

NEWSLETTER

Autumn 2014

RITTENHOUSE ASTRONOMICAL SOCIETY

Founded 1888 WWW.RITTENHOUSEASTRONOMICALSOCIETY.ORG

MONTHLY MEETINGS OPEN TO THE PUBLIC

7:15 PM

The Franklin Institute 20th Street and Benjamin Franklin Parkway **Upcoming Meetings/Events Include:**

Date		
Nov 12	Meeting	Astronomy Gift Ideas for the Holidays and Birthdays
Nov 15	Star Watch	Public Star Watch with Willingboro Astronomical Society Batsto Historic Village Sunset 4:43 pm
Dec 10	Meeting	Dr. Paul Halpern; University of the Sciences "Did Einstein and Schrodinger Discover Dark Energy"

Grand Opening September Meeting Review

Anyone who attended our September meeting might have been blown away with the presentation by Dr. Carter Emmart of the Hayden Planetarium. Utilizing the data base in the Fels planetarium he toured us to the extreme edge of the universe, through the realm of young galaxies, out past the Quasars to the cosmic background radiation.

Hayden planetarium has been the center of the development of the Virtual Universe, a fully interactive, immersion software that allows one to observe the universe from any point within it. It is used to power many planetariums across the nation as well as lap tops or PCs.

Carter was both entertaining and highly informative as we made our way back in time to the earliest beginnings of our universe. Coupled with the amazing skill of Shawn Rush as our navigator/pilot for the Fels planetarium and the result was a rare treat for out members. Just the fact that we have one of the originators of this virtual programming as our personal tour guide gives me great pride that we can bring these experiences to society members.



Carter Emmart, Ph.D Director of Astrovisualization Rose Center of Earth and Space American Museum of Natural History



Virtual Universe : www.nbcnews.com

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November Meeting Preview

We have not done this for a few years now, so we thought this might be the year to address holiday gift ideas. You may be interested in what type of gift you can give that budding astronomer in your family, or that friend or colleague that has astronomical interests. This meeting might generate some ideas for your own personal wish list this holiday season.

We have chosen members that actively observe with us, and those that have demonstrated competence in the field to share with us some useful gift items you may want to consider this holiday season. To date those participating are Denise Vacca, Ted Williams, Dave Walker, Renee Stein, Mitch Berger, Mike Mountjoy, Joe Stieber, Alan Daroff, Al Ryan, Eric Carter, Ted Coats. and Fern Culhane. Presentations are three minutes each so we can preview a variety of gift ideas. Details about the items are posted on the members site.

If you have an item you think would fit the evening, contact us on our members site and make a suggestion, we still have a few spaces that we can include a few more good gift ideas





October Meeting Review

We set the bar high in September and reached it again in October. Jerry Lodriguss (a previous guest speaker) shared with us dozens of 'ohhh's and ahhhh's as he previewed many of his best astrophotographs. Jerry has a grand reputation in the astronomical community as a leading astro-photographer. His work is published at Astronomy Picture of the Day, Sky and Telescope and Astronomy magazine.

As Derrick Pitts added in his introduction, "Jerry is probably the most reputable astro-photographer in the area." During his presentation he displayed an entire array of intriguing sky phenomena, open star clusters, globular clusters, nebula, galaxies and Jerry's own favorites the dark nebula. The sharing of his talent for "Catching the Light" created an evening of wonder for those attending.

If you are interested in the new "Astrophotographers guide to the Deep Sky", which contains many of the pictures we observed at the meeting, it can be purchased on-line, at several web locations.



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Ever So Simple ~Ted Williams

Years of sky-gazing has resulted in finding hundreds of deep space objects including globular clusters, open clusters, nebulae, and galaxies. The thrill of finding them seems at times to be greater than the view itself which can often be only a small fuzzy wisp. Showing them to our visitors at public star events was what I thought would bring the excitement of astronomy to the visiting public.

I now realize after this summer, that sometimes the

simplest of views can be the most captivating. On our summer star watch with Willingboro Astronomical Society, the motion of the moon was quite evident to those that attended. When the first visitors arrived at early twilight we were watching Mars with our telescopes which was to the upper left of the moon (about 4 degrees of separation) at the 10:00 position, top of the moon being 12:00, which the terminator was aligned with that night being very close to first quarter. Visitors were asked to stop by later in the evening when it was darker for some deep sky observing.

Within about 20 minutes, the motion of the moon was very evident. The next visitors could

see Mars at the 11:00 position closer to alignment with the moon's terminator line. We had just witnessed the moon's own motion against the backdrop of Mars and the stars. It gave the appearance that Mars was moving to the West (yes both the moon and Mars are moving to the West as a result of Earths Rotation and exhibit daily motion of the celestial sphere as do the stars.)

A little later in the evening we could see what looked like Mars directly in alignment above moon (12:00 position) with the terminator shadow acting as a straight edge to compare with. What we were actually witnessing was the motion of the moon orbiting the earth, with Mars as a red marker to compare that motion over time.

By the time the moon was setting, Mars appeared to be in the lead, reaching the horizon before the moon did. Again, that shifting ahead of the moon was due to the moons orbital motion eastward over our few hours of observation. Visitors that returned were equally excited to witness the motion and the change in apparent positions from their earlier visit.

Not only did I find it very cool to point this out to our

visitors that evening, but other veteran observers found it just as exciting to witness our moon in motion with Mars as a reference. What made it exceptionally easy was the straight edge of the terminator that night making a reference line of sorts to compare the motion of the moon to Mars.

On another observing night a few weeks later, Joe Stieber pointed out comet Jacques to us as it slowly moved through the southern portion of the constellation of King Cepheus. Some nearby stars allowed us to imagine lines and triangles

for reference to compare the With careful comet's motion. observation you could actually see the motion of the comet against the backdrop of the stars. Its motion seemed to replicate that of an hour hand moving on a clock. Only when the hour hand passes a number on the face of the clock (such as 1:00) can one more easily detect the motion of the hour hand. The same was happening with the comet. The motion was undetectable when first observing it, but as it passed some star alignments we could imagine, you could detect its motion.

A feeling of awe enveloped me that night. Joe wondered if observers from long ago in our

past who detected comets with even more apparent motion also felt that awe. I concurred that they must have, and it may have been the reason many of them spent their lives trying to discover these moving ghosts through our solar system. The thrill of seeing the cosmos in motion lets one appreciate how these objects change over time.

I totally get the idea of showing our visiting public some of the coolest deep space objects on view for a particular night. I have been doing it for years. Now consider that detecting motion in the cosmos as we are observing it, no matter how simple, either with the naked eye or by telescope or binoculars, is a thrill even to the seasoned observer. Consider catching some of these motions when you are observing the night sky. They may be subtle, they may require persistence and patience to see their motion, but with the understanding of what you are observing, they are thrilling none the less.

Please consider joining us for a public star watch and see these exciting observations yourself. You don't need to be a seasoned observer or have any telescope equipment. Just your enthusiasm to gaze at the night sky.



Comet Siting Review

~Joe Stieber

Here's a snapshot of Comet C/2014 E2 (Jacques) that I took on Tuesday, August 26, 2014, at 10:33 pm EDT from Coyle Field in the NJ Pines. I used a Canon 6D digital SLR camera with a Canon 100 mm f/2.8L macro lens (then magnified by cropping to about one-quarter of its original size). It was exposed 6 seconds at f/4, ISO 6400. More at http:// sjastro.org/ (scroll down).

It was a rare week of good weather in the days after new moon with mostly clear skies, mild to cool temperatures and no bugs. I went observing at Coyle Field on three nights (Monday, Tuesday and Thursday), then Atsion on Friday night (I was too tired for a trip to Belleplain for the SJAC public sky watch).

Comet Jacques was a highlight on all of those nights; in particular, its greenish color was faintly evident in my 12.5-inch scope, but what was really amazing was to watch it's rapid movement against the background stars. Positional changes were evident in less than 5 minutes. Jacques was at perigee on Thursday and was moving about 3.5 degrees per day.

Besides lots of galaxies, clusters and nebulae that were observed, the other highlight was seeing all 8.5 planets overnight on Thursday. I was able to nab Mercury after sunset, Saturn & Mars were obvious naked eye objects as darkness fell, while Jupiter & Venus were bright in the morning twilight (back at home). In between, Neptune & Uranus were easy binocular objects at Coyle. The earth, of course, was obvious, but the tricky one was Pluto. Besides the enduring question of its planethood, it was tough to see in the 12.5-inch scope. The respective star field near the Teaspoon asterism in Sagittarius was straightforward to find, but I only caught fleeting glimpses of Pluto with averted vision -- not a solid positive identification



Vice President's Message ~Ted Williams

With the passing of Dr. Friedman, I felt as acting Vice President it becomes my duty to post what is normally the president's message. I find it odd that I am doing this task because I don't feel myself remarkable or knowledgeable enough to offer insight to others. So rather of thinking of this column as guiding words, one might think I am sharing observations with some personal opinion added in. This might better describe what I can accomplish.

It is usually at this time when I confer with Milt to find our direction for the upcoming academic year. In the past Milt might advise me on how we can improve ourselves, or how we might better meet our member's needs. As we begin our 2014/15 academic year, I feel if we can repeat last year's accomplishments, we will again have a remarkable year.

At our September meeting I tried to answer the question "Why are we here?" I started with a review of last year's activities using our website. Last year we worked toward a common goal of supporting "City Wide Telescope Night" during the Philadelphia Science Festival. Through the year we met monthly to share astronomical lessons, speakers and public star watching events we attended with the Willingboro Astronomical Society. We offered some local opportunities to gather and practice our telescope skills at some local public events and we culminated the year with a trip to Cherry Springs State Park, the astronomy capital of the east coast. We met and trained some young high school women with Girls Incorporated and had them assist us presenting astronomy to the public at the Science Carnival on the Parkway.

I never dreamed when I started with the Rittenhouse Astronomical Society that it would be such an enriching experience. Developing not only my own astronomical skills but additionally assisting those of our members, and also those girls working with us on the Parkway has been a blast! I guess I can really only answer why I am here. I am here because I get turned on sharing the knowledge we have developed about the cosmos that we live in. I enjoy sharing those moments of discovery with members and the public when they realize something they have long been wondering about. I'm also here because I really like the view. I've always been the type who has my eyes out the window watching the world go by when I travel, same goes for our Universe. I find the view to be ever fascinating. What I've learned most is that one's observational skills can always be improved. I thought I had seen most all of the universe years back, but looking again and again with

increased knowledge and skill has proven to me that there is always more to see.

So ... are you a member or debating to become one? I once read that getting active in an organization that meets regularly with a purpose that helps the better good of our society is akin to giving oneself the mental benefit similar to getting a \$15,000 pay increase. I've never experienced such a thrill associated with that type of salary raise, but I can say I have really enjoyed my time so far with the Rittenhouse Astronomical Society. As I've said at meetings before, if you are looking for what you will get out of our society, what your membership dollars will do to benefit yourself, please save those dollars and do not feel obligated to join, you are more than welcome to attend monthly. If you are looking to support a society that promotes astronomy education, gives back to our community and welcomes all levels of astronomers (posers, novice, amateur, professional, uberprofessional) and offers them all opportunity's to learn by participation, you might have found the group to support with your membership fee.



So That's Who Bode Was... ~Denise Vacca

In the last newsletter I wrote about all the wonderful objects we observed in the night skies at Cherry Springs. One of them was M81-the galaxy known as Bode's galaxy.



MC 81

I had no idea who Bode was so I decided to look into it and found out that Johann Elert Bode was a German astronomer born in the 1700s. Even with a serious eye condition limiting his sight, Bode discovered the Galaxy bearing his name in 1774. Five years later it would be included in the Messier catalog as M81. Bode also came up with the concept of the Titius-Bode law which, simply stated, hypothesizes that a planet's orbit is a function of its sequence from it's host star.

Bode also has a comet and an asteroid named after him and was the gentleman credited who gave the planet Uranus its name.

Apparently, William Herschel wanted to name the planet after George III but Bode thought since Saturn was named after the father of Jupiter, Uranus should be named after father of Saturn. Makes perfect sense to me. Learn something new every day.

Lunar Eclipse Report 10-8-2014 JOE RAO, Hayden Planetarium

A rapidly moving cold front that dropped 0.61-inch of rain in the after-midnight hours here in Putnam Valley, NY, also served as an "atmospheric whisk broom" and pushed the overnight cloudy/showery conditions to the east and allowed clearing skies to arrive just in time to allow views of this morning's total lunar eclipse.

Upon heading outside at 5:10 a.m. EDT -- five minutes before first contact -- the sky was approximately 80% cloud covered. Still, looking off toward the west-northwest, the full moon was periodically visible through small holes/ gaps in the cloud cover. Visually with both the naked-eye and even more so with 7 x 35 binoculars, the upper portion of the moon's disk was noticeably shaded by the grayish penumbral shadow. During the course of the next hour, the intervals of getting a clear view of the moon were slowly increasing, yet still at late as 6 o'clock the ratio of clear versus clouded views was on the order of about 1:3; that is, for every minute that I had a view of the moon in a perfectly clear space, I had to endure about 2 or 3 minutes of it being hidden behind a mass of dark, albeit fast-moving clouds.

One thing was plainly obvious when more than half the moon had slipped into the umbra: this was evolving into a brighter-than-average eclipse. In fact, when about 60% of the moon had made its way into the umbra, the eclipsed portion of the moon began to faintly light up with a ruddy hue . . . similar to when the coils on an electric oven or a toaster begin to glow a faint red. With the passage of time, the red color became more and more pronounced.

Interestingly, from my location, there was a sharp line of clearing about 10-degrees above the west-northwest horizon. And at around 6:15 a.m., as the moon sank lower in the sky, it ultimately moved out of the area of mottled cloudiness and into this zone of perfectly clear sky. So for the next 20 minutes -- until the moon disappeared behind some nearby mountains -- I had as good a view as I could possibly have hoped for. I actually cursed myself for not setting up my 10.1-inch Dob or even my 25 x 100 binoculars, but from the way the sky had looked just an hour before it didn't seem worth the effort. So I relied solely on my eyes and my trusty 7 x 35's.

That 20-minutes of perfectly clear sky gave me an opportunity to see my clearest view of a totally eclipsed moon in 6-years (going back to February 2008). In terms of judging the color and brightness of this eclipse, I had the luxury of being able to mentally compare this event with the 13 other totalities that I have observed over nearly 50-years (vikes!). My very first dates back to Dec.18, 1964. I call that the "Mr. Magoo Eclipse" because that same night, NBC-TV was showing "Mr. Magoo's Christmas Carol" -- a big television event back then, which was being broadcast at the same time as the eclipse. So I kept running backand-forth from watching the eclipse in clear, but very cold conditions and using my grandfather's binoculars that he used for deer hunting, to running back inside to warm-up and watch some of the Mr. Magoo Christmas show. I can hardly believe that was half-a-century ago.

But I digress . . .

In terms of brightness, to try and make an exact estimate of this morning's eclipse was tricky because of the moon's low altitude and the brightening morning twilight. About five minutes before totality in the 7 x 35's, a gorgeous "Japanese Lantern Effect" of the now strikingly three-



dimensional moon was evident low in the west-northwest sky: a pale coppery color enveloped much of the lunar disk, accompanied along its right-hand limb by a bright pearly edge.

For a Danjon estimate, I judged this eclipse conservatively at L = 2.5. I suspect that if the moon were higher, and the sky darker, my estimate might have been brighter.

At totality's onset at 6:25 a.m., the moon looked like an eerie, reddish-orange, mottled softball, enlarged by the moon illusion, hanging low in the west-northwest sky.

As an editorial comment, I think it's a real shame that Sky & Telescope no longer asks readers to make Danjon estimates of totality... we could really get a better handle as to how bright an event like this was if a simple explanation of how to make a Danjon estimate had been given in their October issue. Back in the day, scores of Danjon estimates were received by the magazine and were carefully analyzed and averaged out by former editors Joseph Ashbrook and Leif Robinson.

There is also another scale proposed in 1924 by Willard J. Fisher that is based on the visibility of surface features inside the umbral shadow which runs from 0 to 2. I gave this eclipse a 2; Fisher's brightest class: "If the naked eye sees spots on the eclipsed moon, or if the maria or other detail can be readily seen in binoculars."

Through reversed binoculars (viewing through the objective lens to reduce the moon's image) I obtained a magnitude of the totally eclipsed moon at roughly -2. However... this was against a brightening cobalt blue sky, not completely dark, so there is a question as to whether the moon might have actually been somewhat brighter. I did

not make any allowance for atmospheric extinction.

At 6:30 sharp, the cannon was fired from nearby West Point, followed by the crowing of a rooster from a local farm down the road. I saw the fading moon disappear behind the mountains 5 minutes later, ending what turned out to be a very interesting and entertaining morning.



Eclipse: Credit Joe Stieber

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Antares Explosion 10/28/2014 It's Not Rocket Science (yes, actually it is) ~David Walker

10/27/2014

- Launch Scheduled 18:42 EDT Scrubbed due to boat in safety range
- On Tuesday, 27 October, 2014 the scheduled launch of an Antares rocket bearing a Cygnus capsule bound for the International Space Station (ISS) was aborted due to a private sailboat inside the range safety perimeter. This was to be the third Antares launch to the ISS, and the first night launch of the vehicle from Mid-Atlantic

10/28/2014

- Regional Spaceport (MARS). Launches from MARS are visible from the Philadelphia area and a night launch is a special spectacle
- Launch Commenced 18:22 EDT Shortly after lifting off of pad LP-0A the vehicle stopped accelerating upward and exploded, crashing to the ground near the pad.
- At the time of writing the cause of the failure is unknown.

The Antares Launch Vehicle (LV) is a commercial launch system from Orbital Science, based in Dulles, VA. The Antares consists normally of two stages. The first is fueled with Kerosene (RP-1) and Liquid Oxygen (LOX) for its two Aerojet AJ-26 engines. The second stage is Castor solid propellant booster.

The Castor stage has been successfully flown on previous Antares missions and a variant is used as the booster by the Japanese Space Agency JAXA.

The AJ-26 has a more interesting provenance. Back in the 1960's when the mighty F1 engine was developed for the Saturn V moon rocket the Soviet Union were developing a competing vehicle called the N1. The S-V used five of the giant F1 engines, a balance between redundancy and reliability, the N1 was designed around 30 NK-15 engines; the complexity and number of possible points of failure contributed to demise of the N1. The NK-15 evolved into the NK-33 which were put into storage after the end of the N1 project. 36 of the 150 surviving engines were purchased by Aerojet in the 1990s. Aerojet modified the NK-33 into the AJ-26 and refined the engine to meet its uses. The NK-33/AJ-26 engines are some of the most powerful engines for their weight ever manufactured. There is some speculation that the engines were the cause of the launch failure and subsequent explosion but no data or evidence has been confirmed.

The Antares was carrying the Cygnus Capsule "SS Deke Slayton" for mission ORB-3.

The "SS Deke Slayton" was the heaviest Cygnus capsule to date, carrying 5,200 kg compared to the 1,494 kg of the previous mission.

Aboard were supplies for the ISS as well as 26 Flock-1d nano-satellites, an Arkyd-3 CubeSat, and eighteen student experiments.



Let's hope for no more repeats of this event!

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