



The Prairie Astronomer

The Official Newsletter of the Prairie Astronomy Club

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July Program

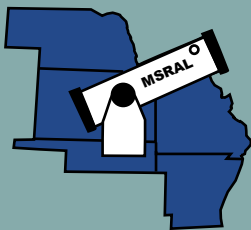
This month's program will feature Emily Moravec. Emily grew up in Lincoln and is a Hyde volunteer. This summer she is doing an REU (Research Experiences for Undergraduates) at Maria Mitchell Observatory in Massachusetts. Her research focuses on collisions between galaxies. Via Skype video, she'll show us the observatory and the work she has been doing.

<http://www.mariamitchell.org/visit/loines-observatory>

<http://www.mariamitchell.org/research-and-collections/astronomy/research>

Featured Photo

VdB 31 - by Rick Johnson. VdB 31 is a reflection nebula around the 7th magnitude A0 star HD 31293 in Auriga about 470 light-years from earth.



Night Sky Network



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

Meeting Minutes

There was no business meeting at the June club meeting.

The barbecue was well attended. Big thanks again to Chef Bob Kacvinsky for his fabulous pork dinner at the PAC summer social meeting.

If you missed it - you missed some great food. We'll try and announce these special happenings on both NSN to the member and on the PAC list. But don't miss out. -Jack Dunn



Iowa Star Party, August 29-September 2

The 2013 Iowa Star Party will be from Thursday, August 29 - Monday, September 2nd at Whitewrock Conservancy's Whitewrock Resort - Coon Rapids, IA. Hosted by Ames Area Amateur Astronomers.

A beautiful weekend of dark skies, star gazing and conversation. The cost of the Star Party registration is \$40/person or \$50/family if you register prior to August 14. For more information and lodging costs, please download [this pdf registration form](#) and fill it out. You may either send a check with the registration form to: AAAA Treasurer, PO Box 1961, Ames Iowa 50010 or pay using your PayPal account (instructions are on the registration form) and e-mail the registration form to Mark Hempe.

A few other things you can do at the Iowa Star Party include: Canoeing, Trails, Bird Watching, Hayrack Rides, Fishing, Guided Nature Hike, Hunting, Raptor Presentation.

-On Thursday some of the astronomers will be arriving at the viewing field in order to get camp-

ers and telescopes set up for the weekend. If the weather is clear we will be observing that evening also.

- On Friday, public night where members of the public can come out and look through our telescopes. The gathering will start at about 7:30 PM with a presentation.

- Saturday afternoon, at 3 PM there will be a talk. Some of the attendees will bring solar scopes and we can safely take a look at the sun.

- Saturday evening will be the banquet and after the banquet Scott Bounds will present his talk which is entitled: "A Return to the Earth's Radiation Belts".

- On Sunday some of the people will be heading back home, but everyone is welcome to stay through Sunday and head back on Monday morning. There are no events planned for that day, but if the skies are clear many of the die-hard astronomers stay to get more pictures and get objects observed that they cannot get in the city lights.

ANNUAL MEMBERSHIP

REGULAR MEMBER - \$30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - \$35.00 per year. Same as regular member except gets 2 votes at club meetings.

STUDENT MEMBER - \$10.00 per year with volunteer requirement.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

Club Telescopes

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

100mm Orion refractor:
Available

10 inch Meade Dobsonian:
Available

13 inch Truss Dobsonian:
Available

2013 PAC Star Party Dates

Dates in bold are closest to the new moon

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

PAC E-Mail:

info@prairieastronomyclub.org

PAC-LIST:

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

pac-list@prairieastronomyclub.org

Events

PAC Meeting
Tuesday July 30th, 2013
@Hyde Observatory

Nebraska Star Party
August 4-9

PAC Meeting
Tuesday August 27th,
2013 @Hyde
Observatory

PAC Meeting
Tuesday Sept 24th, 2013
@Hyde Observatory

PAC Meeting
Tuesday Oct 29th, 2013
@Hyde Observatory

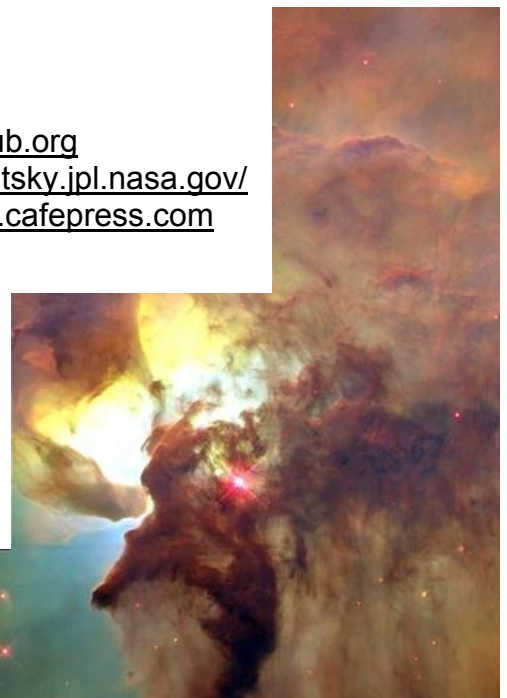
Newsletter submission deadline
August 15, 2013

Links

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

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

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



August Observing: What to View—Jim Kvasnicka

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

Planets

Venus: Low in the WNW at magnitude -4.0, sets 1½ hours after the Sun.

Mercury: Very low at dawn and difficult to see.

Jupiter/Mars: Both rise around 3:30 am in Gemini 5° apart.

Saturn: Begins August 30° above the SW horizon and sets around midnight.

Uranus/Neptune: In Pisces and Aquarius.

Meteor Showers

Perseids: Peaks on the nights of August 11-12 and 12-13. The waxing crescent Moon will set mid-evening and not disrupt the viewing which is best from 11:00 pm to dawn. The predicted peak is 100 visible per hour.

Messier List

M6/M7: Open clusters in Scorpius.

M8: The Lagoon Nebula in Sagittarius.

M9/M10: Class VIII and VII globular clusters in Ophiuchus.

M12/M19: Class IX and VIII globular clusters in Ophiuchus.

M20: The Trifid Nebula in Sagittarius.

M21/M23: Open clusters in Sagittarius.

M62/M107: Class IV and X globular clusters in

Ophiuchus.

Last Month: M3, M4, M5, M53, M68, M80, M83

Next Month: M13, M14, M22, M28, M54, M69, M70, M92

NGC and Other Deep Sky Objects

B86: The Ink Spot, dark nebula in Sagittarius.

NGC 6709: Open cluster in Aquila.

NGC 6781: Planetary nebula in Aquila.

NGC 6818: Little Gem, planetary nebula in Sagittarius.

Double Star Program List

Struve 2404: Close orange pair.

57 Aquilae: White pair.

Beta Cygni: Albireo, beautiful gold and blue stars.

31 Cygni: Yellow primary with a blue secondary.

61 Cygni: Orange pair.

Epsilon Lyrae: The Double Double.

Zeta Lyrae: Pair of yellow stars.

Beta Lyrae: Shellak, yellow primary with multiple white stars.

Challenge Object

Juno: The smallest of the “Big Four” asteroids, an irregular chunk 160 miles across. See the finder chart on page 51 of the August Sky & Telescope.

Observing Programs—Jim Kvasnicka

The Astronomical League offers a variety of Observing Programs that Prairie Astronomy Club members can participate in. The observing skills required to complete these Observing Programs range from the beginner to the advanced observer.

The rules, regulations and easy to use forms necessary to complete the Observing Programs are available on the Astronomical League website. Go to the Astronomical League website and click on Observe. Select the Observing Program you are interested in. If you have trouble downloading the forms, contact me and I will provide you with the necessary forms.
<http://www.astroleague.org>

When you complete an Observing Program please contact me, the PAC Observing Chair. I will review your records for accuracy and completeness. A letter of approval will be forwarded to the Astronomical League Observing Program Chair and you will receive a certificate of accomplishment and a pin to show you have reached your goal.

Now is the best time to start one of the Observing Programs. If you have any questions concerning any of the Observing Programs please contact me.

Observing Programs, continued

Observing Programs Available:

Beginning Observer

Analemma Program
Asterism Program
Binocular Double Star Program
Binocular Messier Program
Carbon Star Program
Constellation Hunter Program
Comet Observers Program
Dark Nebula Program
Dark Sky Advocate Program
Deep Sky Binocular Program
Double Star Program
Galileo Program
Lunar Program
Messier Program
Meteor Program
Sky Puppy Program

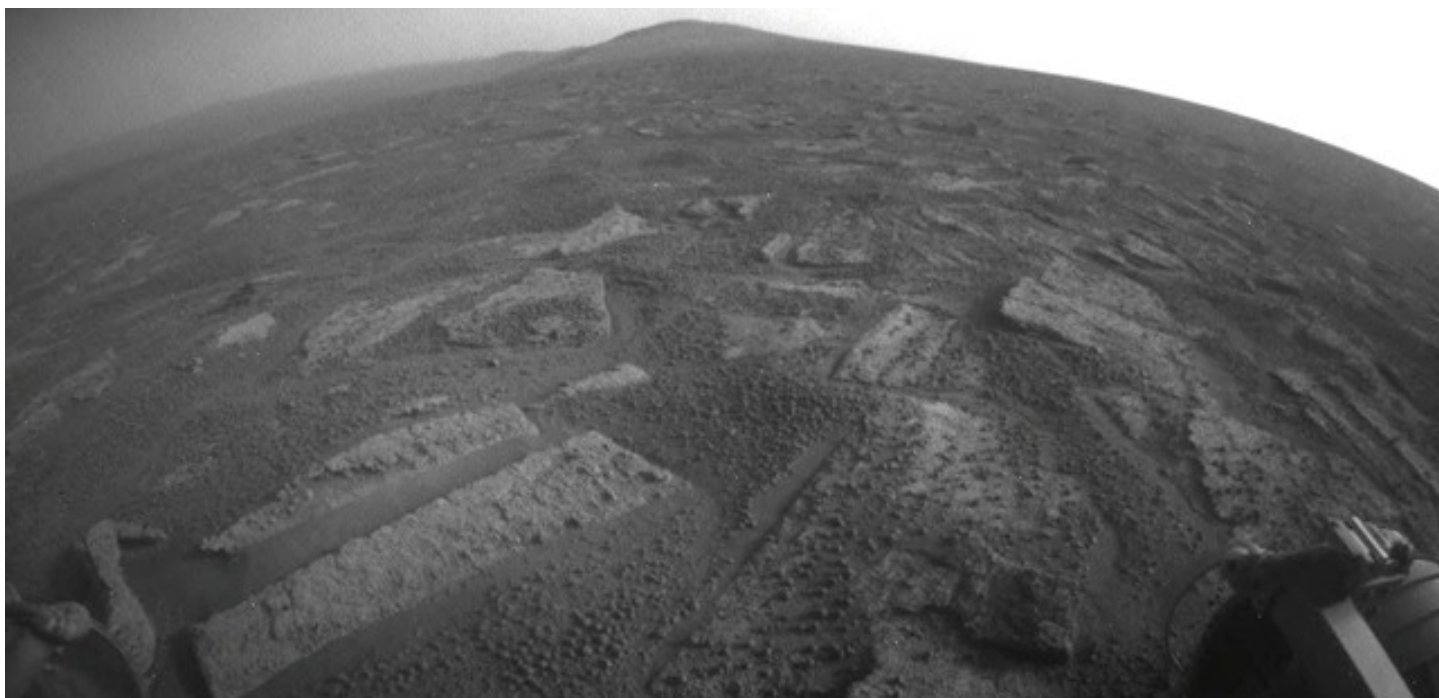
Southern Skies Binocular Program
Stellar Evolution Program
Universe Sampler Program
Variable Star Program

Intermediate Observer

Asteroid Observing Program
Caldwell Program
Globular Cluster Program
Earth Orbiting Satellite Program
Herschel 400 Program
Lunar II Program
NEO Program
Outreach Award
Planetary Observers Program
Southern Sky Telescope Program
Sunspotters Program
Urban Observing Program

Advanced Observer

Arp Peculiar Galaxy Program
Flat Galaxies Program
Galaxy Groups & Clusters Program
Herschel II Program
Master Observer Award
Local Galaxy Groups & Neighborhood
Open Cluster program
Planetary Nebula Program



Opportunity's View in 'Botany Bay' Toward 'Solander Point'

This view shows the terrain that NASA's Mars Exploration Rover Opportunity is crossing in a flat area called "Botany Bay" on the way toward "Solander Point," which is visible on the horizon.

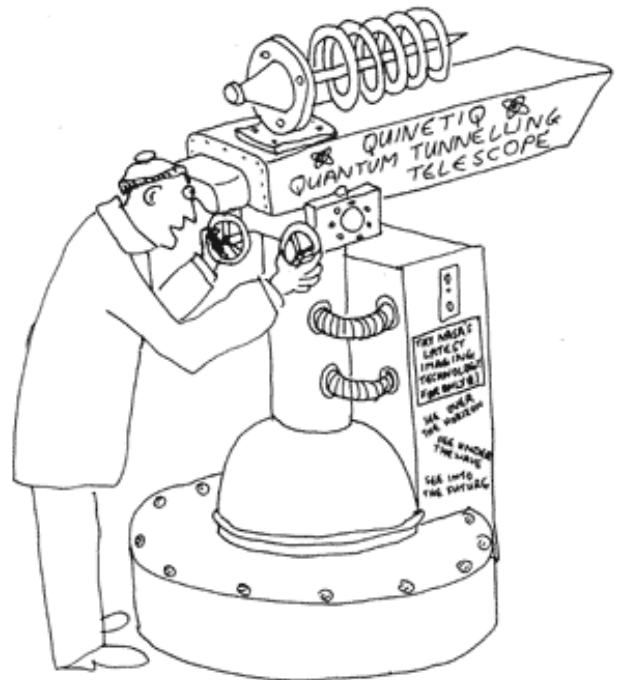
The surface Opportunity is driving upon while crossing Botany Bay has a mosaic pavement of fractured, light-toned bedrock. A mixture of darker-toned basaltic soil and small spherules nicknamed "blueberries" fills cracks between the bedrock pieces and thinly covers some of the bedrock.

The Quantum Tunneling Telescope—Mark Dahmke

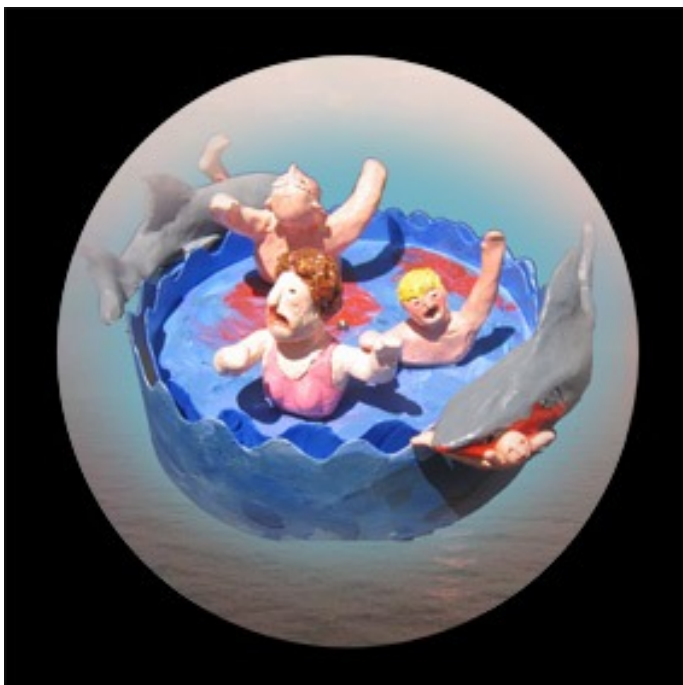
When I came across this cartoon drawing of the quantum tunneling telescope, I assumed it was someone's whimsical idea of a futuristic astronomical telescope. My first thought was to get permission to reprint it and add a caption appropriate to the PAC newsletter, as shown to the right.

Upon further reading, I discovered that this telescope is real and is located at the Southwold Pier, Suffolk, East Anglia, England. It was built by artist and engineer Tim Hunkin. The idea for the telescope came from the pier owner. He couldn't understand why people bothered to use the ordinary telescope as there is usually so little to look at out to sea. He asked Hunkin if he could make it more interesting. Hunkin hit on the idea of building a telescope combined with a periscope. A partially silvered mirror superimposes miniature scenes located in the base of the mount.

As shown below, depending on where the viewer points the scope, they will see one of the various "incident" scenes, including shipwrecks, people in lifeboats, etc. He even added sound appropriate to each scene. An MP3 player plays a track based on input from magnetic reed switches.



My caption idea: "The Quantum Tunneling Telescope: enhance your averted imagination."

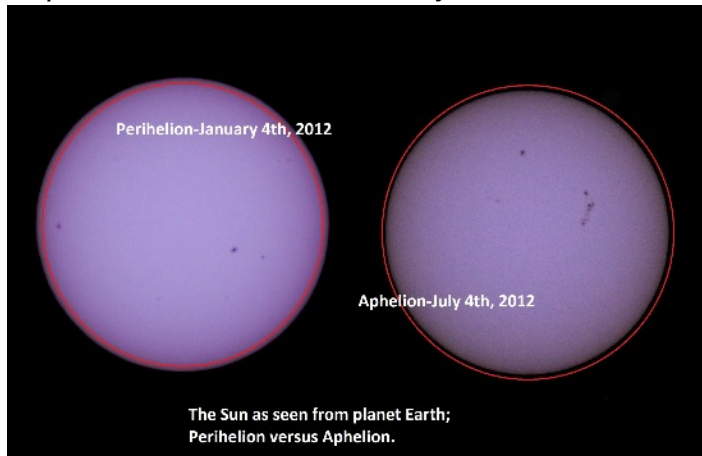


Perhaps we should build our own QTT for Hyde Observatory - it could display scenes of the Moon, planets and various Messier objects on cloudy nights when visitors insist that our telescopes can see through clouds.

Read more about the QTT at: http://www.timhunkin.com/a123_telescope-intro.htm

Happy (or is it Merry?) Aphelion—David Dickinson

Reprinted from Universe Today



Solar apparent size- perihelion versus aphelion 2012. The red circles show the size of one disk superimposed over the other. Shot by the author with the same fixed focal length rig pictured below.

This 4th of July weekend brings us one more reason to celebrate. On July 5th at approximately 11:00 AM EDT/15:00 UT, our fair planet Earth reaches aphelion, or its farthest point from the Sun at 1.0167 Astronomical Units (A.U.s) or 152,096,000 kilometers distant.

Though it may not seem it to northern hemisphere residents sizzling in the summer heat, we're currently 3.3% farther from the Sun than our 147,098,290 kilometer (0.9833 A.U.) approach made in early January.

We thought it would be a fun project to capture this change. A common cry heard from denier circles as to scientific facts is "yeah, but have you ever SEEN it?" and in the case of the variation in distance between the Sun and the Earth from aphelion to perihelion, we can report that we have!

We typically observe the Sun in white light and hydrogen alpha using a standard rig and a Coronado Personal Solar Telescope on every clear day. We have two filtered rigs for white light- a glass Orion filter for our 8-inch Schmidt-Cassegrain, and a homemade Baader solar filter for our DSLR. We prefer the DSLR rig for ease of deployment. We've described in a previous post how to make a safe and effective solar observing rig using Baader solar film.

We've been imaging the Sun daily for a few years



Our primary solar imaging rig. A Nikon D60 DSLR with a 400mm lens + a 2x teleconverter and Baader solar filter. Very easy to employ!

as part of our effort to make a home-brewed "solar rotation and activity movie" of the entire solar cycle. We recently realized that we've imaged Sol very near aphelion and perihelion on previous years with this same fixed rig, and decided to check and see if we caught the apparent size variation of our nearest star. And sure enough, comparing the sizes of the two disks revealed a tiny but consistent variation.

It's a common misconception that the seasons are due to our distance from the Sun. The insolation due to the 23.4° tilt of the rotational axis of the Earth is the dominant driving factor behind the seasons. (Don't they still teach this in grade school? You'd be surprised at the things I've heard!) In the current epoch, a January perihelion and a July aphelion results in milder climatic summers in the northern hemisphere and more severe summers in the southern. The current difference in solar isolation between hemispheres due to eccentricity of Earth's orbit is 6.8%.

The orbit of the Earth also currently has one of the lowest eccentricities (how far it deviates for circular) of the planets at 0.0167, or 1.67%. Only Neptune (1%) and Venus (0.68%) are "more circular."

The orbital eccentricity of the Earth also oscillates over a 413,000 year period between 5.8% (about the same as Saturn) down to 0.5%. We're

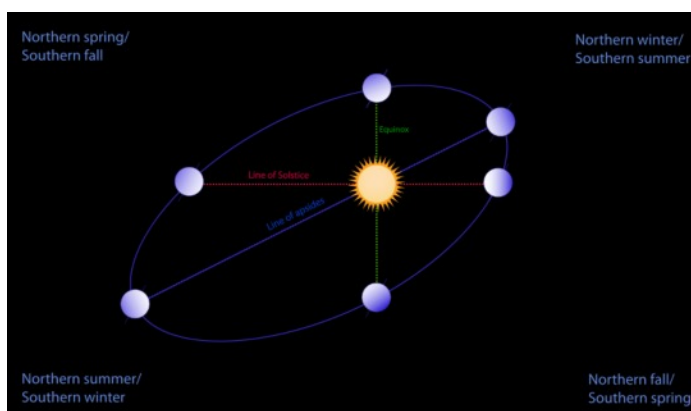
Happy (or is it Merry?) Aphelion, continued

currently at the low end of the scale, just below the mean value of 2.8%.

Variation in eccentricity is also coupled with other factors, such as the change in axial obliquity the precession of the line of apsides and the equinoxes to result in what are known as Milankovitch cycles. These variations in extremes play a role in the riddle of climate over hundreds of thousands of years. Climate change deniers like to point out that there are large natural cycles in the records, and they're right – but in the wrong direction. Note that looking solely at variations in the climate due to Milankovitch cycles, we should be in a cooling trend right now. Against this backdrop, the signal of anthropogenic climate forcing and global dimming of albedo (which also masks warming via cloud cover and reflectivity) becomes even more ominous.

Aphelion can presently fall between July 2nd at 20:00 UT (as it did last in 1960) and July 7th at 00:00 UT as it last did on 2007. The seemingly random variation is due to the position of the Earth with respect to the barycenter of the Earth-Moon system near the time of aphelion. The once every four year reset of the leap year (with the exception of the year 2000!) also plays a lesser role.

I love observing the Sun any time of year, as its



Perihelion and aphelion vs the solstices and equinoxes, an exaggerated view. (Wikimedia Commons image under a 3.0 Unported Attribution-Share Alike license. Author Gothika/Doudoudou).

face is constantly changing from day-to-day. There's also no worrying about light pollution in the solar observing world, though we've noticed turbulence aloft (in the form of bad seeing) is an issue later in the day, especially in the summertime. The rotational axis of the Sun is also tipped by about 7.25° relative to the ecliptic, and will present its north pole at maximum tilt towards us on September 8th. And yes, it does seem strange to think in terms of "the north pole of the Sun..."

We're also approaching the solar maximum through the 2013-2014 time frame, another reason to break out those solar scopes. This current Solar Cycle #24 has been off to a sputtering start, with the Sun active one week, and quiet the next. The last 2009 minimum was the quietest in a century, and there's speculation that Cycle #25 may be missing all together.

And yes, the Moon also varies in its apparent size throughout its orbit as well, as hyped during last month's perigee or Super Moon. Keep those posts handy- we've got one more Super Moon to endure this month on July 22nd. The New Moon on July 8th at 7:15UT/3:15 AM EDT will occur just 30 hours after apogee, and will hence be the "smallest New Moon" of 2013, with a lot less fanfare. Observers worldwide also have a shot at catching the slender crescent Moon on the evening of July 9th. This lunation and the sighting of the crescent Moon also marks the start of the month of Ramadan on the Muslim calendar.

Be sure to observe the aphelion Sun (with proper protection of course!) It would be uber-cool to see a stitched together animation of the Sun "growing & shrinking" from aphelion to perihelion and back. We could also use a hip Internet-ready meme for the perihelion & aphelion Sun- perhaps a "MiniSol?" A recent pun from Dr Marco Langbroek laid claim to the moniker of "#SuperSun;" in time for next January's perihelion; Could a new trend be afoot?

Read more:

<http://www.universetoday.com/103211/happy-or-is-it-merry-aphelion-this-friday/#ixzz2Y7FZlshd>

Wickenburg, AZ: A Stargazing Experience—Chad W. Tolly

Saturday, April 6, 2013

I had a special opportunity to visit Arizona three times earlier this year. On my second trip I stayed in Wickenburg, Arizona, a quaint town of officially 6,000 people that varies greatly depending upon the time of year and the “snowbird” population. Wickenburg is about 60 miles northwest of Phoenix on the way to Las Vegas. Knowing there would not be a moon that night I scouted several locations on the highways leading into and out of Wickenburg, then went into the center of town for lunch.

In the back corner of a cute little side-mall of shops, I happened upon The Telescope Ranch. I felt like a Salmon swimming upstream that had finally found home. The proprietor, a nice man named Brian DeWells, and I talked for about 45 minutes. Amazing you can go anywhere in the world, and if you introduce yourself as “so and so, an amateur astronomer,” strangers will instantly know about 90% of what there is to know about you!



Chad Tolly with his kids, Will and Maddie.

Wickenburg, AZ: A Stargazing Experience, continued

Turns out the local astronomy club was having what we in PAC call a star party that very night! Ten minutes north of town off Constellation Road, my zippy compact SUV rental traversed Blue Tank Road through Calamity Wash to a place called Sophie's Flat. There were about 20-30 people in attendance, and I also found my new friend Brian and met his wife and kids. The most interesting thing about the actual observing was the powerful realization of just how lucky we are here in Nebraska with our dark skies. Despite being well outside of Phoenix, and in desert conditions, I could barely make out the Milky Way.



Brian said one of the things on his "list" to do was to make it to Nebraska to stargaze. Well, I just happened to have my NSP 2013 brochure. How fortuitous! He didn't know if he would make it this year but we will have to look for Brian at the NSP in the years to come.

So if you ever get to Phoenix and feel like an adventure a few miles northwest, you will find Wickenburg and a local contact at The Telescope Ranch ready to guide you!

Clear, Dark Skies!



Nebraska Star Party—From Idea to Reality—Tom Miller

Note: To commemorate the 20th anniversary of NSP I'm reprinting Tom Miller's article from the book *The Prairie Astronomy Club: Fifty Years of Amateur Astronomy*.

Somehow in the spring of 1993 five friends from the Prairie Astronomy Club were able to arrange time off of their jobs to attend the Texas Star Party that's held annually at the Prude Ranch near Ft. Davis Texas. I had been to the TSP (Texas Star Party) several times since my wife and I lived near Amarillo, Texas from 1979 until 1991. I was a member of the Amarillo Astronomy club for years and had many good friends there that would be attending TSP in 1993 as well. Due to changing work responsibilities, I knew this would be my last trip to TSP for a while.

All of us from the Prairie Astronomy Club: myself, Dave Scherping, Ron Debus, Steve Bornemier and John Bruce had needless to say a fantastic time at TSP. That's another story unto itself. For the long 2,000 mile round trip we had equipped our two vehicles with CB radios, so we really burnt up the airwaves. On the return trip back to Lincoln was when the idea of looking for a dark sky site in Nebraska came up. We all knew that it would be impossible to return to TSP year after year. So on our return the search began for a suitable dark sky site with some facilities. That proved a tough challenge because of the sparse population in central and western Nebraska. After narrowing possibilities down to a few places in north central Nebraska, Dave Scherping and I took a trip during a new moon phase to check them out. After checking out Merritt Reservoir we knew this was the best spot for the Nebraska Star Party especially if we wanted to make it a star party that the whole family could enjoy. Many of us had young children at that time and I knew there were not many star parties that could or would cater to families.

The decision for the first year's star party was to make it a private affair with the families of club members from several different clubs attending. So we had folks from Rapid City, SD., Amarillo,

TX., Omaha, NE., and Lincoln, NE. and hopefully I'm not missing anyone here, make it out to Merritt Reservoir in early July in 1994. Everyone was in AWE of the dark skies so preparations started for 1995's first public NSP. The volunteer spirit was high among PAC members and Omaha Astronomical Society members and others so that made all the work that went into the making it possible a lot easier. The list is too long to print but you all know who you are. I even want to thank the skeptics as well because without you we would not have worked as hard to make NSP the success it continues to be. I haven't been involved with the operation of NSP for several years now, but I praise the volunteers who have kept NSP one of the best star parties in the country.



Tom Miller



First NSP T-shirt



THE *Prairie*
Astronomy
Club

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

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FIRST CLASS MAIL

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