the Skyscraper

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AMATEUR ASTRONOMICAL SOCIETY OF RHODE ISLAND ⋆ 47 PEEPTOAD ROAD ⋆ NORTH SCITUATE, RHODE ISLAND 02857 ⋆ WWW.THESKYSCRAPERS.ORG

IN THIS ISSUE

Seagrave Memorial Observatory Open Nights

Saturdays at 7:00 pm - weather permitting

November Meeting: Friday, November 2, 7:30pm at Seagrave Observatory

Professor Brad Marston

The Quantum Mechanics of Global Warming

Quantum mechanics plays a crucial role in determining the Earth's climate. Richard Feynman's famous double slit experiment gives us the key to understanding climate. In tonight's talk Professor Marston will use this understanding to present a simple physical picture of what will happen to the Earth as the concentrations of greenhouse gases such as carbon dioxide continue to increase.

Professor Marston joined the Brown Physics Department in 1991. A graduate of Caltech, he received his Ph.D. from Princeton University in 1989. He has done postdoctoral work at Cornell University and was a visiting scientist at the Institute for Theoretical Physics at UC Santa Barbara. Prof. Marston is an Alfred P. Sloan Fellow and a recipient of a National Young Investigator Award from the National Science Foundation. In 2008, he was designated a NSF American Competitiveness and Innovation Fellow, with the citation: "For his transformational interdisciplinary research harnessing the methods of theoretical condensed matter physics to attack climate modeling and the exceptional interdisciplinary educational opportunities that derive for the mentoring of his students." Professor Marston is extremely well received by Brown students because he "gives excellent lectures while expressing great enthusiasm and interest."

Professor Marston enjoys hiking, camping, and daily yoga practice. He lives with his wife and daughter in Rhode Island where the bay, islands, and garden rocks that they dig up each year point to the fact that 20,000 years ago New England was buried under a mile of ice.

President's Message

Ed Haskel

This Letter will be briefer than usual as I am preparing for Hurricane Sandy just as most of you must be. Weather has a profound effect on our pursuit of astronomical interests and, so it seems, occasionally has more down to earth consequences as well.

Before signing off to batten down the hatches here there are a couple of benefits of your Society membership of which you may not be aware:

We own a number of **telescopes** of different sizes, sophistication, and quality which are **available for loan to members.** If you do not own a telescope but wish you had access to own sometimes, or if you do own a scope but would like to try out other types and sizes, then you should converse with one of the Trustees about the procedure for borrowing an instrument.

The Society has a fairly large **library** of astronomy related books and other media which is **available to the membership.** In addition to the obvious value as a reference resource these volumes can be helpful in letting you study a title carefully before spending limited astronomy funds on your own copy. **Alex Bergemann** is the librarian and will be happy to assist you.

That's all for now, more next month. Keep safe and dry the next few days.

8-inch Newtonian Loaner scope

10-inch SCT Loaner scope

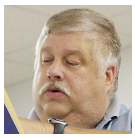
Skyscrapers Library

The Skyscraper is published monthly by Skyscrapers, Inc. Meetings are held monthly, usually on the first or second Saturday of the month. Seagrave Memorial Observatory is open every Saturday night, weather permitting.

Directions
Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

Submissions
Submissions to The Skyscraper are always welcome. Please submit items for the newsletter no later than **November 23** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

E-mail subscriptions
To receive The Skyscraper by e-mail, send e-mail with your name and address to jim@distantgalaxy.com. Note that you will no longer receive the newsletter by postal mail.



Promising Prospects for November Skies:

Meteors and Planet Pairings

Dave Huestis

As the late sunsets of summer (along with the heat, humidity and hazy skies) came to an end, my astronomy associates and I welcomed in the fall season. The biggest plus is that we can begin our observing sessions at a much earlier time in the evening. And besides that opportunity, cool or even chilly evenings often provide crystal clear and steady skies to explore the heavens.

Another factor that comes into play at the beginning of November is the **end of Daylight Saving Time. On Sunday, November 4, at 2:00 a.m.** local time, much of the United States will switch back to Standard Time. Clocks will have to be set back one hour. The saying, "spring ahead, fall back" is often quoted as a reminder about what one needs to do. By doing so also allows astronomers to observe one hour earlier.

But before we implement that timely annual ritual, the heavens will provide a beautiful sky scene on the first day of November. The waning gibbous **Moon and Jupiter** will rise above the eastern horizon around 7:30 p.m. where Jupiter will be the bright object above and to the left of the Moon. They will be about one degree apart, which is two Full Moon diameters. This conjunction (when two astronomical objects appear close together in the sky) will be a very beautiful sight, and I recommend you try to capture a few images to share with your friends and family.

If you are an early riser I'm sure you've noticed brilliant **Venus** in the eastern sky before sunrise. Venus is so bright it can easily be seen even in strong morning twilight. On the 11th it will be very close to a crescent Moon.

Phases of the Moon

Last Quarter Moon
November 7 0:36

New Moon
November 13 22:08

First Quarter Moon
November 20 14:31

Full Moon
November 28 14:46

Usually most meteor showers are best observed after midnight, but during the first couple of weeks of November there is a long duration minor shower called the **North Taurids**. These meteors, which are the remnants of Encke's Comet, peak around the 12th. The good news is that the Moon is New on the 13th, so it won't interfere with observing as many meteors as possible. During normal years, including 2012, the peak rate is only about five meteors per hour.

However, some researchers predict the Earth may intercept a denser part of the "swarm" of particles either this year or sometime soon as part of a 61-year cycle of enhanced activity. Such activity has included the increase in the number of bright fireballs as well. While this scenario is not carved in stone, eh, meteors, with the Moon out of the way I would definitely check the sky from time to time centered around the 12th to see if the sky is ablaze with shooting stars.

The North Taurid meteors radiate from the constellation Taurus the Bull (visible soon after sunset in the eastern sky), not too far from the well known and easily visible Pleiades star cluster. They enter the Earth's atmosphere at approximately 17 miles per second, are yellow in color, and often explode as fireballs, which then fragment into multiple meteors.

The second meteor shower to observe in November is the **Leonids**. Though this major shooting star display now only produces about 20 bright meteors, usually green or blue, per hour at peak, observing conditions will be favorable to enjoy the sky show.

We're certainly in luck this year. First, the shower peaks around 4:30 a.m. on Saturday, November 17. Second, a waxing crescent Moon will set around 7:30 p.m. on Friday. Therefore it will not interfere by beaming moonlight throughout the sky during the meteor shower's peak display between midnight and dawn.

While the meteors can be seen practically anywhere in the sky, you know you've spotted a Leonid if you can trace the meteor's path back to the shower's radiant point (where the meteors appear to emanate from) in the Sickle (backwards question mark) asterism in Leo.

The Leonids hit our atmosphere nearly head-on at about 44 miles per second. For this reason the display produces many fireballs, with about half of them leaving trains of dust which can persist for minutes.

Mid-November can produce some cold temperatures, so dress warmly, get comfortable, and do try to stay awake as you watch for "burning rocks" to blaze across the sky. And if you can conduct your observing session from a light pollution free environment you'll be able to enjoy the best view this meteor shower can offer.

As the month draws to an end we'll have a couple of beautiful **conjunctions**. As dawn begins on the morning of the 26th and 27th you'll find **Venus and Saturn** less than one degree (two Full Moon diameters) apart, low in the east-southeast. On the 28th **Jupiter and the Full Moon** will also be less than one degree apart.

While there are many objects in the heavens for you to discover and explore, during the next several months the local observatories will be focused on Jupiter. The view provided by the telescopes at these facilities is simply magnificent. Be sure to check all the websites for the public night schedules and opening times before visiting these wonderful observatories.

Seagrave Memorial Observatory (http://www.theskyscrapers.org) in North Scituate is open to the public every clear Saturday night.

Ladd Observatory (http://www.brown.edu/Departments/Physics/Ladd/) in Providence is open every clear Tuesday night.

Frosty Drew Observatory (http://www.frostydrew.org/) in Charlestown is open every clear Friday night year-round.

Keep your eyes to the skies.

November Frosty Moon

Francine Jackson

As the swamps began to freeze, settlers looking to stay warm during the winter would set traps along them, to try to catch the full, soft, fluffy beaver, who were looking to prepare their winters' naps; this is why the Full Moon of November is called the Beaver Moon. Also, because the weather tends to take a turn toward the chilly, and ice begins to form on our windows, this Moon is also referred to as the Full Frosty Moon.

With the shortening of daylight - and for us the ending of Daylight Saving Time, causing the daylight to end very early in the afternoon - many myths came of how to keep the towns lit. One such involves the wise elders of Chelm, who, in order to brighten their town, but not pay any money for it, came up with the brilliant idea of capturing the Full Moon by filling a barrel with water, wait for the Moon to shine in the barrel, then hurriedly place a lid on top. When, several days later the sky by itself wasn't enough to light up the streets, the wise men had the barrel rolled into the center of town, and took off the lid. To their surprise, they didn't see the Moon. Thinking it had sunk to the bottom, they slowly poured out the water, but the Moon just wasn't there. The wise men were aghast. Someone had stolen their Moon. They just had to try again, and be more careful guarding it.

We probably won't have to worry about losing our full moonlight this month, even though our Full Moon Wednesday, November 28th, will be accompanied by an eclipse of the Moon; however, it's just a penumbral eclipse. The Earth's penumbra is much lighter than its main shadow, the umbra, so the Moon will show very little in the line of darkening; also, it's occurring on the other side of the Earth.

A Cosmic Tease: Trials of the Herschel Space Telescope Science Teams

Dr. Marc J. Kuchner

Vast fields of marble-sized chunks of ice and rock spun slowly in the darkness this week, and I sat in the back of a grey conference room with white plastic tables spread with papers and laptops. I was sitting in on a meeting of an international team of astronomers gathered to analyze data from the Herschel Infrared Observatory. This telescope, sometimes just called Herschel, orbits the Sun about a million miles from the Earth.

The meeting began with dinner at Karl's house. Karl charred chorizo on the backyard grill while the airplanes dribbled into Dulles airport. Our colleagues arrived, jetlagged and yawning, from Germany, Sweden, and Spain, and we sat on Karl's couches catching up on the latest gossip. The unemployment level in Spain is about twenty percent, so research funding there is hard to come by these days. That's not nice to hear. But it cheered us up to be with old friends.

Samuel Pierpoint Langley, who developed the bolometer in 1878. His instrument detects a broad range of infrared wavelengths, sensitive to differences in temperature of one hundred-thousandth of a degree Celsius (0.00001 C). In 1961, Frank Low developed the germanium bolometer, which is hundreds of times more sensitive than previous detectors and capable of detecting far-infrared radiation.

The meeting commenced the next morning, as the vast fields of ice and rock continued to spin—shards glinting in the starlight. Or maybe they didn't. Maybe they didn't exist at all.

You see, this team is looking at a series of images of stars taken by a device called a bolometer that is blind to ordinary starlight. Instead, the bolometer inside Herschel senses infrared light, a kind of light that we would probably refer to as heat if we could feel it. But the idea of pointing the bolometer at the stars was not to collect ordinary starlight. It was to measure heat coming from the vicinity of these stars, like an infrared security camera, in case there was something else to be found lurking nearby.

And lo and behold, for a handful of stars, the bolometer measurements were off the charts! Maybe something was orbiting these stars. From the details of the bolometer readings—which channels lit up and so on—you would guess that this stuff took the form of majestic fields or rings of icy and rocky particles. It would be a new kind of disk, a discovery worth writing home to Madrid about.

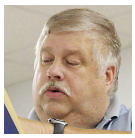
There are several teams of astronomers analyzing data from the Herschel Space Telescope. They call themselves by oddly inappropriate sounding acronyms: GASPS, DUNES, DEBRIS. For the time being, the scientists on these teams are the only ones with access to the Herschel data. But in January, all the data these teams are working on will suddenly be released to the public. So they are all under pressure to finish their work by then. The team whose meeting I was sitting in on would like to publish a paper about the new disks by then.

But it's not so simple. The stars that this team had measured were relatively nearby as stars go, less than a few hundred light years. But the universe is big, and full of galaxies of all kinds—a sea of galaxies starting from maybe a hundred thousand light years away, and stretching on and on. Maybe one of those background galaxies was lined up with each of the stars that had lit up the bolometer—fooling us into thinking they were seeing disks around these stars.

The team argued and paced, and then broke for lunch. We marched to the cafeteria through the rain. Meanwhile, vast fields of marble-sized chunks of ice and rock spun slowly in the darkness. Or maybe they didn't.

What else did Herschel recently uncover? Find out at http://spaceplace.nasa.gov/comet-ocean.

Dr. Marc J. Kuchner is an astrophysicist at the Exoplanets and Stellar Astrophysics Laboratory at NASA's Goddard Space Flight Center. NASA's Astrophysics Division works on big questions about the origin and evolution of the universe, galaxies, and planetary systems. Explore more at http://www.science.nasa.gov/astrophysics/.



Observing Reports:
2012 Orionid Meteor Shower

Dave Huestis

Ideal astronomical circumstances were forecast for the annual Orionid meteor shower peak between midnight and dawn on the morning of October 21. The waxing Moon set before midnight, so it would not interfere by bathing the sky in bright moonlight. These conditions would allow casual stargazers to observe about 20 yellow and green shooting stars per hour under cloud-free skies.

I set my alarm for just before 3:00 a.m. and soon stepped out onto my back porch. Immediately I could see the Winter Circle, a large stellar asterism that encompasses six constellations.

In fact, the Winter Circle contains seven of the 23 brightest stars we can see from northern hemisphere skies. Starting from the brightest star we can see in the sky (besides the Sun of course) and touring clockwise we find Sirius (Canis Major, the big dog), Procyon (Canis Minor, the little dog), Pollux and Castor (Gemini, the twins), Capella (Auriga, the charioteer), Aldebaran (Taurus, the bull), and Rigel (Orion, the hunter). We now complete the tour of the Winter Circle by swinging back to Sirius. But wait, there's one more star that although it resides well within the Circle, it is considered part of the asterism. And that's Betelgeuse.

Also, there was another bright object to the east (right) of the Hyades open cluster containing Aldebaran. That was Jupiter. Jupiter outshone all of the stars, even Sirius! The sky was very transparent and the stars were not shimmering. The temperature was around 47 degrees with no wind. I quickly sat down in a porch chair to begin my observing run.

It took about five minutes before I saw my first Orionid meteor. I had hoped the number of meteors would increase as the morning progressed. Unfortunately, individual members of this display were few and far between.

During a two-hour span I only counted a total of 21 meteors. A few weren't even Orionids. All of them were white. And many of the Orionids were fairly dim ones that I'm sure were not even seen by folks who observed from locations plagued by light pollution. Only three were bright enough to leave dust trains that lasted only about one second each. One bright meteor, blazing east to west, passed just to the north of Jupiter.

Around 4:30 a.m. I caught a glimpse of brilliant Venus low in the east through the now less leafy trees. Regulus, Leo's brightest star that anchors the backwards question mark asterism, also rose above my treeline at about the same time.

It is always so tranquil just gazing at the sky and pondering if out there on some exosolar world an alien stargazer is doing likewise. Though the number of meteors was disappointing, luckily there was just barely enough activity to keep me from falling asleep. Despite the clear and moonless skies we certainly did not experience a peak rate of 20 shooting stars per hour from this location.

I can only hope the activity picked up between 5:00 a.m. and dawn's early light for those observers who decided to watch later than I did.

A Taurid meteor spotted on October 21, peak night for the Orionids. Photo by Jim Hendrickson from Seagrave Observatory.

Struve 2816 and 2819: Triple and Double Stars in Cepheus

Glenn Chaple

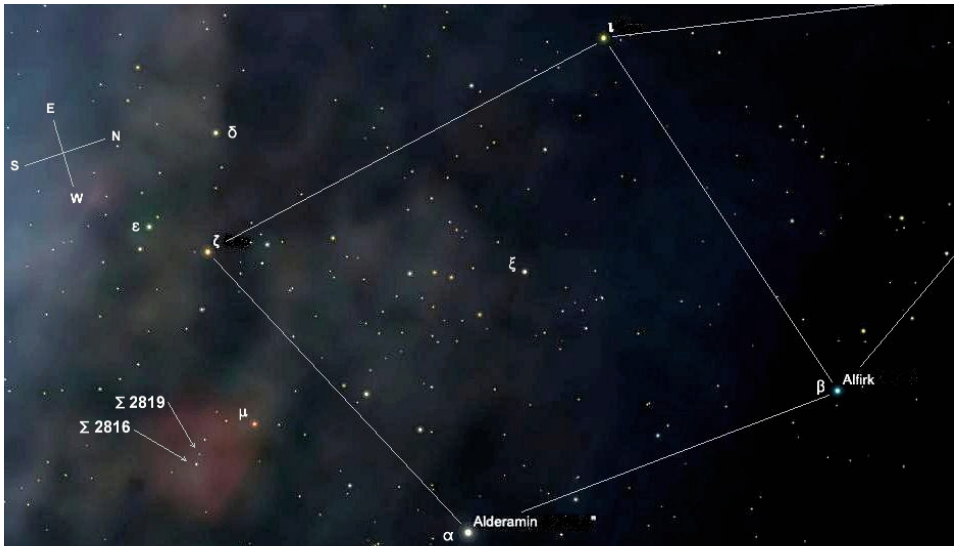
There's something hypnotic about a double star – two gleaming points of light shining bravely through the surrounding darkness. A triple star is even more mesmerizing. Place a double star and triple star in the same eyepiece field, and the visual effect is stunning. This is what greets the eye when you view the triple/double star combo Struve 2816 and Struve 2819.

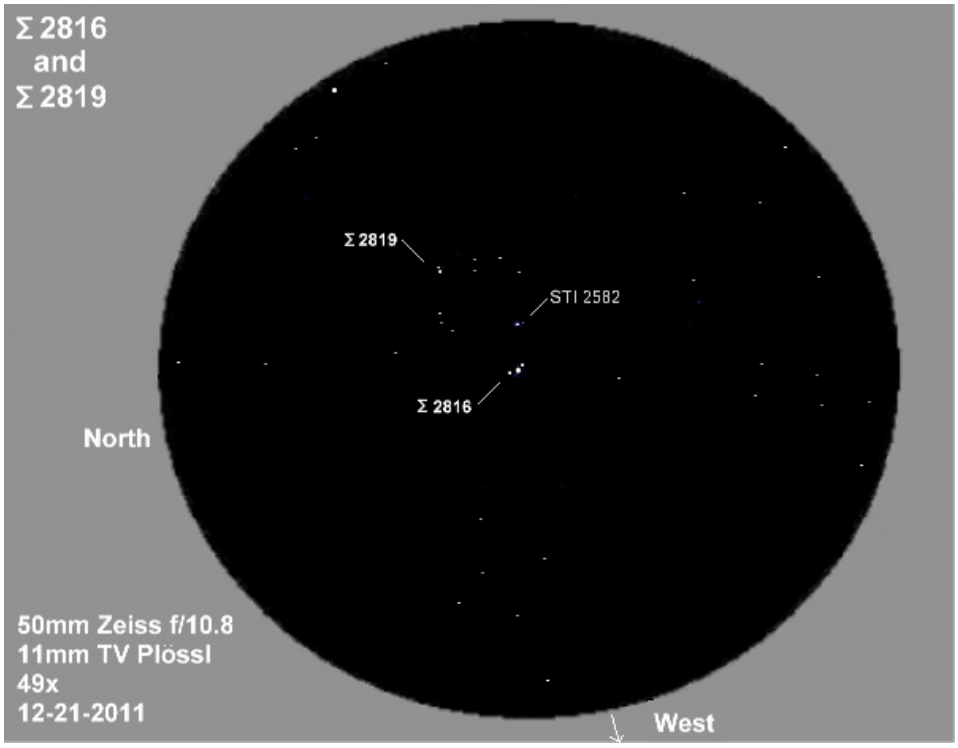
Struve 2816 and Struve 2819 are among the 3000-plus double and multiple stars catalogued by the Russian astronomer F.G.W. Struve in the 1820s and 30s. They lie in Cepheus, about a degree south of mu (μ) Cephei (Herschel's "Garnet Star").

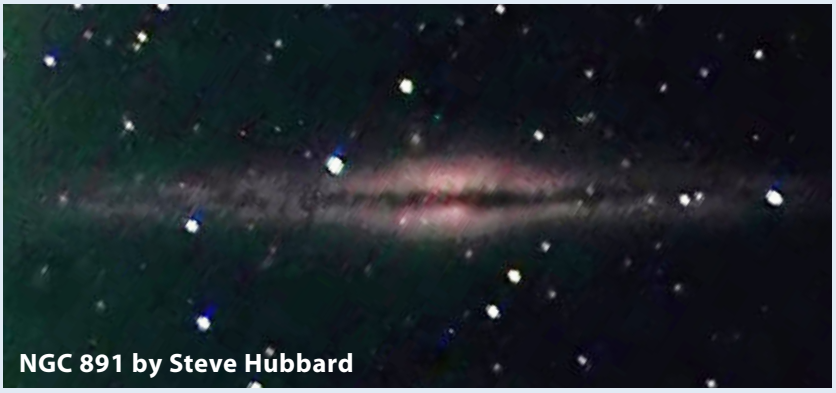
The triple star Struve 2816 consists of a magnitude 5.7 primary flanked by two 7.5 magnitude stars at distances of 12 and 20 arc-seconds. Just 12 arc-minutes away is Struve 2916 - a magnitude 7.5 and 8.5 duo, separated by 13 arc-seconds.

Struve 2816 and Struve 2819 appear together even in the eyepiece field of large-aperture Dobs, but I find the most eye-pleasing views are through small-aperture scopes. Large instruments clutter up the field with a distracting number of faint background stars. Struve 2816 and Struve 2819 are part of the wide open cluster Trumpler 37 which, in turn, is immersed in the huge emission nebula IC 1396.

The accompanying finder chart/ photograph and eyepiece sketch come from the Starsplitters website (http://bestdoubles.wordpress.com), a wonderful collaboration by amateur astronomers John Nanson and Greg Stone. It's a must-visit blog for the double star enthusiast!







NGC 891 by Steve Hubbard

Solar prominence on October 21 by Steve Hubbard

Jim Hendrickson captured the 22° and 46° sun halos, sundogs, tangential arc, and circumzenithal arc visible in the sky over Seagrave Observatory on October 27, ahead of Hurricane Sandy.

John Leonelli captured this wide-angle shot of the northern sky from Seagrave Observatory.

Directions to Seagrave Memorial Observatory

www.theSkyscrapers.org

From the Providence area:
Take Rt. 6 West to Interstate 295 in Johnston and proceed west on Rt. 6 to Scituate. In Scituate bear right off Rt. 6 onto Rt. 101. Turn right onto Rt. 116 North. Peeptoad Road is the first left off Rt. 116.

From Coventry/West Warwick area:
Take Rt. 116 North. Peeptoad Road is the first left after crossing Rt. 101.

From Southern Rhode Island:
Take Interstate 95 North. Exit onto Interstate 295 North in Warwick (left exit.) Exit to Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

From Northern Rhode Island:
Take Rt. 116 South. Follow Rt. 116 thru Greenville. Turn left at Knight's Farm intersection (Rt. 116 turns left) and follow Rt. 116. Watch for Peeptoad Road on the right.

From Connecticut:
• Take Rt. 44 East to Greenville and turn right on Rt. 116 South. Turn left at Knight's Farm intersection (Rt. 116 turn left) and follow Rt. 116. Watch for Peeptoad Road on the right.
• or • Take Rt. 6 East toward Rhode Island; bear left on Rt. 101 East and continue to intersection with Rt. 116. Turn left; Peeptoad Road is the first left off Rt. 116.

From Massachusetts:
Take Interstate 295 South (off Interstate 95 in Attleboro). Exit onto Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

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