveling at a velocity of about 4.2 kilometers per second (about 9,223 miles per hour) relative to Earth. Engineers are beginning to look at data from when the Centaur separated from Cassini to correlate after-the-fact information on spacecraft systems with predicted performance. Telemetry recorded on Cassini's solid state recorder will be played back later this week. Extra commands to shut off two commendable heaters (out of 50) for the star camera were added. Radio plasma wave antennas will be deployed in ten days. Updates for engineering software are scheduled for today and tomorrow.

There are no anomalies with the spacecraft, according to Cassini mission director Chris Jones. "I can't recall a launch as perfect as this one," he said, adding that "everything we see is within predictions, with no failures."

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## 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](http://cafepress.com):



Shop through Amazon Smile to automatically donate to PAC:



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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](mailto: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.