

SPECTRUM

Northern Cross Science Foundation Newsletter

January 2015

Looking Up

January 8, Thursday

General Meeting

7:00 p.m. - Astronomy 101

7:30 p.m. - Main Program

Business meeting to follow.

Telescope workshop

January 15, Thursday

Board Meeting

7:30 p.m.

Home of Jeff Setzer

January 17, Saturday

Candlelight Ski & Hike

6:00 p.m. - 9:00 p.m.

Horicon

February 7, Saturday

Candlelight Ski & Hike

6:00 p.m. - 9:00 p.m.

Harrington Beach

February 8, Sunday

Celebrate Families

11:00 a.m. - 3:00 p.m.

West Bend High School

February 14, Saturday (Updated)

Candlelight Ski & Hike

6:00 p.m. - 9:00 p.m.

Pike Lake State Forest

Have a Sirius-ly Scintillating Holiday!...by Bob King

The holiday season is about many things — family, gift giving, faith, light. Many of us decorate our trees and homes with colorful ornaments and twinkling lights. A look over head reveals the sky responds in kind. Stellar ornaments hang overhead every clear night of the year, but the winter sky has many of the brightest, including the king bulb of them all, **Sirius**. No star twinkles more vividly or more colorfully.



Astronomers call twinkling "scintillation," a fancy word that nicely captures the resonance of rapidly flickering stars. On some nights, Sirius flashes with the abandon of a 4th of July sparkler, but if we could magically remove the atmosphere, it would be perfectly steady.

Twinkling is caused by temperature variations among the many small eddies or cells of air that comprise the atmosphere. Different temperatures from cell to cell make for different air densities — warm air being less dense, cold air denser. Like a weak lens, less dense warm air bends light less, while cold air bends it more strongly. Since air temperature decreases 3.5° F for every 1,000 feet in altitude (6.4° C/km), nature guarantees a constant and generous supply of hot and cold air cells. -

As the eddies pass between your eye and the point-like beacon of Sirius, they resemble a tumble of eyeglasses of varying strength, refracting or bending the light this way and that. Sometimes an eddy will feed most of the star's light to your eye and it appears bright; a split second later, most of the light will be bent off in another direction and the star will suddenly dim. These fluctuations happen several times a second, so fast that our eyes perceive only a frantic flashing. If you watch Sirius closely, you may even see it shortly disappear!

Magnified with a telescope, bright stars not only flicker but also **jerk about** in the field of view as eddies focus and re-focus the star's light first here than there in a series of separate images so close to one another that our eyes see the result as a bouncing or fidgeting.

Atmospheric trickery at its finest.

The wildest scintillation occurs when Sirius is low in the sky. Then our line of sight to the star passes through hundreds of miles of the dense air rich in eddies. The more cells and temperature variations, the more insane the twinkling. In Fiji and La Paz, Bolivia, where Sirius passes directly overhead, twinkles are rare. We peer through far less air when our gaze is directed straight up than along the horizontal direction.

Then there is the matter of color. Close examination of Sirius and other bright stars with the naked eye shows that twinkles come in every color of the spectrum. Violet, blue, green, orange, and red are bent or refracted slightly differently according to their wavelength. A passing eddy might send you a red ray, but divert the green and blue ones. Bingo! You see a momentary red flash.

It is often said that you can tell the difference between a planet and a star because planets don't twinkle. That's true much of the time; however, when Mars, Mercury, and Venus have small apparent sizes, either because they're far from Earth or delicate crescents (Mercury and Venus), I've seen them scintillate just like the stars. Planets, sporting larger disks, generally hold steady against the atmospheric onslaught. Though some of their light rays are diverted away from our eyes, they're big enough that at least a portion of the light always beams in our direction, providing a steady gleam.

M. Minnaert in his wonderful book *Light and Color in the Outdoors* suggests a delightful experiment anyone can do to get a feel for the size of the air cells that cause scintillation.

Look toward a twinkling Sirius (or other bright star) while focusing your gaze on a foreground object lined up with the star about 5 feet (1.5 meters) in front of you. You'll now see *two images* of Sirius, each of which scintillates out of step with the other. Why? Your eyes are far enough apart that an eddy passing over one eye has no effect on the other. Since the distance between your eyes is about 3 inches (cm), many of the eddies must be smaller than that.

December Meeting Minutes

By Secretary Kevin Bert

The December business meeting of the Northern Cross Science Foundation was held at the Unitarian Church North in Mequon. President Jeff Setzer opened the meeting at 7:35 pm. and welcomed 20 members. He stated that this is the only required meeting to elect any needed board members. This was one of the rare occasions that no positions were needed. He then asked for standard reports.

Treasurer Gene DuPree reported a balance of \$6576.66 in the general fund. He reminded members to turn in membership dues and Astronomy Magazine subscriptions. Jeff was pleased to announce that Bayshore had donated a check for \$1500 to the Northern Cross for our 2014 participation at the shopping center. It is up in the air if this trend will continue in the future.

Secretary Kevin Bert informed all that the

membership roster is at 67. He then recognized Brian Sisk for his effort in observing and sketching 84 of the Messier objects. Brian was presented a certificate from the Astronomical League. Kevin reported that the Astronomical League was looking for volunteers to help in transcribing logbooks that accompanied photographic plates of the Harvard College Observatory. The 1/2 million plates taken between 1885 and 1992 are being digitized. There is also a call for new observing program coordinators for the Herschel 400 and outreach program. The H-Alpha sun-viewing club is the League's latest observing program.

Observatory Director Dan Bert said the interpretive signs are all up around the Jim and Gwen Plunkett Observatory. They cover some of the basic astronomical topics that hikers should find interesting. Dan noted that the West Bend Library had donated a color edition of Sky Atlas 2000 to the Observatory.

Under new business, Mickey Kazmierski tells us that the 24th Annual Celebrate

Families will be held at West Bend High School on February 8th from 11:00 am to 3:00 pm. The NCSF will have a booth to promote our hobby and volunteers will be needed to bring telescopes and answer questions.

Imaging Committee member Ernie Mastroianni reports that he will compile a simplified instruction manual to operate the clubs 127 Explore Scientific Imaging telescope and goto mount.

Under upcoming events, Jeff said that the next public viewing opportunity would be at Harrington Beach on January 1st with a daytime sun-viewing event. The 17th is an evening of viewing at Horicon. February 7th is the Pike Lake Candlelight Ski & Hike while the Harrington Beach has there hike the following week. Pike Lake in particular has hundreds of people attend if the weather is good. Consider bringing a scope to help.

With no further business, Jeff closed the meeting at 7:55 pm.

Respectfully submitted by Secretary Kevin Bert.

Things to See in the January 2015 Night Sky By Don Miles

Mercury & Venus: Mercury (mag -0.8) will still be an evening object, but after about mid-month will slip closer and closer to the setting Sun on its way around the "front" side. It sets around 6:30 early in the month and will set right at sunset by the end of the month. On the night of the 14, Mercury will have reached its "Greatest Eastern Elongation"...which is a fancy name for being as far to the East from the Sun as it will get before working its way back towards the Sun. Venus (-3.9 mag) also sets around 6:30 early in the month, but will continue to set later and later thru spring. By the end of the month, it will set around 8pm. As their setting times would lead you to believe, Venus and Mercury are very close for a while early this month with a close pairing happening the night of the 12th (but will be close at least one night before and after the 12th). On the night of the 12th, Mercury will be about a degree above and to the right of the much brighter Venus.

Mars, Neptune, & Uranus: All three planets are up at sunset, but Mars (1.2 mag) is the first to set, and does by about (9pm). It still is an orangish/red colored point of light low on the western horizon in the constellation Capricornus, but will drift into Aquarius by months end. It continues to slip closer to the Sun thru the winter, and by June will disappear into the glare of the setting Sun. Neptune is the next to set, and will by about (10/8pm). This appears to be the month for close pairings of planets as Mars and Neptune will pass less

than one half a degree from each other the night of the 19th. Neptune will be the greenish "star" above and a little to the right of much brighter Mars. Uranus (5.8 mag) sets around (1am/11:30pm), and remains pretty stationary in the constellation Pisces.

Jupiter: Is the center of attention this month as it rises about (8:30/6pm), transits about (3/1:45am), and sets a little after sunrise. It's now at (-2.5 mag), and the views will keep getting better as it keeps rising earlier and earlier throughout spring. If you prepare for the temps and get a clear steady night/early morning to get out, you will not be sorry you did.

Saturn: Rises before the Sun, and will continue to rise earlier through spring. This month it rises around (5/3:30am) and is at (0.6 mag). It begins the month in the constellation Libra and slowly works its way to the East into the constellation Scorpius. As mentioned above, if you can brave the temps, this is another sight that never fails to impress.

Moon:

January 4th: Full Moon

January 12th: Last Quarter

January 19th: New Moon

January 26th: First Quarter

Special Events/Objects:

Meteor Showers: There is only one meteor shower to speak of this month, and those are the Quadrantids. They peak the evening of the 3rd, but an almost full Moon will wash out most all except the brightest. The Moon will have risen even before the Sun sets, but like all other showers hampered by the Moon...if you can avoid the direct moonlight, you may get an enjoyable show. The debris trail is very narrow, so if you've got clear skies, you won't have to freeze all night long looking for one or two. Predicted rates could be as high as 120/hr, and travel at a moderate speed of about 25 miles/second, and are known to have a bluish color to them. Look in the direction of Arcturus in Bootes (to the northeast).

Comet c2014 Q2 Lovejoy: It should be high overhead this month in the constellation Taurus and around (8.0 mag), so should be an easy binocular object. (Being a binocular object also means quick "Locate/View/Retreat-To-Warmer-Temperature-Place" options as opposed to setting up a telescope for at least a quick view). Of course, if the preliminary view looked promising, a wide field telescopic view may be in order.

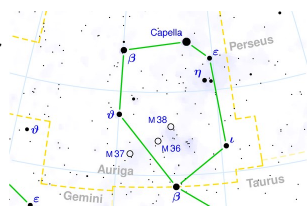


January General Meeting

101 Class...By Kevin Bert

For January, the 101 class will be given by Kevin Bert and is entitled "Micrometeorites." Most people have experienced the sudden appearance of a meteor streaking across the sky at night. These pea-sized particles make up a tiny percentage of the actual material that falls on the earth each day. Micrometeorites are the grains of dust-like particles that the earth sweeps up while orbiting the sun. Learn how you can collect these visitors from the solar system.

Constellation of the Month Auriga



Main Program By Jack Heisler

Sundials

A sundial is a device that measures time by the position of the Sun. It measures local solar time. Before the coming of the railways in the 1830s and 1840s, local time as displayed on a sundial was used by government and commerce. Jack will discuss the history and use of sundials through time.

First Telescope Workshop

Did you get a new telescope for Christmas and find the instructions lacking or confusing? Bring your new telescope to the January meeting and one of our knowledgeable members will get you going in the right direction. You will be observing planets and nebula in no time.

RELATED INFO

Leaders for Public Viewing

January 17

Horicon

Charlotte & Gene DuPree

February 7

Harrington Beach

Charlotte & Gene DuPree

February 8

West Bend High School

Mickey Kazmierski

February 14

Pike Lake

Charlotte and Gene DuPree

Rare triple moon shadow transit to dance across Jupiter...CNET



Jupiter is the largest planet in a solar system. It takes 11.86 Earth years to perform one complete orbit of the Sun. In this time,

something happens twice: three of the planet's four brightest and largest moons (known as the Galilean moons, Ganymede, Callisto, Io and Europa) will pass between the Sun and Jupiter at the same time, casting their shadows onto the planet's face -- and the phenomenon will be observable from Earth.

At 10:36 pm CST, on January 23, 2015, a multiple lunar transit will commence. Callisto, whose shadow will have started crossing Jupiter at 9.10 pm SCT, will be joined by Io, but double lunar transits are pretty common. The real magic begins at 12.26 a.m. CST on the 24th, when Callisto and Io will be joined by Europa. All three shadows will be visible on the face of Jupiter until 12.52 am CST.

Lovejoy is estimated to peak around January 8th at 4.4 magnitude. At that time, it will be in the constellation Eridanus, well placed in the evening sky for viewing or possible photo opportunities. Alas...the accompanying photo was not taken by me.



Chiefland Astronomy Village

By Harvey Sherman

This past December I visited the Chiefland Astronomy Village in Chiefland, Florida. This site was listed in Astronomy magazine as one of the 20 best viewing locations in the U.S. Unfortunately, the skies were overcast every night. There were four of us out on the field the night I set up my scope. The other viewers were very advanced. Something of interest, they were using video astrophotography, with Mallincam cameras, developed by Rock Mallin. See: <http://www.mallincam.net/>

Mallincams are ultra sensitive. They provide video output which can be displayed on TV's or converted to frame sequences for stacking. These guys were big on streaming their observations to the Night Skies Network. See: <http://www.nightskiesnetwork.com/>

The high end Mallincams are pricey at \$1,500. These cameras have 1/2 inch square sensors. There are also less expensive cameras too. Their sensors are 1/3 inch square. Some users are beginning to use an SCB-2000 security cameras for astrophotography purposes. You can enter this field for under \$200 with a lower priced Mallincam Micro-EX or SCB-2000. I found an interesting article on using these cameras for public viewing.

See: <http://www.aseonline.org/members-pages/steve-boerner-s-page/public-viewing-with-a-video-camera>

Neil DeGrasse Tyson

At the Riverside Theater

By Rob Wieland

Of all the unusual acts that have come through Milwaukee, never has there been one stranger than noted astrophysicist and ambassador of science (or perhaps, more correctly, SCIENCE!) Dr. Neil deGrasse Tyson. Dr. Tyson, who is playing a sold-out two-night stand at the Riverside Theater with a different focus each night, used the word "lecture" to describe Wednesday's inaugural talk, but he didn't get to be America's Favorite Really Smart Uncle without being able to entertain.

Dr. Tyson came out to a standing ovation and immediately expressed wonder that so many people had come to the show. He opened with a discussion about his recent *Cosmos* reboot and how it reached such a wide audience, even though it was connected to Fox—a media giant not exactly known for its love of science fiction or thoughtful scientific discussion. Science in the media was one of the main topics of discussion, with Dr. Tyson highlighting films that featured scientists as characters beyond just being the Exposition Guy, and discussing how the explosion of Comic-Con bodes well for future generations using science fiction as a gateway to exploring science fact.

Last night's lecture also featured a quick tour of a few science-minded viral videos, with Dr. Tyson unpacking them a bit further with his analytical eye. He was just as excited about the Orion launch as many people were a few days ago, but sad that a test launch generated such excitement—because those started happening 50 years ago. He talked about the famous Russian meteorite caught by several dashboard cameras, and chilled the *Continued on Pg 4*

Comet Lovejoy

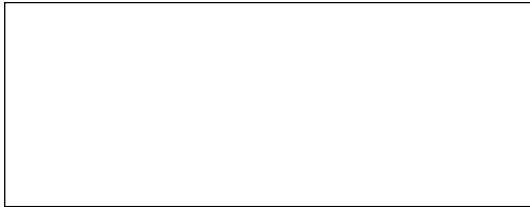
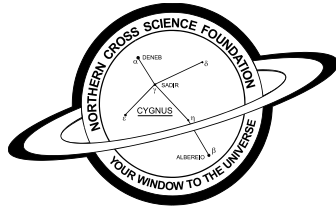
by Rick Kazmierski

Comet Lovejoy, designated C/2014 Q2, is heading out of the southern sky and moving north as January begins. On News



Years Eve I had my first look at the comet, low in the constellation Lepus. I observed it through my 10" Schmidt telescope around 11:30 pm, under a waxing gibbous moon. The object had a bright stellar nucleus with a good size nebulous halo around it. No tail was evident, but photos show a well developed one.

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Continued from Pg 3 Tyson

audience with a seven-page list of other asteroids that consistently cross Earth's path. This led to an extended and amusing riff on how the planet and the universe themselves are hostile to life.



Wednesday had the Q&A (which are to be repeated Thursday night) encore that played something like this. Dr. Tyson revisiting elements of *Cosmos*, suggesting that parents let kids explore their curiosity to encourage a love of science, discussing his status as a meme, and even showing the source of that *meme—both in its original form and a slowed down version. The Questions ranged from fans of his celebrity to science nerds talking heavy theory, but Dr. Tyson did a great job with the answers for the folks who stuck around.

Toward the end of the evening, one of the audience members noticed that Dr. Tyson was not wearing his shoes. Dr. Tyson pointed out that the Riverside was a performance space and that he removed his shoes as a tribute to the artists that played on the stage. In its own way, the lecture was a performance, with the doctor using his body to illustrate astrophysical concepts like a dancer, breaking up dry scientific ideas with hilarious asides like a comedian, and connecting with an audience like an accomplished front man of knowledge.

Dr. Tyson then ended with a reading from the original *Cosmos* Carl Sagan book, "The Pale Blue Dot". To the audience at the Riverside, it was the greatest cover ever heard.

* meme:

an idea, behavior, style, or usage that spreads from person to person within a culture

Or

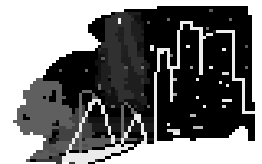
a cultural item that is transmitted by repetition in a manner analogous to the biological transmission of genes.

SPECTRUM

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The NCSF supports the International Dark sky association.



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This Issue, along with back Issues of SPECTRUM, can be found on the NCSF Web Site.

<http://www.ncsf.info>

Monthly Meeting Information

7:00 p.m. Astronomy 101
7:30 Main Program
Unitarian Church North
13800 N. Port Wash. Rd.
Mequon, WI 53097