



the Skyscraper

vol. 41 no. 4
April 2014

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

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Friday, April 4, 7pm at Seagrave Memorial Observatory

Contact Kathy Siok (kathys5@cox.net) to report what dessert you plan to bring. (Beverages and paper goods will be provided) • Bring your Astronomical Photos to Display



Stellar Sounds for Human Ears by Katrien Kolenberg

“Cosmic harmony”, “the music of the spheres”, it’s a concept that has resonated with human civilizations on Earth since ancient times.

Now we know that this “cosmic harmony” bears some truth, also in a scientific way of looking at our universe. Many of the stars that we observe in our night sky ring with sound, like giant musical instruments. The

study of this stellar music is called asteroseismology, and it allows us to probe the depths of our universe in much more detail than ever previously thought possible.

I will present my field of research and its applications, and illustrate it with some soundbites of actual stars.

Katrien Kolenberg was born in Belgium. She studied Physics at the University of Leuven, followed by a PhD in astrophysics. Her research took her first to Vienna, Austria, where she worked at the Astronomical Institute for several years. She currently works at the Harvard-Smithsonian Center for Astrophysics, in Cambridge MA, as a Marie Curie Fellow. The main focus of her research lies in stellar astrophysics, more specifically asteroseismology.

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President's Message

Ed Haskell

This is the twenty fourth and last President's Letter that I have written. Presumably my term will expire with the adjournment of the April Meeting. I don't mean to tergiversate but my term actually is of indefinite duration, "elected ... for a term of one year or until their successors are elected and take office." However I don't expect that to be a problem. The Nominating Committee has recruited an excellent candidate for President (Bob Horton) who I am confident will pick up the mantle as soon as I lay it down.

I am grateful to you for your confidence in me and your support for the past two years, without which I could not have undertaken the fundamental changes that have been wrought in many aspects of the Society. During the nearly three years I served as Secretary before you elected me President I observed a number of areas which could be addressed to the benefit of the Society. These areas fall into one of two categories: improving both the value, and the perception of value, of membership in Skyscrapers, Inc.; and managing the Society's business in a manner congruent with accepted practices of a corporation, which

indeed Skyscrapers is.

Many of the steps taken actually address both of these categories simultaneously. The format of meetings was changed to focus on matters astronomical and business was conducted at Board meetings by the people you elected to do that. The time freed up was filled by improved programs of broader appeal including more member presentations of high quality.

A strong focus on member activities produced well attended members-only observing sessions, technical symposia on several topics, and a major effort to improve access to the instruments. These steps have paid off with a strong improvement in the rate of new memberships and the enjoyment of existing members.

The Board has been able to focus on items of real and enduring value to the Society now that business is being conducted in a businesslike manner. The number and quality of initiatives is much higher under this new approach than was the case previously. It has also been possible to take in stride those unexpected challenges that have arisen and find satisfactory solutions where the prior approach to management would have hamstrung those efforts.

You have been faithfully served by dedicated elected officials (both the Board and the Trustees) who have all worked very well together with no agenda except a shared objective of making Skyscrapers better. You have also served each other well by volunteering for star parties, AstroAssembly support, grounds maintenance, etc. It has been a pleasure to be associated with such a fine group of people.

Thanks for all you do for Skyscrapers.

Phases of the Moon

First Quarter Moon

April 7 08:31

Full Fish Moon

April 15 07:42

Last Quarter Moon

April 22 07:52

New Moon

April 29 06:14

Astronomy Day

Saturday, May 10

To participate or help organize Skyscrapers' celebration of Astronomy Day 2014, contact Conrad Cardano cardanoc@verizon.net



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

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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 **April 18** 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.



Friday, April 11

IBEX Comes to the URI Planetarium

University of Rhode Island Planetarium
Kingston Campus
Upper College Road

Friday, April 11th, 2014
6:00 or 7:00 P.M.

Contact: Francine Jackson 401-527-5558

Much has been written as to where the solar system ends. Here, right above Earth, is a space craft with a mission as to where the influence of the Sun does just that. What has it learned? Is there any other proof as to how far the Sun is a factor within our galaxy. Come to the URI

Planetarium and learn the extent of our neighborhood.

IBEX will be preceded by a short program on light pollution and its effects on the Earth, and followed by an introduction to the Skies over our Heads. Admission, to benefit the URI Planetarium Fund, is \$5.00, and will include an 8X10 photo of the IBEX space craft.

The University of Rhode Island Planetarium is located on the URI campus, on Upper College Road, across from the Art Center. It is available for school and other group presentations. For further information, please call Francine Jackson at 401-527-5558.



Saturday & Sunday, April 12 & 13

Northeast Astronomy Forum & Telescope Show

Hosted by the Rockland Astronomy Club in Suffern, New York, the 23rd annual NEAF is the world's largest astronomy trade show with over 100 vendors, lectures

throughout the day and solar observing star party. <http://rocklandastronomy.com/neaf/>



Friday & Saturday, April 25 & 26

Meridian Project Premieres Multimedia Performance and Lecture Series Inspired By Astrophysics and Cosmology

Four performances at the Museum of Natural History and Planetarium at Roger Williams Park

Mar. 25, 2014 / Providence, RI — Meridian Project is pleased to announce the premiere of DARK MATTER, a multimedia performance exploring cutting edge research in dark matter detection. Dr. Jeremy Chapman, a recent graduate of Brown University's Particle Astrophysics Group, will discuss the latest developments in dark matter research in combination with new music written and performed by Joshua Lantzy, Jacob Richman, Jamie Topper, and Kirsten Volness, and new video/projections by Caroline Doherty and Jacob Richman complemented by the planetarium's Zeiss star projector. Performances take place April 25 and 26, 2014 at 2 pm and 7 pm (doors at 6:30 pm) at the Cormack Planetarium at the Museum of Natural History, Roger Williams Park, 1000 Elmwood Av-

enue, Providence, RI, and are suitable for ages 4 and up (children under age 4 are not permitted in the planetarium). Tickets are \$3 cash at the door and additional donations will be accepted in support of the artists; first come, first served.

The Meridian Project series will continue on May 24, 2014 with COMETS & METEOR SHOWERS, outdoors under the falling stars as the comet LINEAR passes Earth. Further details will be available at www.meridian-project.com. These performances are made possible in part by a grant from the Rhode Island State Council on the Arts, through an appropriation by the Rhode Island General Assembly and a grant from the National Endowment for the Arts.

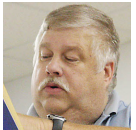
Calendar Listing:

Meridian Project presents
DARK MATTER
April 25 and 26, 2014
2 pm and 7 pm (doors 6:30)
Museum of Natural History and Planetarium
Roger Williams Park, 1000 Elmwood Avenue, Providence, RI
Tickets: \$3 | Donations accepted in support of the artists
Cash only at the door; first come, first served
www.meridian-project.com

Bob Horton, longtime Skyscrapers member, took this beautiful five hour time-lapse of the November 8, 2003 total lunar eclipse on a single frame of film.



A Guide to the April 15, 2014 Total Lunar Eclipse



Dave Huestis

Is this time of the year a little too “taxing” for everyone? Well, I’ve got the perfect astronomical event to help you relax. On April 15, stargazers here in Southern New England will have an opportunity to observe a total lunar eclipse. Though the Moon will set before the eclipse completes, we will be able to watch this celestial event from the beginning until just after the outgoing partial phase ends.

For some of you this lunar eclipse will be challenging to observe. Not technically challenging mind you – temporally so. It occurs on a Tuesday morning between midnight and dawn. A workday for most. A schoolday for many others. However, if the weather cooperates, you can catch some shut eye during the previous evening, and then set an alarm clock for the specific phases of the eclipse you’d like to observe. A full schedule of the eclipse can be found at the conclusion of this column. Use it to

plan out your morning.

While I encourage more dedicated Moon observers to watch the eclipse from start to finish, many casual stargazers may consider that decision sheer lunacy! Why not at least try to observe all of totality? This guide will provide all the details you’ll need to understand and enjoy the event. All times are EDT (Eastern Daylight Time), also known as DST (Daylight Saving Time).

A total lunar eclipse occurs at Full Moon when the Sun, Earth and Moon are in a straight line. With the Earth positioned in the middle of this celestial configuration, its shadow is projected onto the lunar surface.

The eclipse technically begins at 12:53:37 a.m. when the Moon, nestled among the stars of Virgo, slides eastward into the Earth’s light penumbral shadow. This dim initial phase is undetectable. Only as the Moon slides deeper into the penumbral

shadow will a keen-eyed observer see a subtle shading of the lunar surface from left to right. It is just prior to the Moon entering the Earth’s dark umbral shadow that one notices that the moonlight looks somewhat subdued.

When the Moon first encounters the dark umbral shadow at 1:58:19 a.m., the partial phase of the eclipse begins. For one hour and eight minutes the Moon will move deeper and deeper into the dark shadow, generally from left to right. Then at 3:06:47 a.m. the Moon will be completely immersed in the Earth’s dark umbral shadow and totality begins. Will the Moon completely disappear from the sky during totality? It all depends upon how much dust is in the Earth’s atmosphere at eclipse time. We’ll know by mid-totality at around 3:45:40 a.m. Totality will last until 4:24:35 a.m. for a total duration of one hour and eighteen minutes.

During totality please take careful note of the various hues of color on the lunar surface. Enhance your view with binoculars or a small telescope if you have them. The lunar landscape often looks ashen during totality, with subtle copper, orange or red tones scattered about. And the colors often change as totality progresses. So watch carefully. It is truly a beautiful sight to observe.

In addition, throughout the eclipse carefully scan the limb (edge) of the lunar disk using a telescope. This region of space is star-rich, so you'll notice stars being covered on the left limb and uncovered on the right limb as the Moon moves eastward through the star fields.

Totality ends at 4:24:35 a.m. when the Moon begins to leave the dark shadow and sunlight returns to its surface. For one hour and eight minutes the partial phase will continue until the entire Moon is completely illuminated once again at 5:33:04 a.m. For a while the Moon's light will still look somewhat subdued as the Moon will remain within the light penumbral shadow until 6:37:37 a.m. when the eclipse ends. Usually in a dark sky you would be able to detect this shadow soon after the partial phase completes. However, Sun rise is at approximately 6:05 a.m., so bright twilight will most definitely spoil the view. Also, the Moon sets locally around 6:12 a.m., and unless you have an unobstructed west-southwestern horizon you'll lose sight of the Moon before then anyway.

Throughout the eclipse I want you to notice the bright object below the Moon. It

is Virgo's brightest star Spica. Also, above and to the right about 7.5 degrees away you'll see reddish Mars. Before the eclipse begins only a few bright stars will be seen since the Moon is full. As the eclipse progresses and the sky becomes darker, watch as the fainter stars emerge into visibility. Afterwards the dimmer stars will "disappear" when the lunar illumination returns.

I hope the weather will cooperate on the morning of April 15 for stargazers of every interest level to take advantage of the magnificent circumstances which produce the beauty of a total lunar eclipse. If you miss this one for any reason we will have another total lunar eclipse opportunity on October 8. However, once again that one will also occur during the early morning hours. And regrettably, we will see only the partial phase before totality and only 31 minutes of totality here in Rhode Island before the Moon sets.

Below is a quick glance chart of the

important phases of the April 15 total lunar eclipse. All times are Eastern Daylight Time.

Good luck, keep your eyes to the skies, and many happy returns!

In conclusion, please remember that the local observatories are open for your viewing pleasure. Visit their respective websites for public observing schedules. Seagrave Memorial Observatory (<http://www.theskyscrapers.org>) in North Scituate is open every clear Saturday night. Ladd Observatory (<http://www.brown.edu/Departments/Physics/Ladd/>) in Providence is open every Tuesday night. Frosty Drew Observatory (<http://www.frostydrew.org/>) in Charlestown is open every clear Friday night.

Seagrave and Ladd will not be open for this total lunar eclipse. Frosty Drew plans on opening for the entire event. See their website for updates.



The Date of Easter

Francine Jackson

Happy Easter! Now, why is an astronomy newsletter sending you Easter wishes? The easy answer is that the whole several weeks beginning with Ash Wednesday, culminating with Easter Sunday, is based on the calendar.

Easter is always celebrated on the first Sunday after the first Full Moon after the first day of spring. But, there happened to be a problem with that day in the 16th century. Apparently, in 325, the First Council of Nicaea determined that Easter be associated with both the Moon and the start of spring; but, in the late 1500s, that association was occurring early in the month of March.

Julius Caesar introduced a calendar in 46 B.C. that contained 365 days for three years, and a 366th every fourth, giving an average year 365.25 days. Unfortunately, the Sun isn't this cooperative: Its actual time line is several minutes shorter than that, resulting in a gain of about three days' time every four centuries. As a result of that, by 1582, spring was starting the second week of March, closer to the 10th.

To revert back to the proper designated time of Easter, in 1582, October 10th was immediately followed by October 21st. Also, the leap years were changed slightly, in that an extra day would not occur on

hundred years not divisible by 400. As an example, 2000 was a leap year; 2100 will not be. This restored March 21st as the first day of spring, and placed Easter where it belonged.

You might imagine, this did not fare well for the masses. Many people lost their birthdays that year, and landlords complained of losing rent. It also only began in the countries that treated the Pope as a major leader. Therefore, there were many parts of the world that stalled in this calendar change, including Great Britain and America, which waited until 1752, when the calendar then had to be revised by 11 days. This actually became a "Believe It or Not" section, where our first president, George Washington, was not born on the day we celebrate, February 22nd, but February 11th. The last country to adapt this calendar was Greece, which did so in 1923.

This year, the first Full Moon after the vernal equinox – the first day of spring – is Tuesday, April 15th, making Easter Sunday, April 20th. However, fortunately for us, in addition to celebrating this annual event, we have something else to look forward to, as this Full Moon is also bringing with it the ability to witness a total lunar eclipse. Happy Easter and Eclipse Watching to all.

Moon enters penumbra (eclipse begins - not detectable)	12:53:37 a.m.
Moon enters umbra (partial begins)	1:58:19 a.m.
Moon completely within umbra (totality begins)	3:06:47 a.m.
Moon nearest to the center of the Earth's umbral shadow (mid-totality)	3:45:40 a.m.
Moon begins to leaves umbra (totality ends, partial begins)	4:24:35 a.m.
Moon completely leaves umbra (partial ends, penumbral begins)	5:33:04 a.m.
Moon leaves penumbra (eclipse ends - not detectable)	6:37:37 a.m.



First Quarter Moon
March 8, 2014
by Tom Thibault

FIGURE 1

Total Lunar Eclipse of 2014 Apr 15

Ecliptic Conjunction = 07:43:24.8 TD (= 07:42:17.6 UT)
 Greatest Eclipse = 07:46:47.0 TD (= 07:45:39.8 UT)

Penumbral Magnitude = 2.3183 P. Radius = 1.2267° Gamma = -0.3017
 Umbral Magnitude = 1.2907 U. Radius = 0.6952° Axis = 0.2863°

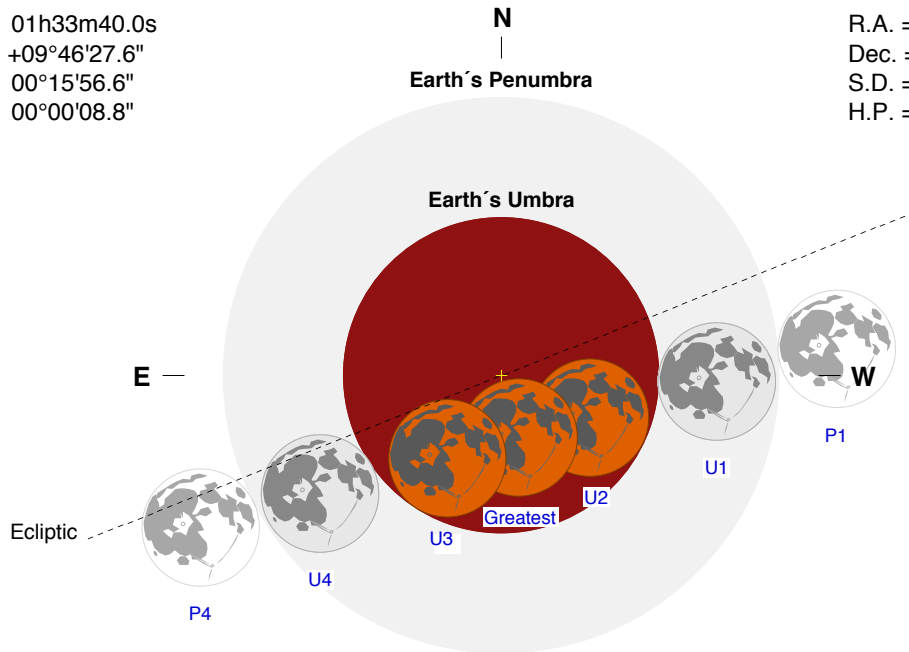
Saros Series = 122 Member = 56 of 75

Sun at Greatest Eclipse
 (Geocentric Coordinates)

R.A. = 01h33m40.0s
 Dec. = +09°46'27.6"
 S.D. = 00°15'56.6"
 H.P. = 00°00'08.8"

Moon at Greatest Eclipse
 (Geocentric Coordinates)

R.A. = 13h33m21.1s
 Dec. = -10°02'59.8"
 S.D. = 00°15'30.9"
 H.P. = 00°56'56.4"



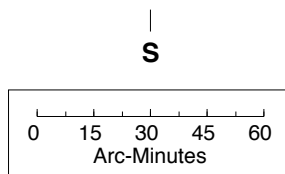
Eclipse Durations

Penumbral = 05h44m00s
 Umbral = 03h34m44s
 Total = 01h17m48s

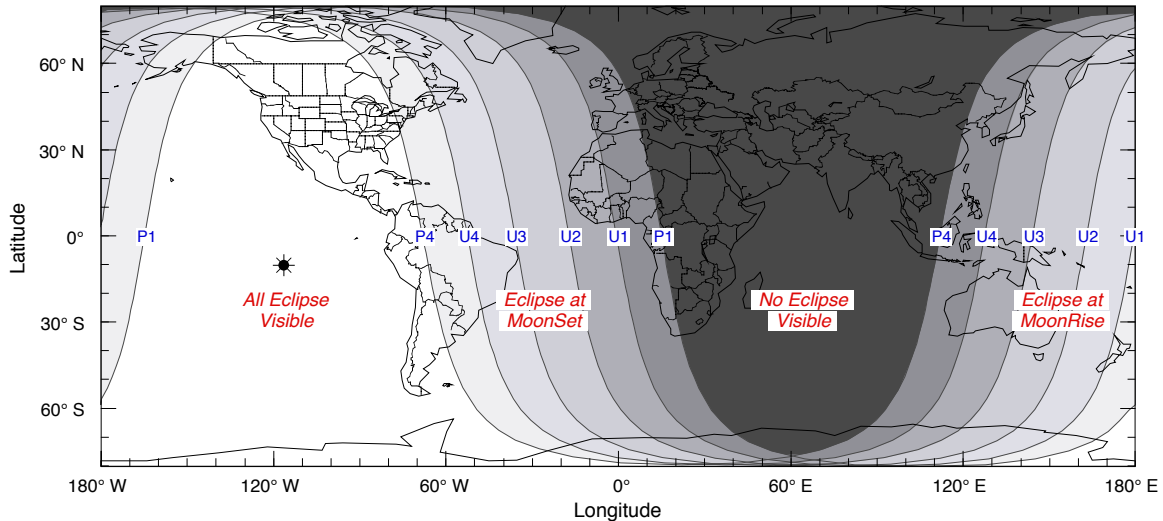
$\Delta T = 67$ s
 Rule = CdT (Danjon)
 Eph. = VSOP87/ELP2000-85

Eclipse Contacts

P1 = 04:53:37 UT
 U1 = 05:58:19 UT
 U2 = 07:06:47 UT
 U3 = 08:24:35 UT
 U4 = 09:33:04 UT
 P4 = 10:37:37 UT



F. Espenak, NASA's GSFC
eclipse.gsfc.nasa.gov/eclipse.html



The Red Planet, a Dwarf Planet, and a Giant Asteroid See the Three Largest Worlds Between Earth & Jupiter



Jim Hendrickson

Mars is at opposition this month, and with nothing more than a pair of binoculars and a clear sky, you can spot dwarf planet Ceres and the giant asteroid Vesta among the stars in Virgo.

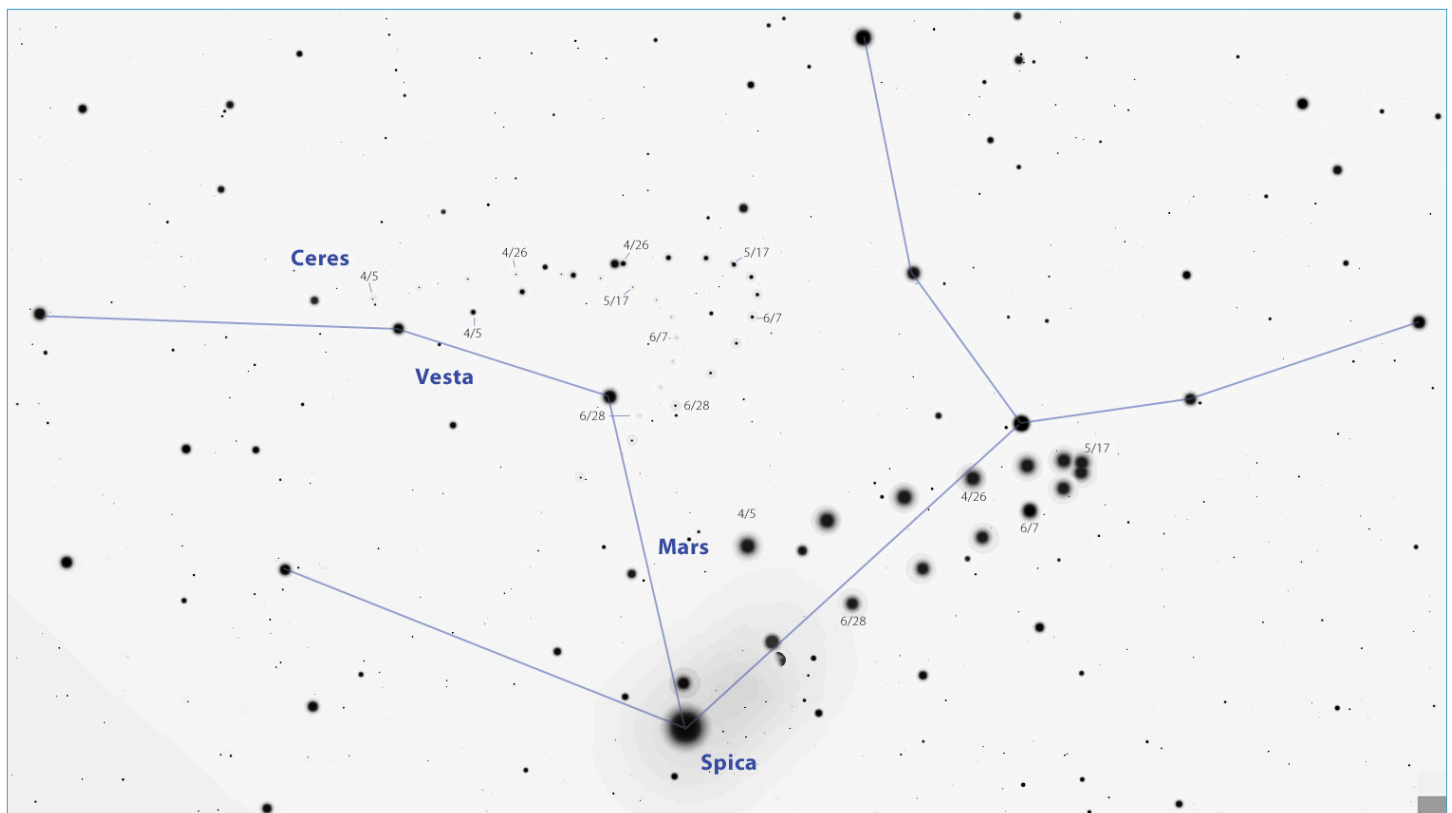
One of the most notable changes to the evening sky during April is the accelerated pace at which the previous season's constellations become consumed by twilight as the Sun climbs higher along the ecliptic this time of year. Orion leans towards the west, and his belt becomes parallel to the horizon. Taurus takes a nosedive and the Pleiades put on their last good appearance. The stars marking the easternmost side of the Winter Hexagon (Procyon, Pollux, Castor, and Capella) form a long horizontal chev-

ron which brackets the last vestiges of the winter sky sinking lower into the west with each passing night. Jupiter, which has taken residence among the twins of Gemini over much of the past year, remains the brightest beacon in the early evening sky. But as the hour becomes late, and the night air becomes still with a chorus of peepfrogs in a distant pond, we turn our gaze towards the spring sky rising in the southeast. Leo is high overhead, the Beehive cluster and Coma Berenices are prominently positioned for binocular observing (and naked-eye if your skies are dark enough), and behind you the Big Dipper's bowl begins to pour its stardust straight down onto Polaris, the North Star. At this hour we're looking out of the Milky Way's north pole, which is why the spring sky seems relatively sparse. This is, among other things, prime galaxy-hunting season. But for now we will focus our observations much closer to home.

Facing southeast, the familiar star patterns of Virgo and Corvus come into view.

Spica, the brightest star in Virgo, has a visitor this spring. Ruddy Mars is making its best appearance since 2012 in our skies this month as it reaches opposition on April 9. Shining at a brilliant magnitude -1.4, Mars contrasts nicely with the magnitude 1.0 blue giant (spectral class B) Spica just below it. Because we are closest to Mars in April, and Earth is moving along in its orbit faster--and therefore overtaking--Mars, it is worth noting how the position of Mars changes with respect to Spica each night you observe.

Given that Mars is a rather small planet at roughly half the size of Earth, and that we are only close to it for a few weeks every two years, this is a long-awaited yet brief opportunity that planetary observers are eager to bring their telescopes out for. There are many things that make Mars a compelling and captivating object to observe, and an entire newsletter could be devoted to the topic of Mars observation, but for this tour we'll leave that to other sources.



This finder chart shows the positions of Mars, Ceres and Vesta plotted every 7 days (each plot is for Saturday night) beginning on April 5 and continuing through July 12. The Moon is shown on July 5, when a photo-worthy conjunction occurs (see inset diagram).

Object	Physical Properties					Visual Properties		
	Semimajor Axis (AU)	Orbital Period (years)	Synodic Period (months)	Diameter (x Earth)	Diameter (x Moon)	Apparent Diameter (April 15)	Apparent Magnitude (April 15)	Date of Opposition
Earth	1.000	1.000	-	1.000	3.665	180°	-	-
Mars	1.524	1.881	25.6	0.532	1.949	15.2"	-1.4	April 8
Vesta	2.362	3.630	16.6	0.041	0.153	0.6"	5.7	April 13
Ceres	2.766	4.600	15.3	0.075	0.274	0.8"	6.8	April 15
Jupiter	5.203	11.863	13.1	10.86	39.812	36.8"	-2.0	February 7, 2015

The next planetary object beyond Mars may not be what first comes to mind. Yes, Jupiter is the fifth planet in our solar system, but well inside of Jupiter's orbit we have the asteroid belt. Unlike some cartoonish depictions of a densely packed wall of rocks, the asteroid belt is simply defined as a zone of the solar system between the orbits of Mars and Jupiter that is populated by bodies far smaller than the familiar planets. Even though there are many thousands of objects in this zone, the sheer size of the asteroid belt means that you would rarely see one asteroid from another. If the belt were packed as tightly as is often portrayed, it would be awfully difficult for us to see the outer planets from Earth. A few objects in the belt, however, are large enough to be seen from Earth using small telescopes or binoculars, and one may even be visible to the naked eye (given optimal conditions). For our tour this month, we will be visiting two solar system objects that reside in the asteroid belt and are often overlooked, yet are relatively close-by and easy to observe with binoculars--Ceres and Vesta.

You may recall that Vesta was recently visited by NASA's Dawn spacecraft, which mapped the surface of this giant asteroid from September 2011 through July 2012. Vesta is among the largest of the asteroids, at over 500 kilometers in diameter, although not quite spherical.

Vesta reaches opposition on April 13, when it will be at a distance of 1.23 AU (154 million kilometers) from Earth. At this distance, it is expected to reach a maximum brightness of magnitude 5.7, placing it easily within reach of binoculars and small telescopes. In fact, this is the same magnitude that Uranus shines at, so if you observed Uranus last autumn you're already familiar with what an object of this brightness will look like in your sky and optics. And if you're up for a challenge and have superbly dark skies, you may even try to spot it without any optical aid.

Vesta is moving retrograde (westward) through central Virgo throughout April, and even though it is a bit farther away than Mars, you can still easily watch its progression from one night to the next. Be sure to watch it on the night of April 25th, when it passes about 3 arcminutes (1/10 lunar diameter) from the 5th magnitude star 78 Virginis. This encounter would be worth taking out your telescope for, as you will likely be able to perceive its motion with respect to the star.

The last stop on our tour is the dwarf planet Ceres. Ceres is the largest object in the asteroid belt, but because it is a bit more distant from Earth (1.64 AU at opposition) it shines more dimly than Vesta. But, at 7th magnitude, Ceres will be only slightly more challenging to spot than Vesta. Use the chart provided to track Ceres as it progresses through Virgo just east of Vesta.

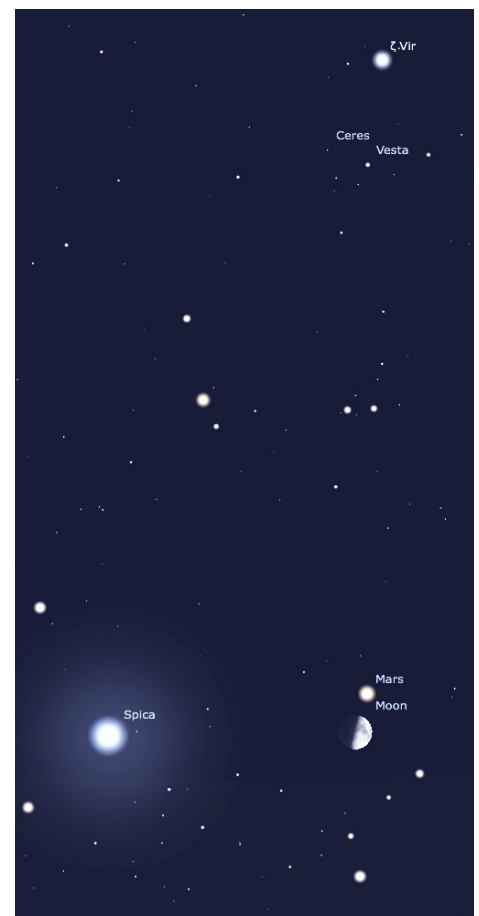
As you are gazing upon this 1,000 kilometer-wide object, consider how, following its discovery in 1801, it was initially thought to be a planet. After all, it was discovered only 20 years after Uranus, and still 45 years before Neptune. It would soon be "demoted," however, when more and more objects were discovered in its realm (sound familiar?), and became the first of what we now call "asteroids" (meaning "star-like"), describing their appearance in even the largest telescopes. However, Ceres would get promoted to dwarf planet status by the same decision by the International Astronomical Union in 2006 that resulted in Pluto being reclassified as a dwarf planet.

And, speaking of dwarf planets, it is exciting to report that next year will be the year of the dwarf planet, as both Ceres and Pluto will be visited by NASA spacecraft. The Dawn probe will enter an orbit around Ceres in February 2015 for an extended study, and we will learn more about its recently discovered water vapor plumes. Distant and enigmatic Pluto will get a brief visit by New Horizons as it speeds past in

July 2015.

Keep watching Ceres and Vesta over the coming months as the apparent distance between them shrinks, until they are only two arcminutes apart on July 13. There is also a beautiful conjunction involving the Moon and Mars on July 5 that, along with Spica, Ceres and Vesta would make a striking photo.

On Saturday, July 5, the Moon joins Mars, and together with Spica, Ceres and Vesta will make a photogenic conjunction. Note that the angular arrangement of Ceres and Vesta with respect to zeta Virginis closely matches that of Spica and Mars from zeta.



Seagrave Observatory Reports

Impressions of Bryant University Students Who Visited Seagrave Memorial Observatory on December 4, 2013

I teach two astronomy labs at Bryant University. And during the semester I include a trip to either Ladd Observatory on a Tuesday night, or Seagrave Observatory on a Wednesday night. For the 2013 fall semester both labs were fortunate. It was clear for each of the scheduled nights.

Here are a few comments from the students. I have also included a very nice drawing from one student named Amanda Spaziano. It is funny what they somehow mis-hear or misunderstand. Though I pointed them to the Skyscrapers website for directions, several students referred to our observatory as Seagrams! While stargazing can be quite intoxicating, I'm not sure what they were thinking. Or perhaps they were thinking outside the box and suggesting a future sponsor to foot our property insurance. And most of the students complained about the cold. It was a balmy 35 degrees.

"The first telescope I saw was the 8-inch Alvan Clark Refractor. The telescope was located in a dimly lit dome shaped building and everything was carried out manually. I remember the professor saying that the telescope was given to Frank Seagrave as his 16th birthday present from his wealthy parents. I was very impressed to see this telescope since it is very antique and looks like a work of art. In addition, the quality of the image reflected on the telescope is also very clear considering the age of the telescope.

Through the telescope, we saw Jupiter long with other stars in the sky. The weather was also in our favor since we did not have major problem locating the objects in the sky.

The second telescope I saw was completely different from the first one. The telescope sits on an off roof building and everything was done digitally through a device to locate the objects in the sky. We located three to four objects in the sky and the last one I believe was Andromeda. I find it easy to look through the eyehole of the second telescope when compared to the first telescope. Also, it was less time consuming to locate the objects since the coordinates are put into the telescope digitally.

Towards the end of the night, the weather became so cold and I became very eager to go home.

I believe this was a very good experience for me since I have not been to an observatory before. I was especially happy to get the chance to see the Alvan Clark Refractor since there was so much history and stories behind this telescope."

"The Seagrave observatory was an eye-opening experience for me, as I had not been to an observatory since I was a little kid. We met Alex, a 12 year old that wants to be an astronaut, it was very endearing to see such a young person with a set goal and passion for what he likes, he will go far in life with this mindset."

"The experience was different; a much more private place with a dedicated crew of astronomers committed to the observatory and with conviction to keep educating people about what happens in our skies ... The fact that the observatory is small and mainly supported by people who are passionate about astronomy surely is inspirational. The Amateur Astronomical Society, as I believe the sign on the way to the first telescope showed, has within it, dedicated people who take care of the facility and inform other persons who are interested to know more about our skies."

"I thought that going to the observatory was a very good way to cement the things that we have been learning this semester and to put it in perspective."

"First and foremost I am glad I was able to attend this little excursion. It was my first trip to a real observatory and my first up close view of some powerful telescopes. It was a rather frightening place at first glance; as I am sure some of the others would agree. It took me longer than I'd like to admit to understand why there were no lights on outside (the use of red lights to avoid interference with telescopes was pretty cool).

The telescope I saw first was the 12 inch Schmidt-Cassegrain (I believe. It was dark and I missed the name initially). While it was cold, I still got to enjoy the view of Uranus, Jupiter, and the Eye of Taurus, Aldebaran. I suppose I was expecting the view

to be clearer, but nonetheless the view of Jupiter and four of its moons was spectacular. Our host also showed us a couple pictures he had taken of Jupiter and the Andromeda galaxy. They were quite enthralling and I was thoroughly impressed. On that note, it was nice to see how the Skyscrapers passion reflected upon their meeting hall. The autographed pictures and framed photos of their achievements made the place seem like a mini museum.

"The second telescope I saw was my personal favorite, due to my love for unique antiques. The 8-inch Alvan Clark refractor was a thing of beauty...I was mesmerized by the fact it was all powered by a mechanized pulley system, a far cry from the Schmidt telescope. The structure (the Alvan (Clark) was placed in was attention-grabbing as well. The captain's wheel that moved the dome was a child's-dream and I was so glad I got to use it. The ingenuity of the track system was a fun story as well. I couldn't believe the dome used to slide on cannon balls (and that they would sometimes pop out). The shift to using shot puts as the ball bearings doesn't seem much better though, but they looked secure and the engineer (knew) what he was doing.

All-in-all I really enjoyed the trip to the observatory. I got to gaze at some planets and view some rather impressive pieces of technology: old and new. I hope to go on my own one day and get a greater glance at our night skies.

Below is a rough sketch I made after the trip:

"It's crazy to me that so many people have so little knowledge about the stars and the other planets in our solar system. Everyone should take the time out to go to an observatory to see other planets and get some background knowledge about where we live and everything around us. I am going to make sure that I bring my kids to an observatory at least a few times because it's cool to see other planets. I also liked seeing the stars and the few constellations that we looked at but my favorite was to look at Jupiter. I've really never gotten a chance to look at another planet before and it was cool to be able to see the moons

around Jupiter. It put in perspective what Earth must look like from an outside look at it. I'm assuming that from Jupiter, Earth would look quite the same as Jupiter did to us just much smaller. I also liked looking at the pictures inside the observatory. I was surprised to hear that famous astronauts had been there."

"A visit to the Seagrave Memorial Observatory was a great experience for our lab class to have. It gave us a chance to see firsthand some of the planets and constellations we have learned about in class ... Later in the evening, we also looked at planets. First we found the planet Uranus. When we looked through the telescope, the

planet shined a bright blue. Of everything we were able to see that night, Uranus was my favorite. Next we located Jupiter. Jupiter was another fun planet to observe through the telescope. We were able to view four of Jupiter's moons. The planets were fascinating to see through the telescope and I am glad we were given the opportunity to."

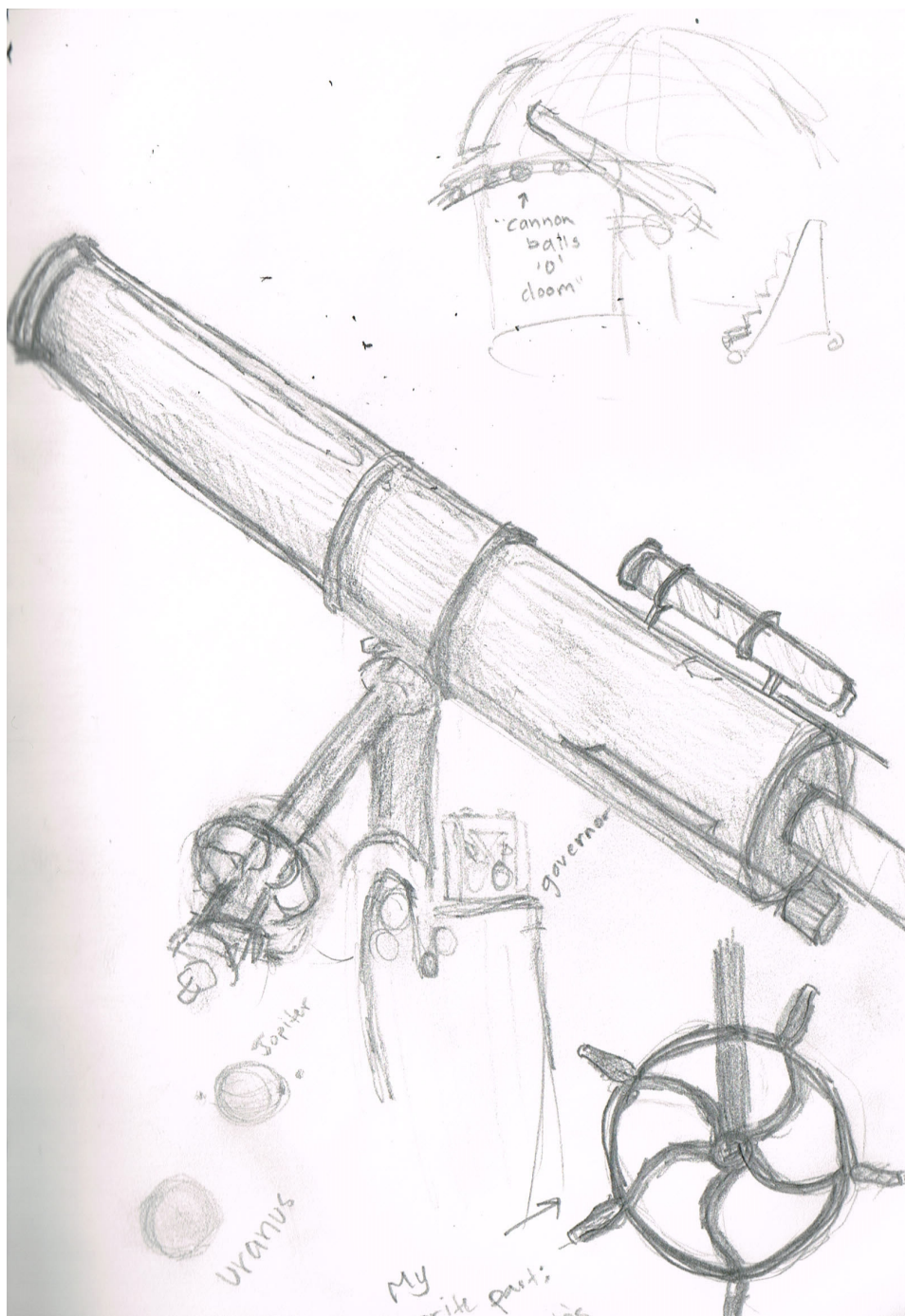
"Being a finance major, I found it hard to stay interested in the class especially with my other class projects and semester papers. However, it makes me think about my future career and whether I would have enjoyed a different path than the one I'm taking. It brings me back to my childhood when my father would wake me up at some

ungodly hour of the morning to watch a meteor shower, or staying up late in the back yard looking through my Dad's telescope. I'd give anything in the world to go back to those days, and I feel like this class was able to help. When you take a step back from everything, astronomy makes me feel very small in the universe around us. Thinking about this helps me focus on the important things in life and I shouldn't let little things bother me. Overall, I was very surprised in how much I enjoyed the class this semester. I probably wasn't the best sunspot counter, but in all seriousness I want to keep building my interest in the subject."

"One of the things that really impressed me was that a telescope (Clark) that was built well over one hundred years ago is still in use today and can get such clear images of planets and galaxies so far away ... craftsmanship so fine that this telescope has been in use since the 1870s. I was also surprised by how easily the dome was able to shift. One barely had to apply any pressure on the wheel to make the entire top half of the dome rotate seamlessly."

"It was cool that we were able to see Jupiter and Uranus because I had never looked at them in the sky before. I had heard people say that it was possible to see them on certain nights but I had never taken the time to look, or even know what I was looking for. At the observatory we were not only able to see them with our own eyes but we could then find it in the telescopes and see much more. We could even see the bands of Jupiter which cannot be seen with our eyes alone ... Another aspect which I enjoyed was that we could see the constellations in the sky, and knew what they were. We had just learned them for a quiz and we were able to look into the sky and point them and also ask questions about them. I really enjoyed looking at the constellations and I think that the trip was a good way to end the semester because it reinforced everything we had learned and sort of put it to the test to see what we remembered and learned. The stars and planets are so far away and we usually just look at them on the computer or on paper during class but being able to visit the observatory made it more real. It is something we do not necessarily need to know in life but something cool that we could look into the sky and point out constellations and planets and know what they are."

"The physical images I saw of Jupiter, Uranus, and the 'eye of the bull' blew my



mind and I am so happy I had the opportunity to see them live with my own eyes. I could see two of Jupiter's moons and that was very interesting because those moons are enormous compared to our moon. Seeing the actual lines of Jupiter where the color changed from light orange to black to dark orange and red. Unfortunately I could not spot the big red storm but I was again real happy I could see the actual lines separating color of the planet. Overall seeing Jupiter first-hand was a very eye-opening experience and I will never forget it.

Viewing Uranus through the other telescope (12-inch Schmidt-Cass) was also very intriguing because that one was programmed to move to see different object by remote. It amazed me that a telescope on Earth was able to track Uranus and its exact location as well as other stars in that region by an automated movement. Seeing Uranus, a planet so incredibly far away from Earth was awesome because I don't think I will ever see it gain in my life. Although I could only see Uranus as a small ball, I could still tell the difference in viewing a planet versus a star."

"I also thought it was very interesting to think that the dome itself, with the moving roof, had to be fixed by using shot puts to make the roof spin. It just shows how innovative, but simple, technology can be sometimes ... one of the other things that amazed me on this trip was the large database of planets, stars, and galaxies that one

telescope can hold ... and the computer database can determine where it is in the night sky just based strictly on the code in the computer. It really still baffles me sometimes how advanced technology has really become, and this is a prime example of it. It could pick out anything in the night sky based on the coding."

"Tom was the man who operated and explained the smaller telescope (12-inch Schmidt-Cass) to us he also told us that he has a telescope very similar to that one at his home and that at his home he has programs that allow him to print and save what he sees through the telescope similar to the Project Slooh assignment we had been attempting in class. He had a view photos on his cell phone and showed them to us, the photos were of the Andromeda Galaxy, and of the planet Jupiter. While we were observing through the telescope with Tom he showed some different objects in the sky, we saw Jupiter as well as the four moons around it, we looked at the Andromeda Galaxy, we also observed the eye of the bull, and with his laser pointer he should us the Orion Galaxy and some of the main points in it such as Orion's belt and shield. In order for us to view Jupiter Tom had to manually move the telescope to the direction of Jupiter because the machine was not working properly and said it was under the horizon when we could clearly see it with our naked eye."

"When I got there it was quiet and cold,

but all these feelings were put aside when I gazed up, towards to the sky. The stars looked like small holes of light that were punched through our sky, and their locations all seemed to be in the right space ... After I finished looking at the objects Tom was showing us I started to walk back. On my way back to the car I can see a faint light behind the trees, and above again were the bright and perfect stars I saw when I arrived."

"Looking through the telescope was an experience all in itself. When the telescope was positioned at the right coordinates, we could see Uranus. When I looked through the eye piece, the planet looked a little blue. It wasn't very colorful, but there was a little tint to the bright planet."

"At around 9:20 the night has ended and we were all sent back to school. Can't deny that I was a little happy purely because I would be able to feel my toes once again after blasting the heat in the car (ha-ha). This experience showed me just how cool astronomy actually is. All the aspects of the telescopes and facts about them were truly surprising. If given the opportunity again, I would definitely go back to view the stars. However, I would want it to be in a warmer climate for sure!"

"As I walked into the building to go to the tower, there were more red lights, and it almost felt like a haunted house." (If they only knew!)

2014 Season Opener & First Views of Mars March 22, 2014

After a bit of uncertainty, the decision was made to open Seagrave Observatory for the scheduled public night, marking the beginning of the 2014 season. Bob Horton, Jim Hendrickson, and I arrived just before 8:00 pm to find about three or four cars waiting to get in.

While Bob switched on the ground lights, Jim and I proceeded to open the Alvan Clark. Unlike last year, the grease for the dome was pliable and we had no trouble turning the dome to acquire our first object of the season, M-42, The Great Orion Nebula. This vast stellar nursery has an apparent magnitude of 4.0 and is 1344 light years distant. It is one of the easiest deep sky objects to locate and can be observed with a pair of binoculars or a small telescope.

A while later, we moved the scope over



to Jupiter and with the great seeing, everyone was treated to an exceptional view of our Solar system's largest planet. The Great Red Spot was very clearly visible along with the atmospheric banding. The views varied from good to excellent.

After everyone had seen Jupiter, Jim turned to scope over to M-79 located in the constellation of Lepus. This dim object can be located by using the stars Arneb and Nihal as a guide. The three objects form a line with Nihal almost dead center. M-79 is a globular cluster which is 41,000 lights years distant. At an apparent magnitude of

8.56, it can be seen through a small scope however, I wasn't able to see it in the finder scope.

As we were observing these other objects, Mars was slowly rising out of the trees. When it was high enough to see through the branches, I trained the Clark over to the Red Planet. This would be my first view of Mars through a telescope in almost forty years. Although the seeing had softened up considerably, I was able to make out one of the polar caps. As Mars heads towards opposition later this month, the viewing should only get better.

Before we closed for the evening, Jim navigated the scope over to M-104, the Sombrero Galaxy. This unbarred spiral galaxy is recognized by the prominent dust band along its rim. At magnitude 9, it can be seen through even a small telescope. The galaxy lies some 29.3 million light years away.

This was the same weekend we opened last year and we counted about ten to fifteen members and guests who joined us for an evening observing the cosmos.

Submitted by,
Matt White



Planetary Nebula in Hydra Ghost of Jupiter: NGC 3242

Glenn Chaple

From Puppis and the planetary-within-a-cluster combination of NGC 2438 and M46, we move eastward and further south to the solitary planetary nebula NGC 3242. It gets its nickname "Jupiter's Ghost" because its angular size and slightly oval shape (40" by 35") approximate those of its namesake planet. Make Jupiter 10 magnitudes fainter and change its color from lively yellow to pale blue-green, and you have

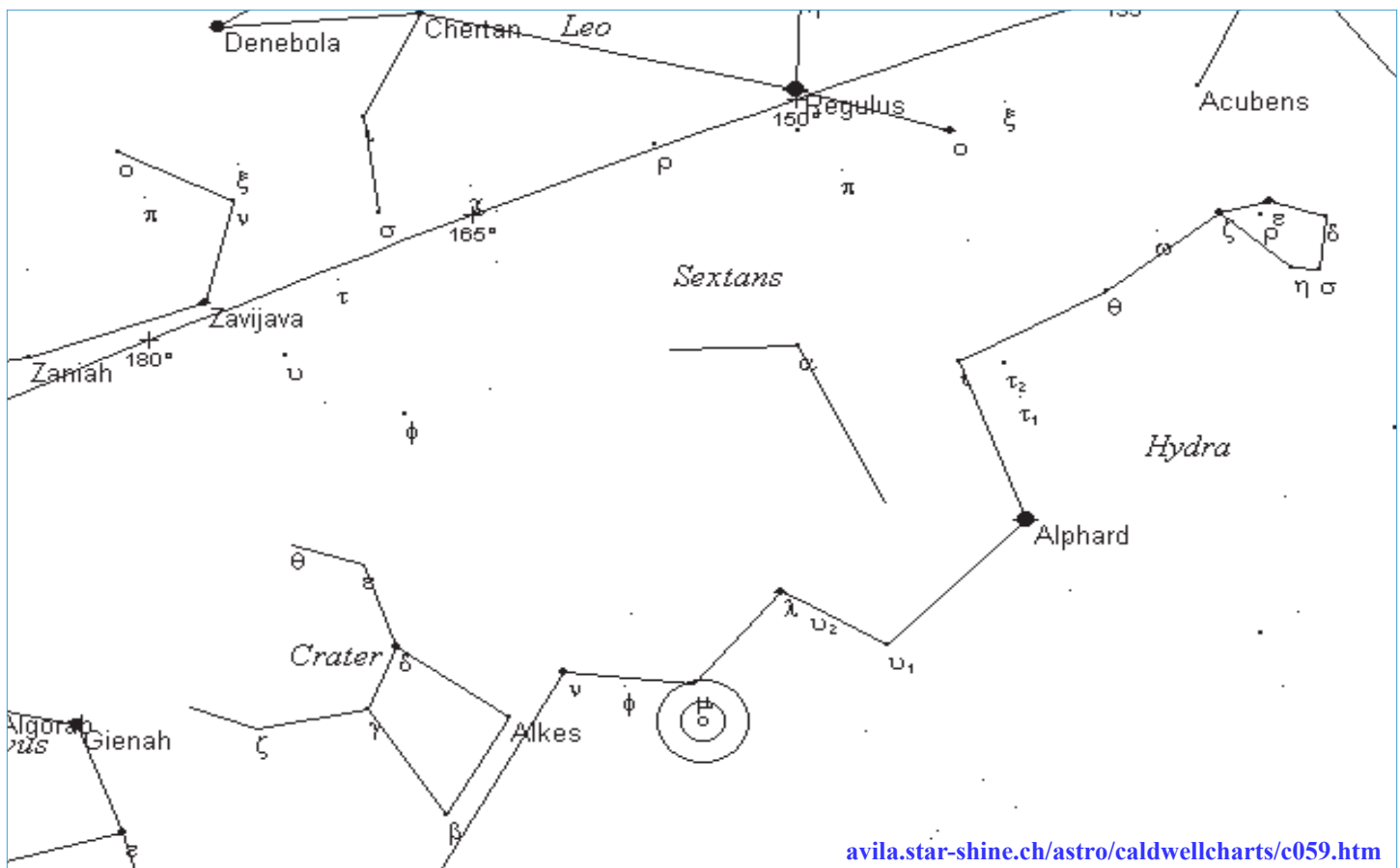
NGC 3242 – Jupiter's Ghost!

Begin your search for NGC 3242 by centering your finderscope on the 4th magnitude star mu (μ) Hydrae, then dropping 1.8 degrees south and slightly west. A low-power search should turn up an out-of-focus 8th magnitude "star."

What next? If you're using a small-aperture telescope (4 inches or less), boost the magnification to 120-150X and look for the

nebula's oval shape and bluish color. Scopes in the 6 to 10-inch aperture range will tease out more detail and capture the 12th magnitude central star. If you prowl the skies with a large-aperture Dob, look for the dark area between the central star and the surrounding bright oval-shaped ring that gives NGC 3242 the overall appearance of (as Arizona amateur Steve Coe notes) the "CBS Eye."

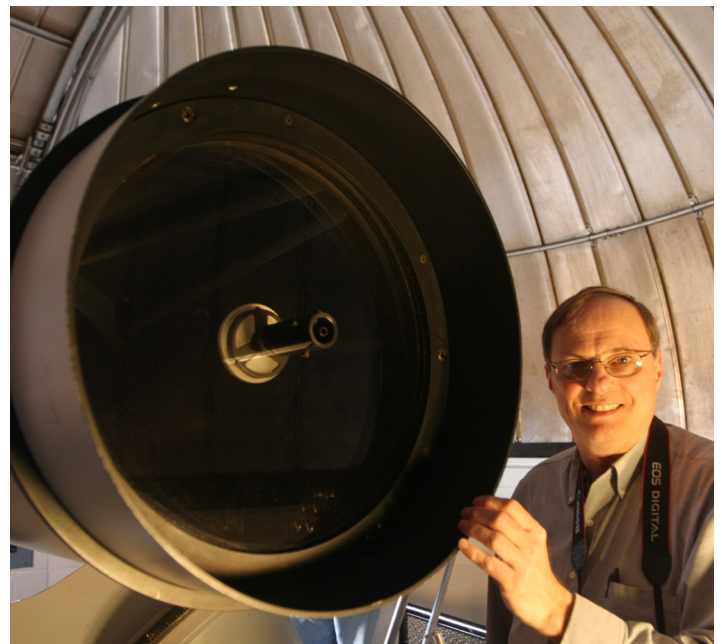
"Jupiter's Ghost" was discovered by William Herschel in 1785. Various estimates place its distance and true size at around 1500 light years and one-half light-year, respectively.



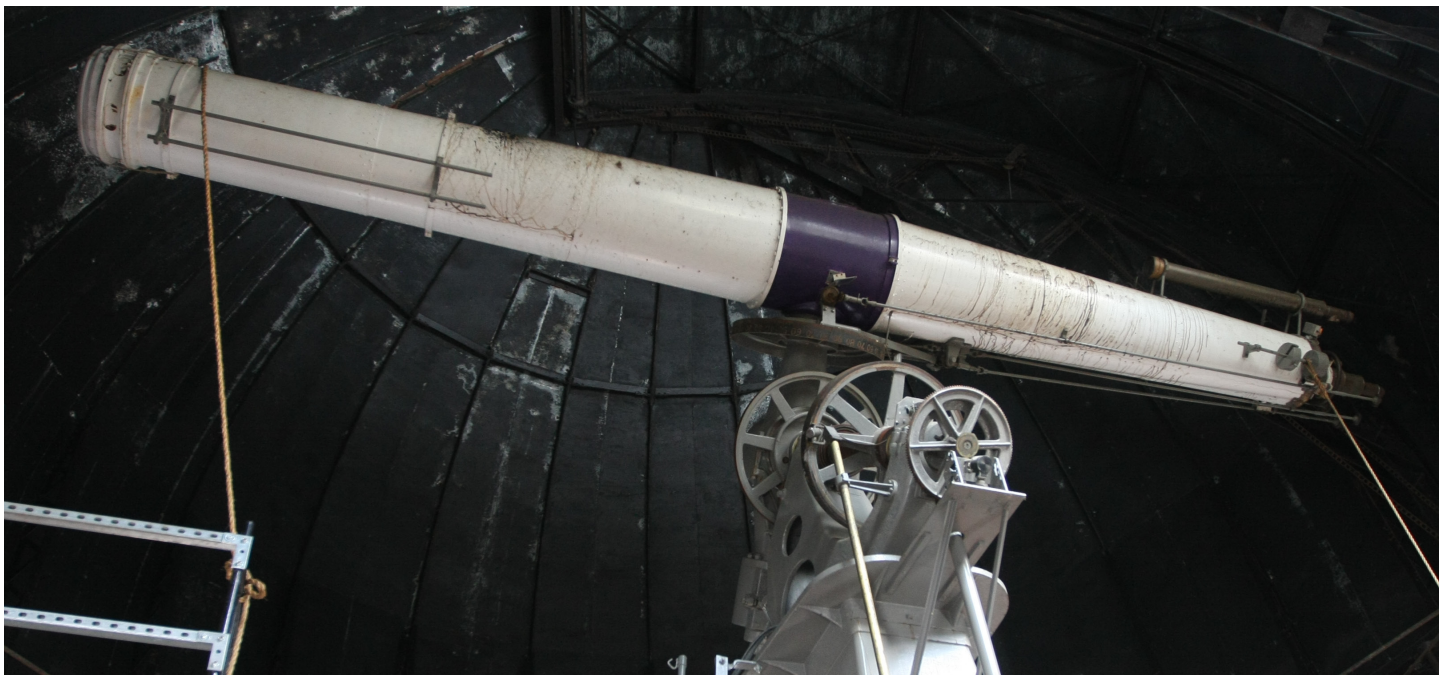
avila.star-shine.ch/astro/caldwellcharts/c059.htm

Skyscrapers Visit Springfield Science Museum and Wilder Observatory

On Saturday, March 22 about 20 members of Skyscrapers visited the Seymour Planetarium at Springfield Science Museum and the Wilder Observatory at Amherst College. Photos by Matt White & Jim Hendrickson.



Top: Skyscrapers in front of the projector at Seymour planetarium. The projector, built in 1937, is the oldest operating planetarium projector in the United States. Left/above: Rich Sanderson shows the 20-inch Schmidt-Cassegrain telescope on the roof of the Springfield Science Museum. The observatory is open for public viewing on the first Friday of each month.



Top: The 18-inch Clark refractor at Wilder Observatory at Amherst College. Above: Tom Whitney gives us a tour and narration of the history of the 111 year old observatory. Right: the dome and rear entrance to the 18-inch telescope at Wilder Observatory. The observatory is open for public viewing on Saturdays from April through October.



Frank Evans Seagrave



The Names Behind the Observatories: Part 1

Mark Sweberg

Rhode Islanders are fortunate in having four observatories available for our use and enjoyment. Each has scheduled open public viewing nights, and often opens their domes for special celestial events at other times.

Crisscrossing the state from North to South are: Seagrave Memorial Observatory in North Scituate, Brown University's Ladd Observatory in Providence, CCRI's Margaret Jacoby Observatory located in Warwick, and Frosty Drew Observatory in Charlestown's Ninigret Park.

Each takes its name from a prominent person associated with the facility, and each is fittingly named in their honor. Let's take a brief look at the people behind the names of the observatories, and acknowledge their place in the history of astronomy in Rhode Island.

Seagrave Observatory in North Scituate is owned and operated by The Skyscrapers, Inc., The Amateur Astronomical Society of Rhode Island, and is named after astronomer Frank Evans Seagrave (1860–1934).

Mr. Seagrave developed an early interest in astronomy, and by age 15, was granted the privilege of access to the Harvard College Observatory. His father purchased an 8 ¼-inch Alvan Clark refracting telescope

as a gift for his 16th birthday, and an observatory was built for it in 1878 at the family house at 119 Benefit Street in Providence.

By 1914, Seagrave despaired of his Providence location due to the city's coal dust and installation of gas lamps and subsequent air and light pollution. After a search in New England for a spot to relocate the observatory, he chose a plateau in the deep and dark woods of North Scituate at 47 Peepoad Road, to build it. Here, and elsewhere, Seagrave conducted much important research, and by the time of his death in 1934, had contributed a great deal of new knowledge to the field.

When The Skyscrapers Astronomy club was founded in 1932, Seagrave became an honorary member. After Seagrave's death, his observatory was listed for sale. The Skyscrapers, which incorporated in 1936, purchased Seagrave Memorial Observatory that year, and has operated it ever since.

Historic Ladd Observatory, a Brown University facility at the corner of Doyle Avenue and Hope Street in Providence, opened in 1891.

Earlier, Brown was desirous of developing its physics and astronomy curricula and actively recruited prominent astronomer Winslow Upton in 1884. The reticent Up-

ton agreed to join the Brown faculty under the stipulation that a telescope be provided for his and students' use.

When the University was slow in its response and an observatory was not forthcoming, Professor Upton threatened to leave. Facing the loss of such a prestigious faculty member was a bitter pill to swallow, and the administration faced a conundrum until a timely benefactor stepped in to fund the \$50,000 needed to construct an observatory.

Governor Herbert W. Ladd (1843–1913) was a two-term chief executive from 1889–1890 and 1891–1892. A popular and public-spirited leader, Ladd attended the 120th annual commencement of Brown University in 1889, and announced that he would fund construction of an observatory. This announcement was received with the wildest enthusiasm. Never before had there been such a gratifying surprise to the students, alumni, and friends of the University than his timely gift.

Fittingly enough, Brown's historic observatory bears its benefactor's name.

As we've briefly seen, Seagrave and Ladd Observatories are both venerable institutions, with much history to their pedigree. Rhode Island's other two observatories, Margaret M. Jacoby and Frosty Drew, are of more recent vintage.

Next month, we'll examine the naming tradition of these two newcomers to the astronomy scene in Rhode Island.

Till then, visit Seagrave and Ladd, as generations of Rhode Islanders have done before you, and keep looking up!



Herbert W. Ladd



Old Tool, New Use: GPS and the Terrestrial Reference Frame

By Alex H. Kasprak

Flying over 1300 kilometers above Earth, the Jason 2 satellite knows its distance from the ocean down to a matter of centimeters, allowing for the creation of detailed maps of the ocean's surface. This information is invaluable to oceanographers and climate scientists. By understanding the ocean's complex topography—its barely perceptible hills and troughs—these scientists can monitor the pace of sea level rise, unravel the intricacies of ocean currents, and project the effects of future climate change.

But these measurements would be useless if there were not some frame of reference to put them in context. A terrestrial reference frame, ratified by an international group of scientists, serves that purpose. "It's a lot like air," says JPL scientist Jan Weiss. "It's all around us and is vitally important, but people don't really think about it." Creating such a frame of reference is more of a challenge than you might think, though. No point on the surface of Earth is truly fixed.

To create a terrestrial reference frame, you need to know the distance between as many points as possible. Two methods help achieve that goal. Very-long baseline interferometry uses multiple radio antennas to monitor the signal from something very far away in space, like a quasar. The distance between the antennas can be calculated based on tiny changes in the time it takes the signal to reach them. Satellite laser ranging, the second method, bounces lasers off of satellites and measures the two-way travel time to calculate distance between ground stations.

Weiss and his colleagues would like to add a third method into the mix—GPS. At the moment, GPS measurements are used only to tie together the points created by very long baseline interferometry and satellite laser ranging together, not to directly calculate a terrestrial reference frame.

"There hasn't been a whole lot of serious effort to include GPS directly," says Weiss. His goal is to show that GPS can be used to create a terrestrial reference frame on its own. "The thing about GPS that's different from very-long baseline interferometry and satellite laser ranging is that you don't need complex and expensive infrastructure



Artist's interpretation of the Jason 2 satellite. To do its job properly, satellites like Jason 2 require as accurate a terrestrial reference frame as possible. Image courtesy: NASA/JPL-Caltech.

and can deploy many stations all around the world."

Feeding GPS data directly into the calculation of a terrestrial reference frame could lead to an even more accurate and cost effective way to reference points geospatially. This could be good news for missions like Jason 2. Slight errors in the terrestrial reference frame can create significant errors where precise measurements are required. GPS stations could prove to be a vital and untapped resource in the

quest to create the most accurate terrestrial reference frame possible. "The thing about GPS," says Weiss, "is that you are just so data rich when compared to these other techniques."

You can learn more about NASA's efforts to create an accurate terrestrial reference frame here: <http://space-geodesy.nasa.gov/>.

Kids can learn all about GPS by visiting <http://spaceplace.nasa.gov/gps> and watching a fun animation about finding pizza here: <http://spaceplace.nasa.gov/gps-pizza>.



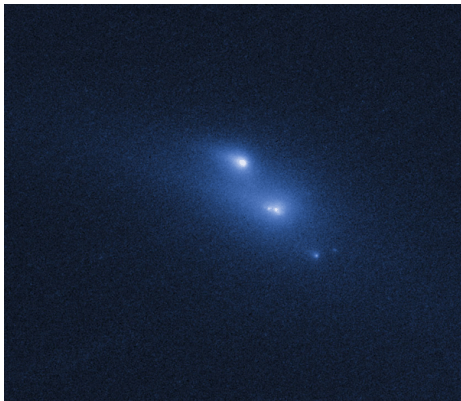
Jupiter, Io & Europa on March 18 by Steve Hubbard



What's Up in Space News?

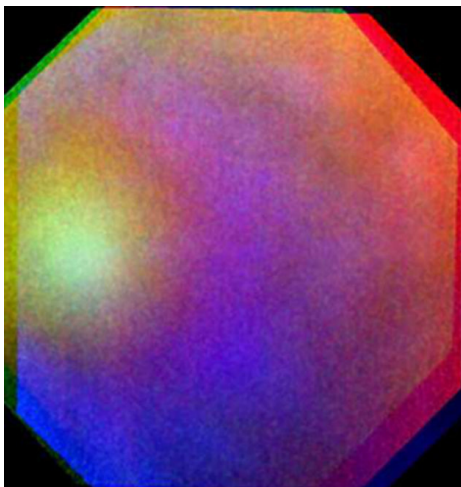
Jason Major

Happy spring, fellow northern hemispherians! While winter doesn't seem to want to loosen its cold grip on New England just yet, there have been quite a lot of hot stories in space news over the past several weeks. Here are a few of the steamiest:



Hubble Watches as an Asteroid Crumbles

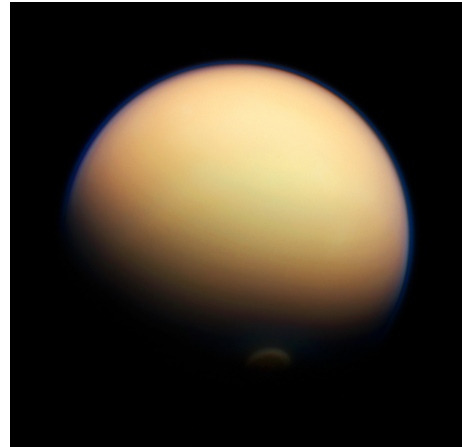
Observations with the Hubble Space Telescope over the course of several months revealed the slow but steady breakup of a 200,000-ton asteroid, thought to be the result of tidal stresses created by its rotation, nudged ever so slightly over time by the force of sunlight. In space even a sunny day (or at least a whole lot of them) can be an asteroid's undoing! [Read more here.](#)



A "Glorious" Rainbow on Venus

Glories are commonly seen on Earth as a rainbow-colored ring surrounding the shadow of an aircraft or the shadow of a person's head in a sunlit fog, but one has

also now been seen in the atmosphere of Venus by Europe's Venus Express spacecraft. But the colors are a little off – Venus' thick atmosphere is full of sulfuric acid, not just water! [Learn more here.](#)



Surf's Up on Titan!

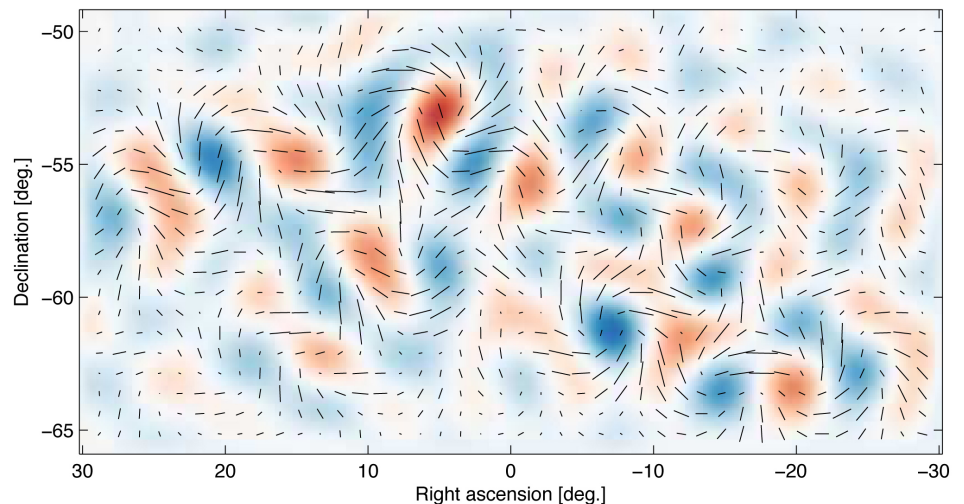
Titan is known to harbor large lakes, seas, and rivers on its surface – except they aren't filled with water but rather liquid methane and ethane in its incredibly cold -300°F temperatures. And what's been even stranger is the lack of any texture on the lakes' surfaces... radar data from Cassini has shown them to be literally smoother than glass! But the winds may be picking up – some researchers have announced what seem to be waves on Titan's lakes. At around 2cm high, small waves, yes, but it's something (and, just like Earth, the seasons on Titan they are a-changin'.) [Read more.](#)

The Largest Yellow Hypergiant Star Found

An international team of astronomers using the European Southern Observatory's VLT in Chile have identified the largest "yellow hypergiant" star, a behemoth named HR 5171 located 12,000 light-years away in the constellation Centaurus (unfortunately for us Rhode Islanders, it's only visible from south of the equator.) This enormous star is over 1,300 times the diameter of the Sun and half again as big as Betelgeuse – and it even has a smaller (but still enormous) companion that's so close, the two are touching. It's like a monster stellar peanut – [read more here.](#)

New Discovery Makes the Best Case Yet for the Big Bang Theory

No, not Sheldon and Penny but the real Big Bang theory, which proposes that the entire Universe bloomed into existence from an astoundingly-dense point 13.8 billion years ago. This event is supported by many current observations, and on March 17 astronomers announced what could be called the best case yet for the Big bang: patterns of polarized light in the cosmic microwave background that are a signature of primordial gravitational waves within spacetime itself – literally ripples of the rapid expansion of the early Universe. And what's more, this discovery may even hint at the presence of other Universes out there. [Find out more here](#) (and check out a simplified 2-minute video of the findings [here.](#)) Bazinga!





Venus May Have Active Volcanoes

...and I'm not talking about millions or even thousands of years ago, but right now! Data from ESA's Venus Express orbiter have shown bright flashes above a rift zone on Venus' surface called Ganiki Chasma. These flashes were found to indicate hot zones even hotter than normal on Venus (which is saying a lot) – between 908 and 1,520°F. The area where the flashes originated is near a known volcano called Maat Mons, which is thought to have erupted as recently as 10 to 20 million years ago – so researchers suspect ongoing volcanism might be continuing today. Venus and volcanoes? Now that's hot! [Read more here.](#)

As you see it's been a busy few weeks in space and those were only just a few of the recent stories! There were many more, including:

...NASA's Dryden research facility getting [renamed in Neil Armstrong's honor](#), Earth got buzzed by a couple close-passing asteroids, like [2014 DX110](#), Skylab astronaut [Bill Pogue](#) passed away, NASA [launched a rocket into an aurora](#), we get an

idea of [how big the Solar System REALLY is](#), "Planet X" got the [axe](#), a brand-new Cosmos series [kicked off on Fox](#) (34 years after Carl Sagan's originals), Mercury was found to have shrunk [double the amount](#) previously thought, a new, giant [interactive map](#) of the Moon's north pole was released (a must-see), a [new gully](#) appeared on Mars (but it's not all wet) and Hubble gave us all a gift for its own 24th birthday: newborn stars [blasting gas inside a monkey's head](#).

So happy vernal equinox everyone, and let's hope actual spring weather doesn't wait too long to get to Rhode Island. (Only another 146 million miles until summer!)

Do you have any questions about these stories or want to know where you can learn more? Feel free to contact me at jpmajor@me.com, and follow me on Twitter [@JPMajor](#) and on Facebook as [Light-sInTheDark](#). Ad astra!

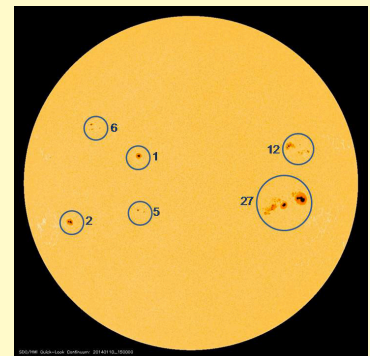
Jason is a freelance graphic designer and a space news blogger currently living in Warwick, RI. He writes for Universe Today, Discovery News, and on his blog LightsInTheDark.com. He has also been featured on National Geographic News, Space.com, io9.com, PhysOrg, NBC News Cosmic Log, and

has attended several launch events at NASA's Kennedy Space Center.

Photos and links from this story may be found at <http://www.theskyscrapers.org/april-2014-space-news>

Participate in the Skyscrapers Sunspot Count Project

<http://www.theskyscrapers.org/science-teachers-sunspot-count-challenge>



MARCH REPORTS



Secretary Tom Thibault

Skyscrapers March Meeting Minutes – 3/4/14

President Ed Haskell called the Skyscrapers March Members Meeting to Order at 7:32PM.

President, Ed Haskell: Ed asked Nomination Committee Chairman Tom Thibault to report the committee's selections for this year's elections. • Ed noted Al Hall's Lifetime Membership Award in Al's absence and then followed with the presentation of Presidential Awards to Jim Crawford and Kathy Siok. Ed noted Jim's dedication and enthusiastic continued support to the organization and Kathy's 42 years of membership in which she has served in all positions which comprise the organizations Board of Directors.

Secretary, Tom Thibault (Nomination Committee Chairman): Identified the Nomination Committee's selections for the 2014 Election as follows: President – Bob Horton • 1st VP. – Kathy Siok • 2nd VP. – Steve Siok • Secretary – Tina Huestis • Treasurer – Linda Bergemann • Member at Large 1 – Pat Landers • Member at Large 2 – Matt White • Trustee – Tom Thibault • Tom opened and requested nominations from the floor in which none were received, resulting in the close of the nomination process.

2nd Vice President, Bob Horton: Bob noted Skyscrapers have been invited to the Springfield Science Museum on March 22nd that will include a visit to Wilder Observatory which houses the 18" Clark Refractor. Activities will also include a show at the Museums Planetarium. A number of members have signed up and those interested in participating should contact Bob.

Treasurer, Linda Bergemann: Linda introduced Connie Cameron and Mike Fuller to the membership, both will be presented for vote at the next meeting they attend.

Historian, Dave Huestis: Noted two (2) Centennial Seagrave Observatory Calendars were available for a \$20.00 donation of which both were purchased.

Trustee, Steve Siok: Steve restated his organization of the viewing session of the upcoming asteroid occultation of Regu-

lus. This rare event will be occurring in the early morning hours of March 20th. Due to the limited area of visibility travel will be required to a site in New York. Those interested in participating should contact Steve. • Noted the broadcast of the remake of the "Cosmos" series beginning on March 9th. • Noted that Seagrave is closed due to snow cover on the grounds.

Trustee, Conrad Cardano: Requested volunteers for April 11th Star Parties that are being held at Steer Farm Elementary in Burrilville, RI. and Portsmouth Middle School in Portsmouth, RI. Since both are on the same evening and are anticipated to generate large turnouts, he urged the members to consider lending a hand at these events. Please contact either Dave Huestis or Conrad regarding volunteering for either of these events.

Steve Hubbard, Member: Steve recently participated in a Aurora Expedition organized by Sky and Telescope and offered those in attendance to view his pictures displayed of the trip.

1st Vice President: Kathy Siok: Our speaker for April will be Dr. Katrien Koltenberg: "Stellar Sounds for Human Ears". • Kathy introduced our featured speaker for the evening, Dr. Adria Updike.

Speakers: Dr. Adria Updike: Adria's presentation, "Observing the Early Universe with Gamma Ray Bursts" was enthusiastically presented and well received by the membership. Following the presentation numerous questions were posed to Dr. Updike who graciously answered all.

Meeting recessed at 9:00PM



Adria Updike



Treasurer Linda Bergemann

Cash Flow YTD as of March 21, 2014
(4/1/13 through 3/21/14)

INFLOWS

AstroAssembly	
Banquet	\$1,220.00
Grill	\$421.50
Misc	\$30.00
Raffle	\$506.00
Registration	\$1,540.00
TOTAL AstroAssembly	\$3,717.50
Centennial Calendar	\$700.00
Donation	
Misc Donation	\$263.00
Refreshment Donation	\$172.20
TOTAL Donation	\$435.20
Dues	
Contributing	\$164.05
Family	\$533.88
Junior	\$30.00
Regular	\$2,079.20
Senior	\$898.97
TOTAL Dues	\$3,706.10
Misc Income	
Sale of Items	\$630.00
TOTAL Misc Income	\$630.00
Star Party Donations	\$140.00
Subscription Income	
Astronomy	\$460.00
Sky & Telescope	\$230.65
TOTAL Subscription Income	\$690.65
FROM Preservation Fund (See note below)	\$96.30
TOTAL INFLOWS	\$10,115.75

OUTFLOWS

Astro Assem Exp	
Caterer	\$1,000.00
Grill	\$244.13
Misc	\$68.90
Raffle	\$5.00
Reception	\$138.31
Tent Rental	\$670.00
TOTAL Astro Assem Exp	\$2,126.34
Centennial Calendar Production	\$304.64
Corporation, State Fee	\$30.00
Postage and Delivery	\$21.20
Presidential Fund	\$55.07
Printing and Reproduction	\$10.27
Property Insurance	\$2,566.00
Refreshment Expense	\$181.46
Subscription Payments	
Astronomy	\$494.00
Sky & Telescope	\$230.65
TOTAL Subscription Payments	\$724.65
Trustee Expense	\$1,527.79
Utilities	
Electric	\$178.33
Porta-John	\$693.00
Propane	\$80.25
TOTAL Utilities	\$951.58
TO Preservation Fund (See note below)	\$96.30
TOTAL OUTFLOWS	\$8,595.30

OVERALL TOTAL

\$1,520.45

Note: Designated Preservation Fund monies used to digitize photos for archive.

Cash and Bank Accounts - As of 3/21/14

Capital One Bank	\$12,332.49
Checking	\$12,127.58
PayPal	\$57.96
TOTAL Bank Accounts	\$24,518.03

Board of Directors Meeting Minutes – 3/24/14

Attendees: Ed Haskell, Kathy Siok, Bob Horton, Tom Thibault, Steve Siok, Conrad Cardano, Jim Crawford, and Matt White

Ed Haskell, President: Meeting called to order at 7:15PM at Seagrave.

Kathy Siok, 1st Vice President: April Meeting will be at Seagrave Observatory

- April 4th speaker Dr. Katrien Kolenberg presenting “Stellar Sounds for Human Ears”.
- Future speakers are being confirmed.
- AstroAssembly planning has begun and one feature will be the 100th Anniversary of Seagrave Observatory.
- The Scituate Community Center has been reserved for October 4th’s for our AstroAssembly Buffet and featured speaker presentation.

Bob Horton, 2nd Vice President: March 22rd Springfield Science Museum gathering went well and enjoyed by all that attended.

- Noted Dick Parker's many contributions to the Skyscrapers organization as well as to the amateur astronomy community. Bob proposed Dick be presented an Honorary Membership. Bob’s proposal was unanimously approved by the BOD for presentation and vote by the membership at the upcoming annual meeting.
- Suggested Skyscrapers plan events at Seagrave to celebrate Astronomy Day that will occur on May 10th, 2014. Trustee Conrad Cardano presented an outline of activities to consider for the event which included public solar and celestial observing. Planning will continue and event formalized.

Tom Thibault, Secretary: Questioned current status of the Election Committee, which Jim Crawford confirmed that election ballots have been sent to the membership.

Trustees: Noted Seagrave hosted its first Public Night of this year on March 21st.

- Jim Crawford restated a number of grounds projects should be taken on this year. Activity include Meeting Hall ceiling replacement, exterior building trim work, Roll-off observatories painting, and property entrance enhancements.
- Conrad Cardano updated the current status of the Automation Committee. Discussions focused on next steps with a desire to showcase its viewing capabilities to the membership soon.

Ed Haskell, President: Presented the 2014-2015 Skyscrapers budget to the BOD,

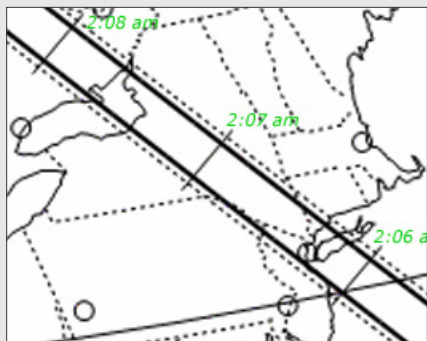
which was unanimously approved for presentation to the membership at the annual meeting.

Meeting adjourned at 8:51PM

Submitted by Tom Thibault - Secretary

Ed Haskell presented two more President's Awards at the March 2014 meeting, to Jim Crawford and Kathy Siok.





Regulus Occultation Clouded Out

After much anticipation for the March 20 occultation of Regulus by 163 Erigone, several Skyscrapers that had planned to travel to upstate New York to observe the event canceled their travel plans due to poor weather forecasts. As it would turn out, no one along the narrow track of the occultation fared any better. From Bermuda all the way up to Hudson Bay, sky conditions concealed the entire event.



Dan Lorraine imaged the Sun on February 6 (above) and a sundog appearing over his 4-inch Unitron refractor.





Proposed Budget 2015 Explanatory Notes

Ed Haskell

The Income and Expense Budget for the coming fiscal year is little changed from last year. Some categories are slightly higher, some slightly lower. Changes are based on recent experience and plans for changes in various programs. On balance these changes total a reduction in spending of just under four percent.

A new area in the Budget provides for

spending on capital items (durable goods with a lifetime of more than three years and major property enhancement or maintenance activities). The item listed, First Generation Remote Observatory, is the projected cost to move from a prototype to a finished system for controlling the 16" Meade mount, acquisition of a wide field refractor to piggyback the 16", and elec-

tronics to capture and display images in the Meeting Hall. The amount listed is the cost burden if all components are purchased new. The number is overstated by a factor of more than four if prospective gifts and long term loans under discussion materialize. Good budgeting practice dictates that the worst case amount be shown.

BUDGET WORK SHEET 2014-2015					
Expense Category	2013/14 Approved Budget	2013/14 Actuals	Variance	2014/15 Proposed Budget	Notes
Astro-Assembly	-\$2,650.00	2,126.34	-\$523.66	\$2,650.00	No change to LY
Domain Name	-\$15.00	\$0.00	-\$15.00	\$15.00	No change to LY.
Donations	-\$50.00	\$0.00	-\$50.00	\$50.00	Clear Sky Chart, No change to LY.
Utilities (Power, Toilet, Internet)	-\$1,275.00	943.17	-\$331.83	\$1,275.00	2013 March and April bills not reflected
Corporation renewal fee	-\$22.00	\$30.00	\$8.00	\$30.00	No change to LY.
Postage	-\$100.00	\$18.40	-\$81.60	\$50.00	Reduce by \$50
Presidential Fund	-\$150.00	\$55.07	-\$94.93	\$150.00	No change to LY.
Printing	-\$83.00	\$0.00	-\$83.00	\$50.00	Increase \$2.00
Property Insurance	-\$2,600.00	2,566.00	-\$34.00	\$2,600.00	No change to LY.
Refreshments	-\$350.00	\$138.59	-\$211.41	\$150.00	Based on recent experience
Trustee Expense	-\$700.00	\$1,252.79	\$552.79	\$700.00	No change to LY.
Contingency	-\$557.00	\$0.00	\$0.00	\$770.00	This number is "plugged" to make totals balance, and for contingencies.
Miscellaneous		\$299.60		\$0.00	Mischaracterized. Should be booked in Contingency.
Property Maintenance Fund	-\$250.00	\$0.00	-\$250.00	\$0.00	Not used. Remove in 2015
TOTAL	-\$8,802.00	\$7,429.96	-\$1,372.04	\$8,490.00	4% less than LY.

Income Category	2013/14 Approved Budget	2013/14 Actuals	Variance	2014/15 Proposed Budget	Comments
Astro Assembly	-\$3,722.00	\$3,717.50	-\$4.50	\$4,000.00	Centennial attendance expectation
Donations	-\$600.00	\$435.20	-\$164.80	\$485.00	Based on recent experience
Dues	-\$3,420.00	\$2,359.05	-\$1,060.95	\$3,420.00	Based on current membership
Misc Income	-\$60.00	\$1,230.00	\$1,170.00	\$85.00	Probably understated but varies widely year to year
Star Party Donations	-\$1,000.00	\$74.00	-\$926.00	\$500.00	Decrease based on experience
TOTAL	-\$8,802.00	\$7,815.75	-\$986.25	\$8,490.00	4% less than LY.

Capital Budget

First Generation Remote Observatory

Total **\$2,400.00**



For Sale: Fujinon 10x70 FMT-SX Polaris Binocular

These binoculars are absolutely the best for astronomy. They have a 5 degree field of view. I have enjoyed many hours of deep-sky viewing with these binoculars. The field is flat and the contrast is excellent.

Features: flat-field, distortion-free eyepieces • transmits an incredible >95% of the light • Nitrogen-purged fogproof • excellent eye relief

It comes with a solid, beautiful handcrafted, portable oak tripod.

Price: \$350 • Conrad Cardano • 828-0702

Directions to Seagrave Memorial Observatory

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.



47 Peeptoad Road
North Scituate, Rhode Island 02857