

# ***The Prairie Astronomer***

May 2015 Volume 56, Issue #5

***What are the mysterious  
bright spots on Ceres?***



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***Dawn at Ceres  
June Observing  
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And more...***



***Night Sky Network***



The Newsletter of the Prairie Astronomy Club

# The Prairie Astronomer

**NEXT PAC MEETING:  
PAC DINNER  
Tuesday May 26, 2015 6:30 PM  
Valentino's on South 70th**


## Program

### Upcoming Programs (tentative):

June: Solar Observing Party  
July: Review of Nebraska Star Party  
August: The Sky is Falling (Michael Sibbersen)  
September: Beginning Astrophotography (Brett Boller)  
October: Nebula Filters (tentative)  
November: How to Buy a Telescope  
December: PAC Holiday Gathering

## Pac-list Has Moved

The old pac-list listserv has been moved to Google Groups. The new email address is [pac-list@googlegroups.com](mailto:pac-list@googlegroups.com). Everyone who was subscribed to the old list has been added to the new list. This list is open to anyone, not just PAC members. To subscribe click here: [GoogleGroups](#).



**Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy.** Order online from [Amazon](#) or [lulu.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](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.

## Events

PAC Meeting  
Tuesday May 26th, 2015, 7:30pm  
Hyde Observatory

MSRAL, May 29-31, Univ of Arkansas

PAC Meeting  
Tuesday June 30th, 2015, 7:30pm  
Hyde Observatory

Nebraska Star Party, July 12-17

PAC Meeting  
Tuesday July 28th, 2015, 7:30pm  
Hyde Observatory

Newsletter submission deadline June 20

## Club Officers

President	Jim Kvasnicka (402) 423-7390 <a href="mailto:jim.kvasnicka@yahoo.com">jim.kvasnicka@yahoo.com</a>
Vice President	Brett Boller <a href="mailto:proboller86@yahoo.com">proboller86@yahoo.com</a>
2nd VP (Program Chair)	Dave Churilla <a href="mailto:dchurilla@neb.rr.com">dchurilla@neb.rr.com</a>
Secretary	Lee Taylor <a href="mailto:otaylor88@gmail.com">otaylor88@gmail.com</a>
Treasurer	John Reinert <a href="mailto:jr6@aol.com">jr6@aol.com</a>
Club Observing Chair	Jim Kvasnicka <a href="mailto:jim.kvasnicka@yahoo.com">jim.kvasnicka@yahoo.com</a>
Outreach Coordinator	Dan Delzell <a href="mailto:dan@delzell.net">dan@delzell.net</a>
Website and Newsletter Editor	Mark Dahmke <a href="mailto:mark@dahmke.com">mark@dahmke.com</a>



**Night Sky Network**

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

100mm Orion refractor: Available

10 inch Meade Dobsonian: Available

13 inch Truss Dobsonian: Available

## Internet

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

[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/>

## PAC Star Party Dates

Dates in bold are closest to the new moon

### 2015 Star Party Dates

Jan 16,**23**, Feb 13,**20**  
Mar 13,**20**, Apr 10,**17**  
May 8,**15**, Jun 12,**19**  
Jul 10,**17**  
NSP Jul **12-17**  
Aug 7,**14**, Sep 4,**11**  
Oct **9**,16, Nov 6,**13**  
Dec 4,**11**

### Lunar Party Dates

Mar 27, Apr 24, Jul 24, Aug 21

(Lunar party dates are tentative, sites to be determined.)

### 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)

## Club Apparel



Order club apparel from [cafepress.com](http://cafepress.com):



Shop through Amazon Smile to automatically donate to PAC:



## Address

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

## PAC Meeting Minutes

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Minutes for the meeting of April 28, 2015

President Jim Kvasnicka called the meeting to order. 15 members, 1 guest, welcome back David Hamilton.

Upcoming events:

Hyde is open every Saturday night, 8PM – 11PM April through October.

The next PAC meeting is at 6:30 PM Tuesday, May 26, at Valentino's Buffet, our annual get together.

MSRAL, the annual convention of the Mid-States Region of the Astronomical League will be May 29-31 at the University of Arkansas, Little Rock Campus.

Archie's Late Night Party, June 25 6-10pm. An evening out at Morrill Hall. Two or three volunteers are needed to help.

Nebraska Star Party: July 12-17

Wildwood Historic Center has invited the club out on Sept. 12 at Nebraska City. We've assisted them before. Dan Delzell discussed his experiences with them.

Brian Sivill mentioned a contact from Clay Naff from Citizens for Science for a Star party at the UNL Student Observatory on Friday May 1<sup>st</sup>.

Membership

\$30 for an individual membership

35 family membership

10 student membership with volunteer requirements. To join, see John Reinert.

Jim presented his monthly Observing Report for May.

Bob Kacvinsky has received another observing award, the Binocular Messier award, congratulations, Bob!

Club business

Paul Maley of the NASA Johnson Space Center Astronomical society will be in Lincoln on May 6 for an occultation of an 11<sup>th</sup> magnitude star by asteroid Camilla. Brett has agreed to help with the C-11. He also asked for someone to be about 8 miles south of where Brett sets up. He requests someone with at least a 10-inch 'scope with tracking capabilities. Several members have considered helping.

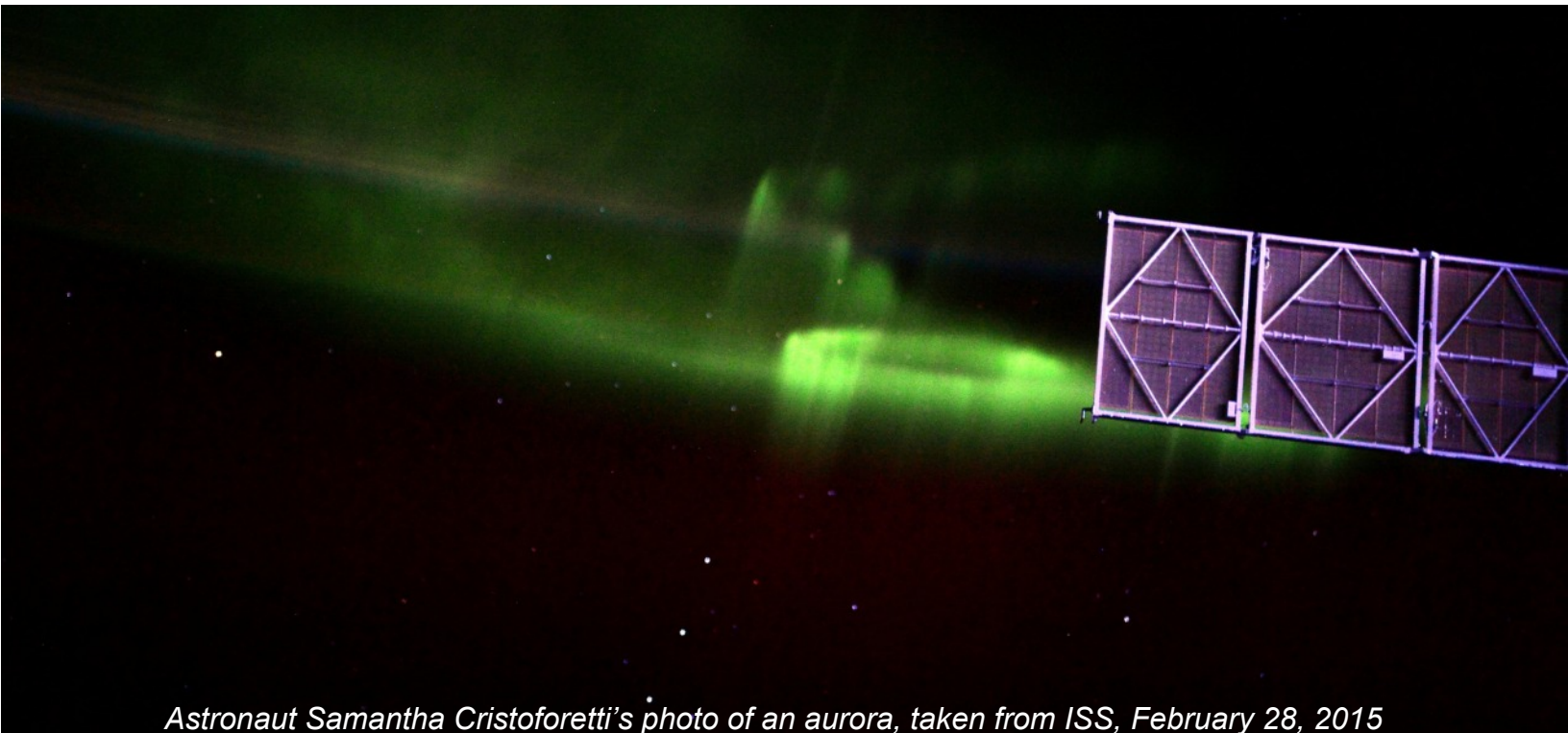
Treasurer's report

John Reinert reports that finances are running well. We have filed our bi-report with the secretary of State. He also filed the roster with the AL, with updated contact info for our members. Thanks, John!

Adjourn to Dave Knisely's program on Deep sky observing.

Respectfully submitted by,

Lee Taylor



*Astronaut Samantha Cristoforetti's photo of an aurora, taken from ISS, February 28, 2015*

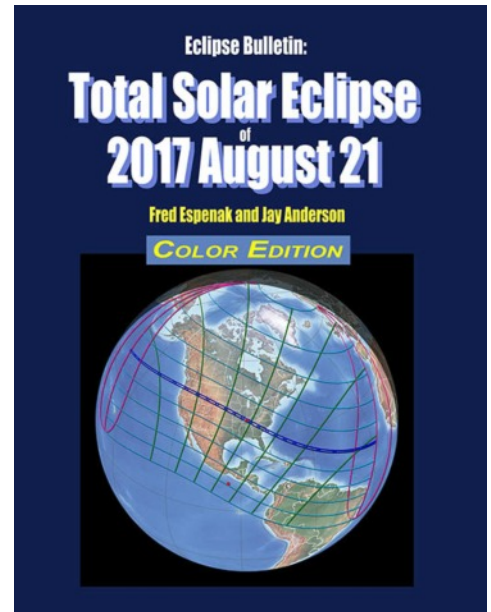
# Bulletin Now Available for 2017 Solar Eclipse

On Monday, 2017 August 21, a total eclipse of the Sun will be visible from the contiguous United States for the first time since 1979. The track of the Moon's umbral shadow begins in the Pacific Ocean and crosses the nation from west to east through Oregon, Idaho, Wyoming, Nebraska, Kansas, Missouri, Illinois, Kentucky, Tennessee, Georgia, North Carolina, and South Carolina. Inside the 70-mile-wide path of totality, the Moon will completely cover the Sun as the landscape is plunged into an eerie twilight, and the Sun's glorious corona is revealed for nearly 3 minutes. Outside the narrow shadow track, a partial eclipse will be visible from all of North America.

Eclipse Bulletin: Total Solar Eclipse of 2017 August 21 is the ultimate guide to this highly anticipated event. Written by two of the leading experts on eclipses, the bulletin is a treasure trove of facts on every

conceivable aspect of the eclipse. The exact details about the path of the Moon's shadow can be found in a series of tables containing geographic coordinates, times, altitudes, and physical dimensions. A set of high resolution maps plot the total eclipse path across the USA. They show hundreds of cities and towns in the path, the location of major roads and highways, and the duration of totality with distance from the central line.

Local circumstances tables for more than 1000 cities across the USA provide times of each phase of the eclipse along with the eclipse magnitude, duration and Sun's altitude. Additional tables cover the eclipse circumstances for cities in Canada, Mexico, Central and South America and Europe. An exhaustive climatological study identifies areas along the eclipse path where the highest probability of favorable weather



may be found. A travelogue highlights key locations in the eclipse track from Oregon through South Carolina. Finally, comprehensive information is presented about solar filters and how to safely observe and photograph the eclipse.

For 15 years, Fred Espenak and Jay Anderson published more than dozen eclipse bulletins through NASA, each one covering a major upcoming solar eclipse. Prepared in cooperation with the International Astronomical Union, the bulletins were internationally recognized as the most authoritative reference for each eclipse. The team has reunited to produce this new bulletin on the 2017 total eclipse through the USA. And now, for the first time, the bulletin is available in both black & white and color editions.

[Order online](#)

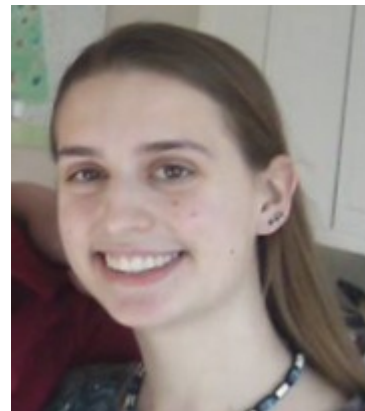


# Hyde Observatory Volunteer of the Year



*The Hyde Observatory Annual Volunteer Appreciation dinner was held at Mueller Planetarium on May 19<sup>th</sup>. This year's Volunteer of the Year is Annalisa Holmgren. Annalisa was not able to attend. After dinner, planetarium coordinator Zach Thompson ran the full-dome show "A Planet for Goldilocks."*

*Above: Dan Delzell, Leonard Mertz, Lee Thomas, Ed Schmidt, Ron Veys, Ruth Grady, Zach Thompson, John Reinert, Mark Dahmke.*



Annalisa Holmgren,  
Hyde Volunteer of the  
Year

# Reflection Nebula vdB62

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The reflection nebula vdB 62 is illuminated by the Herbig-Bell star HD 288313. These are young A or hotter stars with emission lines. They are also called Herbig Ae/Be stars for this reason. These are surrounded by nebulosity. If no nebulosity is present then they are simply Ae/Be stars. The nebulosity is also known as Parsamian 3 and GN 05.51.0.02. I was unable to find a distance estimate for this nebula but I assume it is likely related to LDN 1622 that fills much of the field and is thought to be about 500 light-years

distant. I couldn't begin to fit all of LDN 1622 into my field but the portion sometimes called the "Boogy Man Nebula" did mostly fit in. It continues to the north east another field or so. I was going to capture that as well and mosaic the two but clouds had other ideas. In fact they cut short the session so I only got one green frame. Weather never cooperated sufficiently to try again. Clouds hurt the color data I did get so it is somewhat suspect. In fact I originally pitched the data as unprocessable but pulled it back from the bit bin and tried one

cloudy night to salvage something. It seems severely blue starved for the nebula which came out far redder than others show it yet the star colors were right. I find this happens a lot when hit by clouds as this one was. I probably should have left it mono. This is one I will try again next winter. The nebula is located in Orion just east of the core of Barnard's loop.

*Rick Johnson*



# June Observing: What to View

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Jim Kvasnicka

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

## Planets

**Venus and Jupiter:** The two planets start the month 20° apart and get closer each day. On June 30<sup>th</sup> they are separated by just 0.3°. This conjunction may have been what was seen when they saw the Star of Bethlehem that pointed to the birth of Jesus.

**Saturn:** Visible at night fall with its rings tilted 24°.

**Neptune and Uranus:** Still not very bright at dawn.

**Mercury:** Low in the ENE at dawn; use binoculars to see it.

**Mars:** Passes through conjunction with the Sun on June 14<sup>th</sup> and is not visible.

## Messier List (Virgo Galaxy Cluster)

**M58:** Oval shaped galaxy with a brighter core.

**M59/M60:** Two fuzzy oval shaped galaxies that fit in the same FOV.

**M84/M86:** Fuzzy round galaxies with bright cores that fit in the same FOV.

**M87:** Another round fuzzy galaxy with a brighter core.

**M88:** A small oval shaped galaxy with a stellar core.

**M89/M90:** Both fit in the same FOV.

**M91:** A faint oval shaped galaxy.

**M98:** A thin elongated galaxy.

**M99:** A bright round galaxy with a brighter core.

**M100:** A round hazy galaxy.

**Last Month:** M49, M51, M61, M63, M64, M85, M94, M101, M102, M104

**Next Month:** M3, M4, M5, M53, M68, M80, M83

## NGC and other Deep Sky Objects

**NGC 5746:** Elongated galaxy in Virgo.

**NGC 6072:** Planetary nebula in Scorpius.

**NGC 6210:** Planetary nebula in Hercules.

**NGC 6229:** Class IV globular cluster in Hercules.

**NGC 6302:** Bug Nebula in Scorpius.

**NGC 6369:** Little Ghost Nebula in Ophiuchus.

## Double Star Program List

**Sigma Corona Borealis:** Equal pair of bright yellow stars.

**16/17 Draconis:** Equal pair of white stars.

**Mu Draconis:** Equal pair of close white stars.

**Kappa Herculis:** Yellow pair.

**Alpha Herculis:** Orange primary with a greenish secondary.

**Delta Herculis:** Bright white star with a blue-purple secondary.

**Rho Herculis:** Close white stars.

**95 Herculis:** Yellow and white stars.

**Alpha Librae:** Wide pair of yellow and white stars.

## Challenge Object

**NGC 5576:** The brightest and largest in a trio of galaxies in Virgo that includes NGC 5577 and NGC 5574.



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## Observing Awards

Congratulations to Bob Kacvinsky for completing the Binocular Messier Observing Program. This is Bob's 7th observing award having already completed the Messier Program, Lunar Program, Double Star Program, Herschel 400 Program, Caldwell Program, and the Globular Cluster Program. Bob has also received an Outreach Award. Congratulations again to Bob.



# NGC Objects: NGC 6302, The Bug Nebula

*Jim Kvasnicka*

NGC 6302 is a planetary nebula located in Scorpius. The Bug Nebula is a bi polar planetary nebula some 3 light years across and 4,000 light years distant.

The structure in the Bug Nebula is among the most complex observed in planetary nebulae. The wings of the bug are actually cauldrons of gas heated to more than 36,000 degrees Fahrenheit. Its central star, a white dwarf with a surface temperature of more than 200,000 K is

one of the hottest stars in the galaxy. Over the next several thousand years NGC 6302 will gradually disperse into space.

NGC 6302 has a listed magnitude of 9.6 and through a 10 inch telescope appears 1.5' x 0.5' elongated in an ENE-WSW direction. NGC 6302 is also Caldwell Object 69.



*Butterfly Emerges from Stellar Demise in Planetary Nebula NGC 6302 The Wide Field Camera 3 (WFC3), a new camera aboard NASA's Hubble Space Telescope, snapped this image of the planetary nebula, catalogued as NGC 6302, but more popularly called the Bug Nebula or the Butterfly Nebula.*

# 22<sup>nd</sup> Nebraska Star Party - 2015

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Mark Dahmke

Photo Credit: Fred Hultstrand History in Pictures Collection, NDIRS-NDSU, Fargo.

## The early registration deadline is June 15<sup>th</sup>!

Join us this summer as we gather families from all over the US and around the world in the sparsely populated sand hills of North Central Nebraska to spend a good week under a galaxy of stars.

### NSP Schedule of Events (July 12-17):

Sunday: registration and check-in, optional dinner.

Monday: registration and check-in, field school, optional dinner.

Tuesday: registration and check-in, swap meet, field school, free “Cattle Country” hamburger dinner.

Wednesday: (All at Valentine High School) field school, registration, swap meet, speaker program, children’s program, dinner on your own.

Thursday: Brewer’s Niobrara Canoe or tube float, optional dinner.

Friday: public star party at 9pm.

For more information see the [NSP website](#).

# The Ordinary Spaceman

Jack Dunn

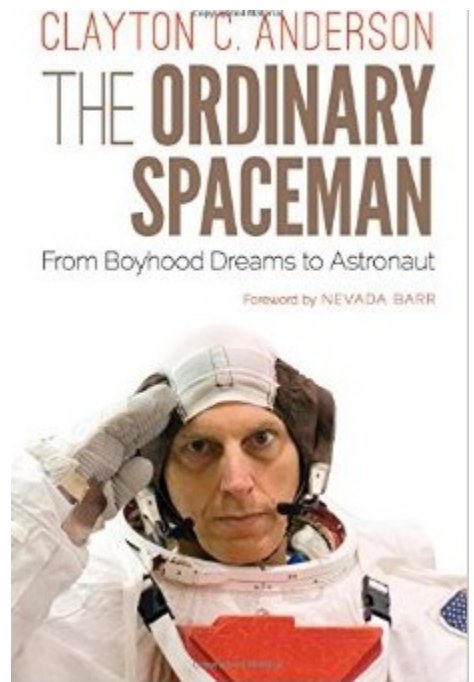
Now available from University of Nebraska Press and also on Amazon - Nebraska Astronaut Clayton C. Anderson's biographical book: "The Ordinary Spaceman." The book will also be in bookstores starting June 1st.

As someone who has known Clay since 2000 when he was beginning his astronaut training, I'd say it presents a fine picture of his life as an astronaut. Many Nebraskans have heard bits of his family history and background in various presentations and then been inspired by his images from space. The majori-

ty of the book does go into depth about the training and decisions that make an astronaut. We get a lot more about his training routine at Johnson Space Center and time in Russian with cosmonauts.

You'll learn it isn't a bed of roses. Clay writes in an easy-to-read conversational style and the reader is taken along on all his journeys - including multiple launches, spacewalks and landings.

You'll like it.  
[Order through Amazon](#)



# Richard Wright will be the Main Speaker at NSP

Jack Dunn

The main speaker for Nebraska Star Party 2015 will be Richard Wright Jr.



Richard S. Wright Jr. is the Imaging Evangelist for Software Bisque, and a Sr. Software Engineer where for over a decade, his focus there has been graphics and cross

platform technologies. He is currently responsible for Software Bisque's mobile products and cross platform imaging solutions, and has authored many of the Camera Add On device plug-ins for Windows, Mac, and Linux. Richard was diagnosed with an incurable case of the imaging virus about 7 years ago. Ongoing treatment takes place primarily in Central Florida or at his dark sky site observatory in South Florida.

His astrophotography blog and image gallery can be found at [www.eveningshow.com/AccidentalAstro](http://www.eveningshow.com/AccidentalAstro)

Here's a description of his talk.

*The Evening Show, Adventures of an Accidental Astronomer.*

What happens when a photography buff and software engineer gets a job at an astronomy software and hardware company? A life long amateur observer, Richard will talk about what it's like to have the best job in the world for an amateur astronomer and imager, and recount his own journey getting started and progressing in the field of astrophotography. Lessons learned at the school of hard knocks, and how accidentally he also gets to be a real astronomer.

## Quick Detour by NASA Mars Rover Checks Ancient Valley

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Researchers slightly detoured NASA's Curiosity Mars rover from the mission's planned path in recent days for a closer look at a hillside site where an ancient valley had been carved out and refilled.

The rover made observations and measurements there to address questions about how the channel formed and filled. Then it resumed driving up Mount Sharp, where the mission is studying the rock layers. The layers reveal chapters in how

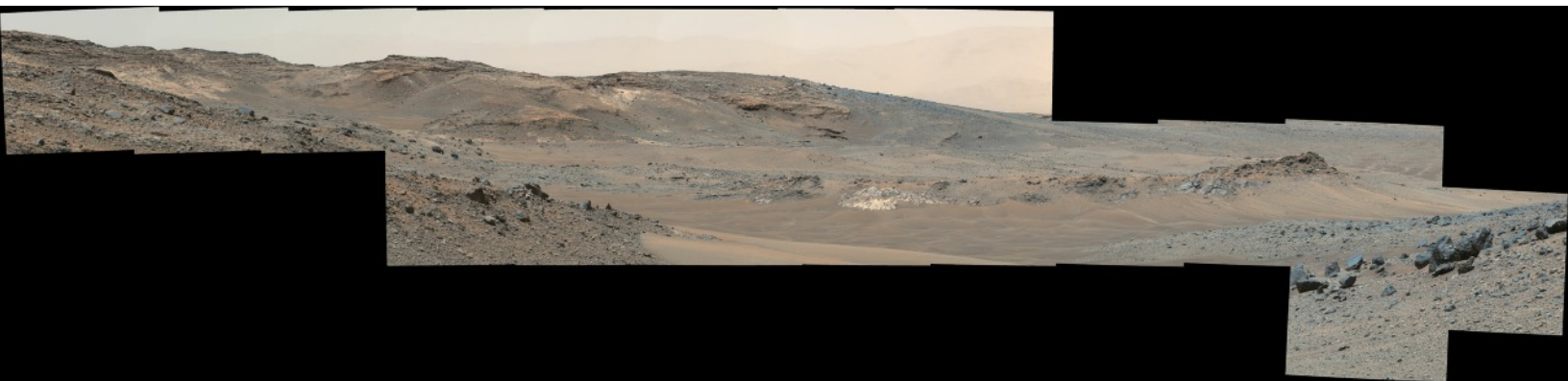
environmental conditions and the potential to support microbial life changed in Mars' early history.

Two new panoramas of stitched-together telephoto images from Curiosity's Mast Camera (Mastcam) present the increasingly hilly region the rover has been investigating, and more distant portions of Mount Sharp. These large images are online, with pan and zoom controls for exploring them, at:

<http://mars.nasa.gov/msl/multimedia/deepzoom/PIA19397>

<http://mars.nasa.gov/msl/multimedia/deepzoom/PIA19398>

Curiosity has been exploring on Mars since 2012. It reached the base of Mount Sharp last year after fruitfully investigating outcrops closer to its landing site and then trekking to the mountain. The main mission objective now is to examine successively higher layers of Mount Sharp. Curiosity spent



*This detailed panorama from the Mast Camera (Mastcam) on NASA's Curiosity Mars rover shows a view toward two areas on lower Mount Sharp chosen for close-up inspection: "Mount Shields" and "Logan Pass."*

*The scene is a mosaic of images taken with Mastcam's right-eye camera, which has a telephoto lens, on April 16, 2015, during the 957nd Martian day, or sol, of Curiosity's work on Mars, before that sol's drive. The view spans from southwest, at left, to west-northwest. The color has been approximately white-balanced to resemble how the scene would appear under daytime lighting conditions on Earth.*

*By 10 sols later, Curiosity had driven about 328 meters (1,076 feet) from the location where it made this observation to an outcrop at the base of "Mount Shields." A 5-meter scale bar has been superimposed near the center of this scene beside the outcrop that the rover then examined in detail. (Five meters is 16.4 feet.) This study location was chosen on the basis of Mount Shields displaying a feature that geologists recognized from images like this as likely to be a site where an ancient valley was incised into bedrock, then refilled with other sediment.*

*After a few sols examining the outcrop at the base of Mount Shields, Curiosity resumed driving toward a study area at Logan Pass, near the 5-meter scale bar in the left half of this scene. That location was selected earlier, on the basis of images from orbit indicating contact there between two different geological units. The rover's route from Mount Shields to Logan Pass runs behind "Jocko Butte" from the viewpoint where this panorama was taken.*

several months examining the lowest levels of the mountain's basal geological unit, the Murray formation, at an outcrop called "Pahrump Hills." Then it set off toward a site called "Logan Pass," where the team anticipates a first chance to place the contact-science instruments at the end of the rover's arm onto a darker geological unit overlying or within the Murray formation.

"In pictures we took on the way from Pahrump Hills toward Logan Pass, some of the geologists on the team noticed a feature that looked like what's called an 'incised valley fill,' which is where a valley has been cut into bedrock and then filled in with other sediment," said Curiosity Project Scientist Ashwin Vasavada of NASA's Jet Propulsion Laboratory, Pasadena, California.

This unusual geometry of the rock layers was noted on the side of a rise called "Mount Shields," which sits northwest of the planned route to Logan Pass. The team chose in late

April to divert the rover to the base of Mount Shields.

"We wanted to investigate what cut into the mudstone bedrock, and what process filled it back in," Vasavada said. "The fill material looks like sand. Was the sand transported by wind or by water? What were the relative times for when the mudstone formed, when the valley was cut into it, when the cut was filled in?"

"It's exciting to see this on Mars for the first time," he continued. "Features like this on Earth capture evidence of change. What in the environment changed to go from depositing one kind of sediment, to eroding it away in a valley, to then depositing a different kind of sediment? It's a fascinating puzzle that Mars has left for us."

Scientists are examining the evidence collected at Mount

Shields as the rover approaches its next study area, at Logan Pass.

JPL, a division of the California

*The rover inspected a site where a valley was cut into bedrock, then refilled. A site of that type had not been seen previously on Mars.*

Institute of Technology in Pasadena, built the rover and manages the project for NASA's Science Mission Directorate in Washington. For more information about Curiosity, visit:

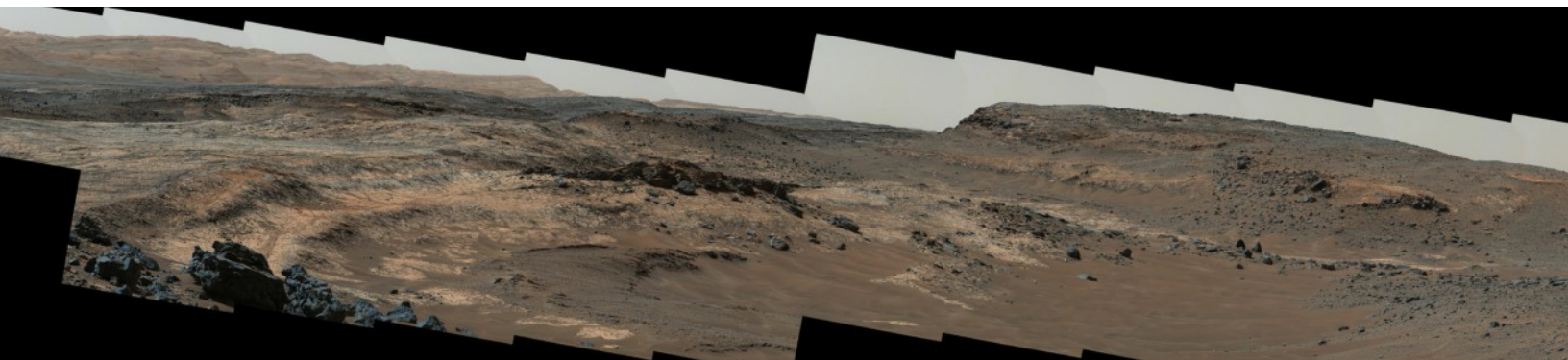
<http://www.nasa.gov/msl>

<http://mars.jpl.nasa.gov/msl/>

You can follow the mission on Facebook and Twitter at:

<http://www.facebook.com/marscuriosity>

<http://www.twitter.com/marscuriosity>



*A sweeping panorama combining 33 telephoto images into one Martian vista presents details of several types of terrain visible on Mount Sharp from a location along the route of NASA's Curiosity Mars rover.*

See <http://www.jpl.nasa.gov/spaceimages/details.php?id=PIA19397> for a full description and high resolution image.

## Ceres Animation Showcases Bright Spots

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The mysterious bright spots on the dwarf planet Ceres are better resolved in a new sequence of images taken by NASA's Dawn spacecraft on May 3 and 4, 2015. The images were taken from a distance of 8,400 miles (13,600 kilometers). The animation is available at:

<http://www.jpl.nasa.gov/spaceimages/details.php?id=pia19547>

In this closest-yet view, the brightest spots within a crater in the northern hemisphere are revealed to be composed of many smaller spots. However, their exact nature remains unknown.

"Dawn scientists can now conclude that the intense brightness of these spots is due to the reflection of sunlight by highly reflective material on the surface, possibly ice," said Christopher Russell, principal investigator for the Dawn mission from the University of California, Los Angeles.

These images offer scientists new insights into crater shapes and sizes, and a host of other

intriguing geological features on the surface. The image resolution is 0.8 mile (1.3 kilometers) per pixel.

Dawn has now concluded its first mapping orbit, in which it completed one 15-day full circle around Ceres while making a host of new observations with its scientific instruments. On May 9, the spacecraft powered on its ion engine to begin the month-long descent toward its second mapping orbit, which it will enter on June 6. In this next phase, Dawn will circle Ceres about every three days at an altitude of 2,700 miles (4,400 kilometers) -- three times closer than the previous orbit. During this phase, referred to as Dawn's survey orbit, the spacecraft will comprehensively map the surface to begin unraveling Ceres' geologic history and assess whether the dwarf planet is active. The spacecraft will pause twice to take images of Ceres as it spirals down into this new orbit.

Dawn is the first mission to visit a dwarf planet, and the first to

orbit two distinct solar system targets. It studied giant asteroid Vesta for 14 months in 2011 and 2012, and arrived at Ceres on March 6, 2015.

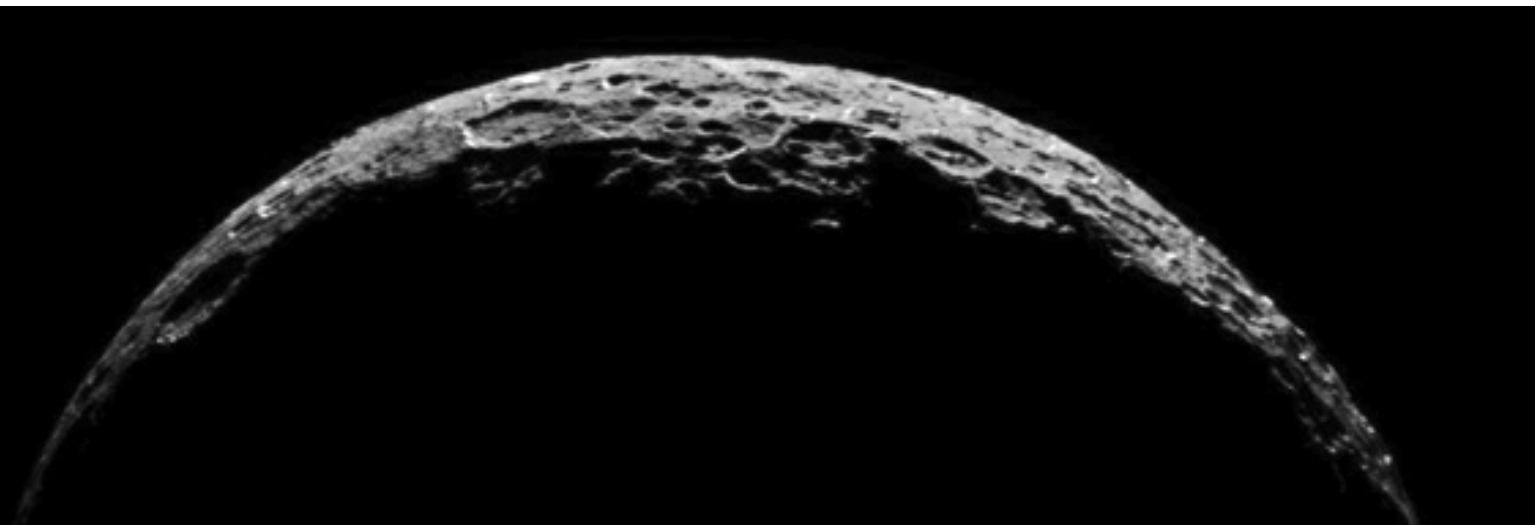
Dawn's mission is managed by JPL for NASA's Science Mission Directorate in Washington. Dawn is a project of the directorate's Discovery Program, managed by NASA's Marshall Space Flight Center in Huntsville, Alabama. UCLA is responsible for overall Dawn mission science. Orbital ATK Inc., in Dulles, Virginia, designed and built the spacecraft. The German Aerospace Center, Max Planck Institute for Solar System Research, Italian Space Agency and Italian National Astrophysical Institute are international partners on the mission team. For a complete list of mission participants, visit:

<http://dawn.jpl.nasa.gov/mission>

More information about Dawn is available at the following sites:

<http://dawn.jpl.nasa.gov>

<http://www.nasa.gov/dawn>



# Review: *Annals of the Deep Sky* by Jeff Kanipe & Dennis Webb

David Dickinson, *Universe Today*

Any lover of the night sky knows the value of a good star atlas and an astronomical handbook to guide your exploration of the universe. And while it's true that more information exists out there than ever before online, much of it is intended for a

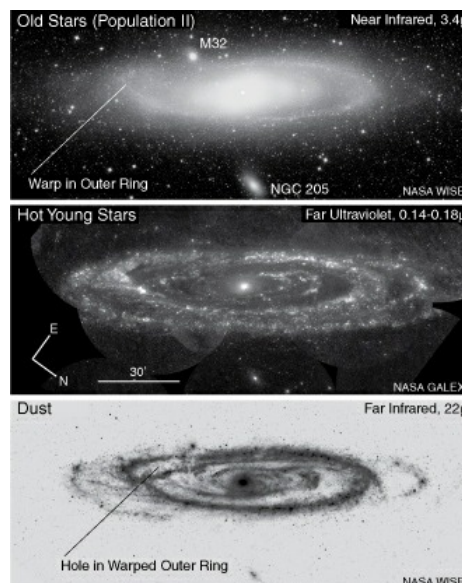
covering constellations in alphabetical order from Andromeda to Caelum are out now from Willmann-Bell, Inc., and the projected 12 volume set will cover all 88 constellations when completed. Volume 3 is due out in early 2016.

*PAC Founding Member Rick Johnson said he's been working with the authors on this book project. Contrary to what the author of this review says, even Jeff and Dennis don't know how many volumes there will be. Dennis says they won't know until they decide to stop writing. Many constellations haven't even been roughed in as yet so they have no idea how many it will take. As Dennis said, "it depends on how much interesting material we find." Rick said that twelve volumes is likely the minimum. Each is thinner than Burnham's three volumes. The total page count however will be much greater.*

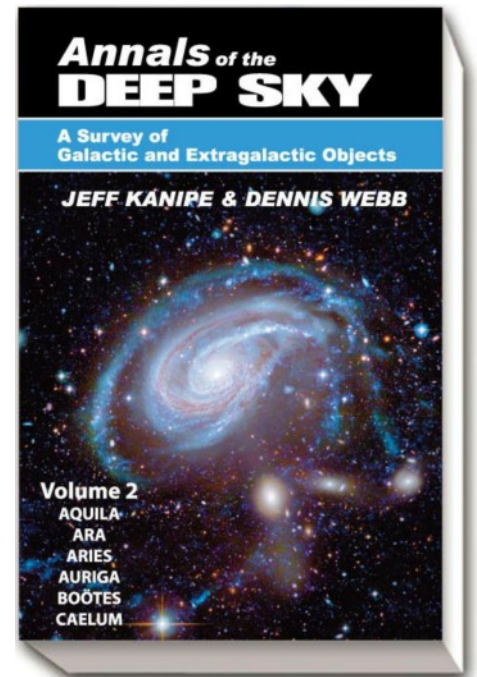
general armchair astronomical audience, or is scattered about the web in disparate places...

But an exciting new series promises to be an essential must for deep sky observers. *Annals of the Deep Sky: A Survey of Galactic and Extragalactic Objects* by Jeff Kanipe and Dennis Webb is a through rundown of the night sky constellation-by-constellation which is aimed at the advanced observer. Mr. Kanipe is a science writer with 35 years experience, and Mr. Webb is a NASA engineer and observer with more than 25 years of experience exploring the night sky. If the names are familiar to deep sky fans, it might be because they also teamed up to produce the *Arp Atlas of Peculiar Galaxies: A Chronicle and Observer's Guide* in 2006. Volumes 1 and 2

*Annals* promises to join the ranks of some of the classic sky guides. Observers from the pre-digital era will recall the paucity of good observing resources available just a few decades ago. Growing up in rural



*Messier 31 deconstructed by the Annals of the Deep Sky. Image credit: NASA/Willmann-Bell, Inc*



northern Maine, even getting our hands on *Sky and Telescope* or *Astronomy* magazine was a daunting challenge, and we often gleaned knowledge of the astronomical goings on for the year from the tables of the *Farmer's Almanac*. I remember hearing of the close 0.0312 AU passage past the Earth of Comet IRAS-Araki-Alcock in 1983, days after it had passed by! Contrast this with today, as message boards and Twitter alert us to new discoveries, sometimes within minutes.

Over the years, Ottewell's yearly *Astronomical Calendar* has become a crucial resource as well.

*Annals of the Deep Sky* promises to be this generation's answer to Burnham's *Celestial Handbook*. You have to be of a certain age to remember Burnham's, but that landmark three volume guide is one of the

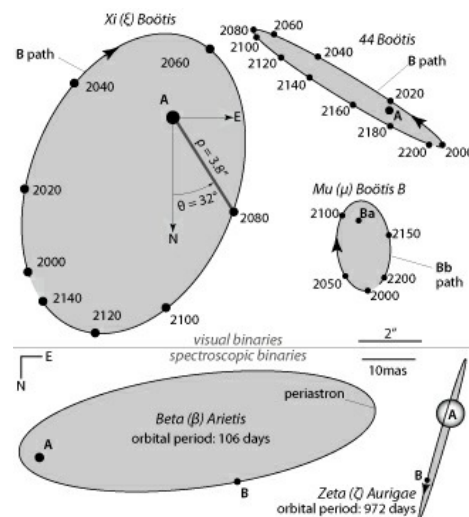


*A monument to Burnham's Celestial Handbook at the Lowell observatory in Flagstaff, Arizona. Image credit: David Dickinson*

few hard copy resources that still resides on our desk well into the digital era. And Burnham's has survived despite its use of now outdated 1950.0 stellar coordinates... that's the kind of legendary staying power it has had in the amateur astronomy community!

Annals of the Deep Sky begins with an outline of how to use the books, and a summary of basic observational astronomy and astrophysics. Like Burnham's, Annals presents the field of observational astronomy beyond the solar system. But unlike Burnham's—which was mainly text—the true magic of Annals lies in its extensive use of maps, diagrams and charts, all meant for the serious visual and photographic observer, both in planning observation runs and in the field. These also include some innovative '3-D' style views through the constellations themselves as seen from our Earthly perspective. These views take the observer out through the plane of our galaxy and beyond as we peer out into the universe.

Annals of the Deep Sky also incorporates the latest discoveries and our understanding of the universe, as well as how our knowledge of astronomy and astrophysics got to where it is today. Annals not only provides the visual observer with handy field of view overlays for classic objects such as the Andromeda Galaxy (M31), but it also provides charts depicting camera sensor versus focal length and field of view for DSLR photography of key objects. To our knowledge, no



*Representative views of visual (top) and spectroscopic binary orbits. Image credit: Willmann-Bell, Inc*

other such resource for this specialized level of information exists for astrophotographers. We also enjoyed the graphic depictions of visual and spectroscopic binary star orbits, another tough item to dig up in research, even with today's modern planetarium programs.

The inclusion of history and astronomical lore is also a great touch that really makes the resource 'pop' in a vein similar to Burnham's. This lends a fascinating dimension of astronomical history to the Annals that suits to a casual 'shotgun' reading style. Like Burnham's, I can see discovering something new from a random opening of the Annals for years to come. A fine example is the lingering mystery of the Nova of 1860 in Volume 2 observed by Joseph Baxendell near Arcturus, a fascinating tale we'd never heard of.

We only wish that this awesome resource was also available in digital format so that we could carry this essential reference with us out in the field... we could easily envision cross-referencing information from a laptop planetarium program such as Starry Night or Stellarium at the eyepiece, with Annals of the Deep Sky cued up on the Kindle.

So grab that 'Dobsonian light bucket' and the first two volumes of Annals of the Deep Sky. This series promises to be an anticipated gem for many years to come. And hey, you can tell the next generation of hipster backyard observers that you remember what it was like before we had Annals of the Deep Sky to consult!



## ***From the Archives: PAC's Role in Building Hyde Observatory***

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Hyde Observatory was envisioned and designed largely by members of the Prairie Astronomy Club. The following excerpts from the PAC History Book give a more detailed account of the relationship between PAC and Hyde.

### **Community Observatory Needs Your Help at August 12th [1976] City Council Meeting**

As most club members know by now, a committee composed of educational, business, and professional representatives has been working to build a community observatory in Holmes Park. One of our club members, Professor Carroll Moore of Nebraska Wesleyan University, is chairman of the Committee, and Earl Moser, Merton Sprengel, Jack Dunn, Jess Williams, and Lee Thomas are also working on the committee. Approximately \$60,000 is required to build and equip the observatory. This will provide for a 12 x 30' room with a roll-off roof to house a 14 inch Celestron reflector, an 8-inch reflector, and an 8" inch rich-field reflector, the latter telescope to be built and contributed by the club. The committee has raised about half of the necessary \$60,000, and has decided to make a presentation to the Lincoln City Council in an effort to obtain city funding for the remaining half. Former Nebraska Governor Bob Crosby, a member of the club, Dale Rathe, science curriculum

coordinator for the Lincoln, Public Schools, and Lee Thomas, Station & Program Manager of KLMS Radio, will make the formal presentation at the Council's public budget session on the evening of August 12. We need your help.

We need to demonstrate to the Council that there is community interest in this project. And for that, we need people to simply attend the Council meeting. You don't need to speak (unless, of course, you really want to.) All you have to do is be there, be interested, and demonstrate that interest. Certainly, the club and the community stand to benefit greatly from this project. Anyone who has manned telescopes at our Gateway Sky Shows, or attended a Behlen Observatory open house knows the public interest in astronomy. Schools, scouting groups, civic organizations will be able to use the observatory, whose facilities will be unique for this purpose in our area.

The interest in astronomy is particularly acute now, in the wake of the Jupiter probes, and the Viking missions to Mars. The Prairie Astronomy Club has one of the largest memberships for astronomy clubs in cities the size of Lincoln anywhere in the country. If Lincoln is not a hotbed of astronomical interest, it certainly sustains a considerable level of curiosity.

Now, for the purely selfish part: what's in it for you? Well, for one thing, the club will gain access

to, and experience with, a 14-inch telescope. The location, Holmes Park, is not ideal for detailed deep sky observing, but is nevertheless adequate for many learning projects that members might want to initiate.

The club has already volunteered its services to man the equipment during public nights, and its support of the project will earn a lasting association with the observatory and access to its telescopes.

Working with the observatory also fulfills two club objectives: to educate the public in astronomy, and to provide interested persons with membership in the club, and access to its benefits. In short, here is a rare opportunity to reach people who are potential club members. Third, and further into the future, the advent of a community observatory close-in and available to the public, frees the club to pursue the possibilities of seeking a permanent site for construction of a club-owned observatory.

Past discussions about such a project usually turned on two incompatible objectives for such a club facility: convenience and accessibility for public users, vs. dark-sky for serious amateur observing. Freed from the first requirement, the second might be met by a club-owned observatory designed and located exclusively for the use of serious amateurs. Certainly, such a club observatory would be a long-range, involved

undertaking. But the possibility of embarking on that long road might be greatly improved by the arrival of a community observatory on the Lincoln scene. There is much to be gained, and virtually nothing but a small amount of your time to be lost by your attending the City Council meeting Thursday night, August 12, at 7:00 p.m. We need you!

### **The Big News—It Looks Like Lincoln Will Have a Community Observatory!**

**[November, 1976]**

A formal announcement is expected in December that the Community Observatory fund has reached its goal of slightly over \$70,000, according to committee chairman Carroll Moore. Some details are still to be arranged with the principal donor and the Lincoln City Parks

*Plans developed by the observatory committee for operation of the facility, which will be owned by the City of Lincoln, call for members of the Prairie Astronomy Club to conduct regular public observation nights, and to participate actively in activities at the observatory, as well as having access to its instruments for research.*

And Recreation Department. However, Moore says he expects that bids for construction will be accepted starting January 1. Bids will probably be let February first, with construction to commence around the first of March.

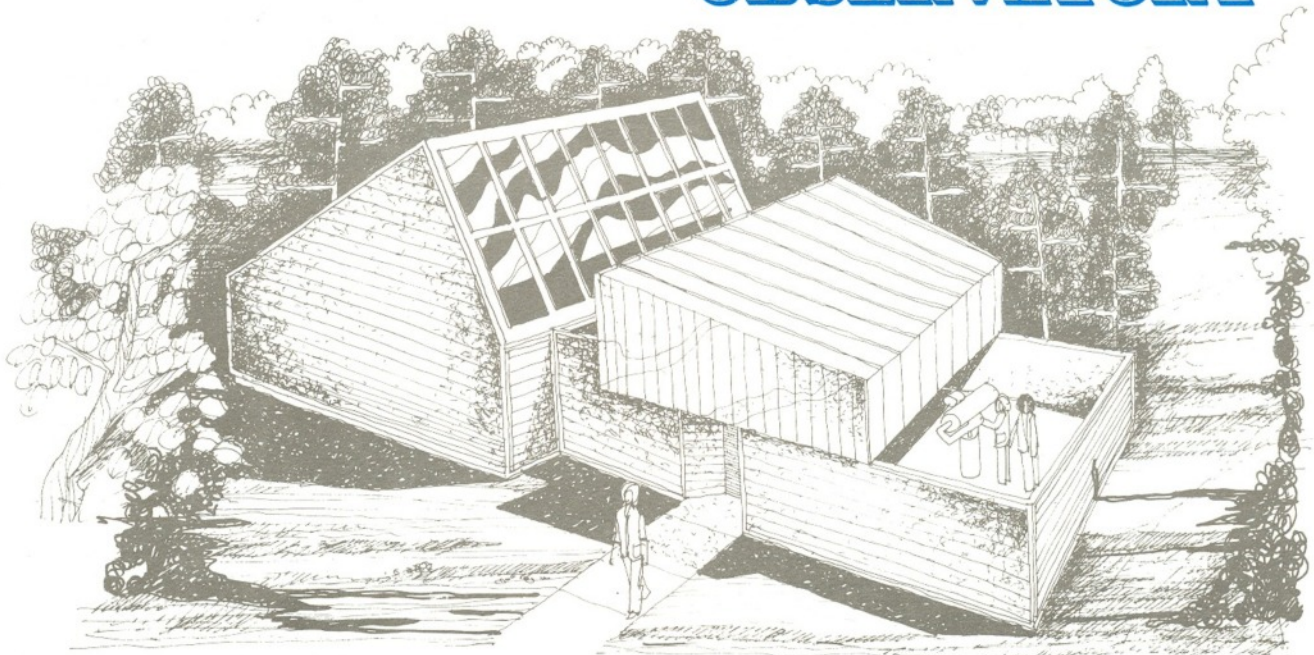
Allowing about three or four months for completion of the project, Lincoln's community observatory should be ready for the public in late Spring, 1977. The observatory, which will house a 14-inch Celestron

Schmidt-Cassegrain telescope on a permanent pier, will be

located next to the Holmes Park golf course, just off the road to the boat docks. When completed, it will also contain an eight-inch rich field telescope, constructed and donated by the Prairie Astronomy Club Fund, and one other telescope, probably an 8-inch Celestron or Dynamax.

The observatory will also house a lecture-meeting room, and will have a large permanent solid slab on the exterior to facilitate viewing through portable telescopes.

## **THE HYDE MEMORIAL OBSERVATORY**



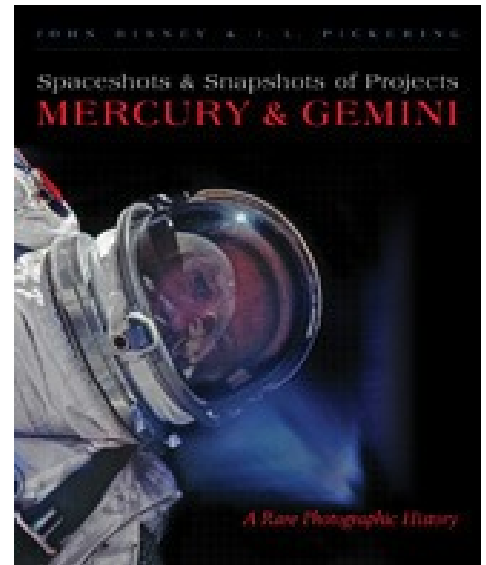
**HOLMES PARK, LINCOLN, NEBRASKA**

## Spaceshots and Snapshots of Projects Mercury and Gemini: A Rare Photographic History

The race to space between the United States and the Soviet Union captured the popular imagination. On April 12, 1961, the USSR launched cosmonaut Yuri Gagarin on a one-orbit flight, making him the first human in space. Three weeks later, American astronaut Alan B. Shepard Jr. flew 116 miles above Earth before splashing down in the Bahamas. Over the next twenty years astronauts emerged as national heroes.

This book tells the story of the people and events of Projects Mercury and Gemini with

hundreds of unpublished and rare photographs—both color and black-and-white. Unlike other publications, which illustrate the space race with well-known and easily accessible images, this history draws from the authors' private library of over one hundred thousand (and growing) high-quality photos of the early US manned space program. Collected over a lifetime from public and private sources—including NASA archives, fellow collectors, retired NASA and news photographers, and



auction houses—the images document American space missions of the Cold War era more comprehensively than ever before. Devoting a chapter to each flight, the authors also include detailed descriptions, providing new insight into one of America's greatest triumphs.

John Bisney is a former correspondent who covered the space program for more than thirty years for CNN, the Discovery Channel, and SiriusXM Radio, among other news outlets. He lives in St. Petersburg, Florida.

J. L. Pickering lives in Bloomington, Illinois. He is a space-flight historian who has been archiving rare space images and historic artifacts for some forty years.

[Order through Amazon](#)

*Left: Gemini IV launches on June 3, 1965, from Cape Kennedy Air Force Station in Florida. Credit: University of New Mexico Press.*

