



the Skyscraper

vol. 41 no. 3

March 2014

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

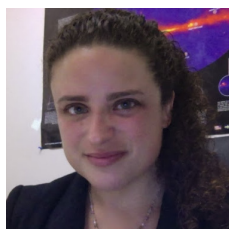
In this issue

- 2 President's Message
- 4 Supernova 2014J and Asteroid 2 Pallas
- 5 Open Cluster & Planetary Nebula in Puppis M46 & NGC 2438
- 6 Highlights of the Spring Sky
- 7 Hubbards In Alaska
- 8 Secretary & Treasurer
- 10 Sunspot Count Project Challenge for Science Teachers
- 12 What's Up in Space News?
- 14 A December's Winter Night
- 15 A Two-Toned Wonder from the Saturnian Outskirts

Friday, March 7, 7pm at North Scituate Community Center

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



Observing the Early Universe with Gamma Ray Bursts by Adria Updike

Dr. Updike earned her Ph.D. in Physics from Clemson University in 2010 for her dissertation *Gamma Ray Bursts as Probes of Dust in the Evolving Universe*. She spent a year as a postdoctoral researcher in the Observational Cosmology Lab at NASA's Goddard Space Flight Center working with Dr. Eli Dwek before accepting a Visiting Professor of Physics and Astronomy position at Dickinson College. She began teaching at Roger Williams University in the fall of 2012 as an Assistant Professor of Physics.

Her research interests are in the field of astrophysics, primarily gamma ray bursts (massive, exploding stars), supernovae (slight smaller exploding stars), classical novae (the entire star didn't explode this time), chemical evolution (dust production and destruction by evolving stars), and dust production in young stars. She works with telescopes to take data (remotely working with telescopes in Arizona and Chile through collaborations with Clemson University and the SARA consortium, working on-site with telescopes in Chile with the Max Planck Institute), does data reduction and analysis, and also writes computer simulations of the systems she studies. She has several RWU students working with her on data analysis and instrumentation.



Seagrave Memorial Observatory Open Nights

Saturdays at 8:00 pm
weather permitting

Renew Your Membership Today

Memberships are due at the end of March. You may renew online at www.theskyscrapers.org/join-renew

Secure Payments by

PayPal





President's Message

Ed Haskell

This month's Letter could be entitled *Whither Star Parties; Where we are going with this important outreach program.*

Regular readers of this Letter will be familiar with several facts about Star Parties; they come in two varieties, Open Nights (Saturday evenings at Seagrave), and private star parties (arranged, usually off site, at the request of an organization), also they are a core function of our public service offerings, they are an important source of income to the Society, and, while they are a lot of work, they are fun to put on. What you may not be aware of is that for the year ending March 31 (our fiscal year) star parties were a dismal failure.

This deplorable state was not created by the failure of our volunteers who were prepared to do their usual good job, or of a sudden lack of interest in things astronomical by the public, or by the lack of suitably exciting events in the sky. It was created by the consistent, even all pervasive, failure of the weather gods to shine their face upon us (pun intended). None among us can remember a year with as few Open Nights or as many canceled star parties.

This lamentable situation cannot be permitted to continue unaddressed.

Now before you conclude that the Board must be suddenly in the grip of megalomania and has concluded that it is powerful enough to change the weather, let me tell you about how we are going to escape from dependence upon clear skies.

For some time we have been investigating how to take advantage of technology to enhance the usefulness of the observatory (the Automation Project). That effort has progressed to the point that we can con-

trol the 16" scope remotely and project the image that instrument is capturing onto the screen in the Meeting Hall. Plans are underway to use these new functions to enhance Open Nights by augmenting the number of people who can simultaneously "see" through the 16" Meade, thus improving the experience enjoyed by public visitors. Since at that point we've got 'em in the Hall watching the screen, we can also use short videos to explain our mission, explain what they are going to see, and, by the way, mention that we do accept donations and we welcome new members.

Of course, if we are closed on account of weather then none of these marvelous technological wonders can be used.

Or can they?

It is our intention to recast the way we do Open Nights in such a way that we will not be closed on account of weather. By artfully capturing the data stream from the 16", building a library of images, and augmenting the images with appropriate video snippets we can present a program little different from what visitors would experience if the sky was clear. Assuming the weather is not really horrid, and most of the time we close it is simply because of overcast, visitors can still be shown around the various observatories, and then can see in the Meeting Hall about what they would see under clear skies.

This same approach may be used for star parties. By imposing a little more structure on the sponsoring organization (requirement that a sheltered environment must be provided) we can improve the viewing experience for all star parties, and rescue weather impaired parties by the techniques described above. We have to devise a practical equipment configuration amenable to easy moving and setup, of course. The additional work is offset by requiring a suitable donation. Had this approach been available to us the past year then virtually all of the canceled star parties could have proceeded as scheduled.

What I have described above is being worked on now and will be in use as soon as volunteer effort can get it there.

Thanks for all you do for Skyscrapers.

Phases of the Moon

First Quarter Moon
March 8 13:27

Full Worm Moon
March 16 17:08

Last Quarter Moon
March 24 01:46

New Moon
March 30 18:45



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.

President

Ed Haskell haskell.ed@gmail.com

1st Vice President

Kathy Siok ksiok@cox.net

2nd Vice President

Bob Horton Robert_Horton@brown.edu

Secretary

Tom Thibault DeepSpaceViewer@aol.com

Treasurer

Linda Bergemann lbergemann@aol.com

Members at Large

Pat Landers pbl64@comcast.net

Ernie Ross ginnypony@juno.com

Trustees

Steve Siok ssiok@cox.net

Conrad Cardano cardanoc@verizon.net

Jim Crawford jrcrawford@cox.net

Outreach Coordinators

Conrad Cardano cardanoc@verizon.net

Bob Forgiel bforgiel@cox.net

Librarian

Alex Bergemann astroalex@verizon.net

Historian

Dave Huestis dhuestis@aol.com

Editor

Jim Hendrickson jim@distantgalaxy.com

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 **March 21** 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.

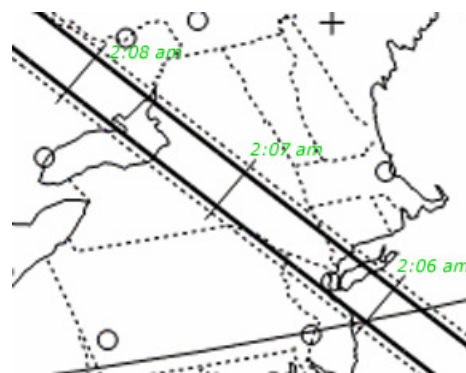


Thursday, March 20

163 Erigone Occults Regulus for 14 Seconds

On the morning of Thursday, March 20, a small asteroid will occult the naked-eye star Regulus in the constellation Leo. Not only will this rare event be spectacular to witness, it also provides a great opportunity to contribute to science. By recording and timing the event, and if enough observers contribute, we can learn with precision the size, shape and rotation of the asteroid known as 163 Erigone. The track of the

occultation is rather narrow and does not pass over southern New England but it is not too far to our west. Now is the time to start planning your observation. See the web page of the International Occultation Timing Association at <http://occultations.org/regulus2014/> for more details about the event and how to contribute your observations.



Friday, March 21

Enjoy *Cosmic Colors* at the University of Rhode Island Planetarium

University of Rhode Island Planetarium
Upper College Road
Kingston, RI

Friday, March 21, 2014
6:00 and 7:00 P.M.

Contact: Francine Jackson: 401-527-5558

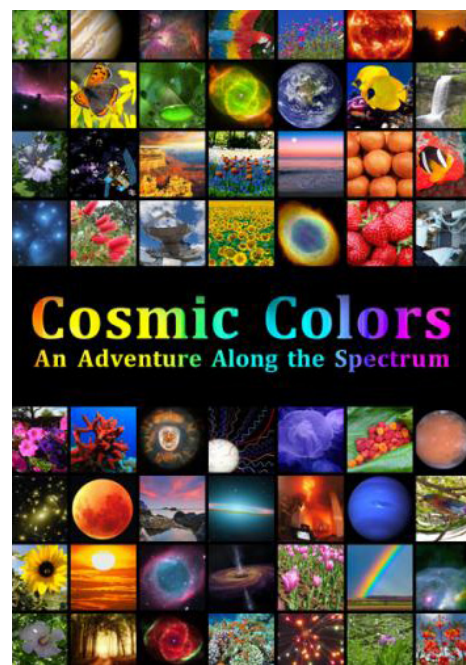
As the season of spring is about to begin, thoughts turn to the beautiful colors it brings to the Earth. But, how are we able to view these varied colors? What causes them? Cosmic Colors, an introduction to the way we see and feel, by means of the electromagnetic spectrum, will take you back to the days of Sir Isaac Newton, forward to the surface of Mars, and every place in between, to show you the origins and

importance of such everyday phenomena as X rays, microwaves and infrared waves and their relation to the colors we love so much.

Cosmic Colors, a planetarium program for audiences of all ages, will be shown at the URI Planetarium, Upper College Road, on the URI campus, at 6:00 and 7:00 P.M. Admission, to benefit the URI Planetarium fund, is \$5.00. Cosmic Colors will be preceded by a 6-minute award-winning presentation on light pollution, and will be followed by a live segment showing the skies above the URI campus.

Come and see the beauty of color!

The University of Rhode Island Planetarium is available for programs of many varied topics of astronomical interest for all age groups. For more information, please call 401-527-5558.



Saturday, March 22

Visit the Springfield Science Museum and a Tour of Wilder Observatory at Amherst College

Rich Sanderson, Director of the Springfield Science Center, has invited members of Skyscrapers to visit the Museum on March 22nd for a tour of one of the oldest planetariums in the U.S., plus guided tours of the museum observatory and 20" Cassegrain telescope. After lunch, you are invited to tour nearby Amherst College's Wilder Observatory and 18" Alvan Clark

telescope.

Participants should plan to arrive at the Springfield Science Museum by 10am. Admission cost to the museum is \$15 regular, \$10 seniors.

For more information, please contact me at Robert_Horton@brown.edu. Perhaps we can arrange some car-pooling.





Supernova 2014J and Asteroid 2 Pallas

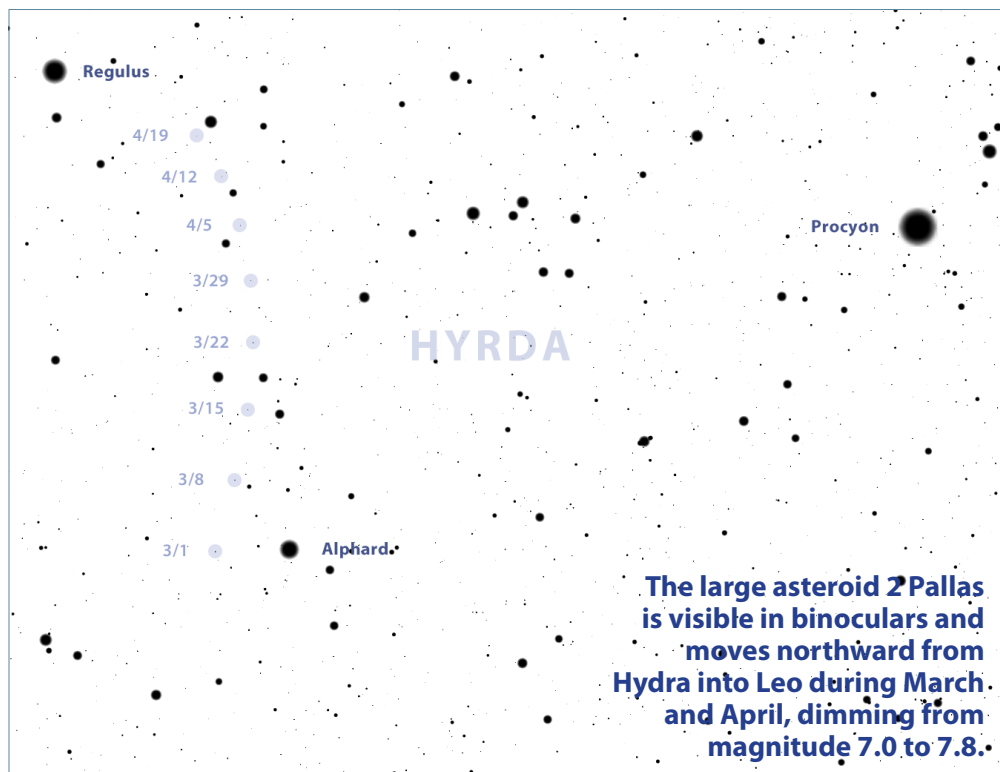
Craig Cortis

Around the end of January (exact date not recorded) I visited my friend Tim Dube in East Douglas, Mass. for an attempt to view the much hailed supernova in the galaxy M82 in Ursa Major. We used an 8-inch SCT at 45 power, the lowest magnification obtainable with an available eyepiece. Clear skies and a New Moon close to that particular evening made for a lucky combination for observing. M82 had obtained an altitude sufficiently high enough that things worked in our favor at the time of night involved. The date closely coincided with what was reported to be peak brightness for the supernova, about 10.5 magnitude, as I recall. Upon training the scope on M82, the supernova was immediately evident within the galaxy's soft glow. Two foreground stars of comparable magnitude pointed almost precisely to the supernova, making it appear as the end star of a convenient row of three nearly equally-separated stars. We did not notice any hint of the orange color seen in camera images or in larger telescopes; the color was plain white. I've personally seen very few examples of supernovae, but 2014J was easily the brightest and most prominent viewed by me to date. Articles and possibly entire books will be devoted to this marvelous supernova; the reasons for its importance are too numerous to list here. Much has already been written and is available on many websites – this is one for the record books, I'm sure. Unless I have it wrong, 2014J ranks as the most significant supernova since 1987A in the Large Magellanic Cloud (LMC). Although considered relatively close to our galaxy in terms of extragalactic distances, M82 is still about 75 times more distant than the LMC. I'll always remember the ease of seeing a single star's brilliance from approximately 12 million light-years away.

Asteroids seem to have a natural fascination for me and an opportunity to spot any of the major ones rarely escapes me. 2 Pallas – the largest or second-largest of the known asteroids – reached opposition on February 26. Ceres, at around 590 miles in diameter, is bigger than the 340-mile mean size of Pallas, but there's some question as to whether Ceres still technically can be called an asteroid. After all, the 2006 “mischief” undertaken by the I.A.U. (International Astronomical Union) resulted

in the demotion of Pluto from its traditional planet status to that of the newly-minted class, “dwarf planet”; asteroid Ceres was promoted (or elevated, if you will) to that same class of objects at about the same time. Regardless of its actual ranking, 2 Pallas is both historically interesting and reaches a brightness level that makes it easy to see, provided you can precisely isolate its position on a star atlas or finder chart for a given time and date. Asteroids look just like background stars and require careful study of an atlas or finder chart to know which points of light are stars, and which is the asteroid. On the night of 2/25 I used an ephemeris having coordinates for Pallas as of 7:00 p.m., or zero hours U.T. for 2/26. I observed at 9:30; the difference in true position over only 2.5 hours was no problem. The position was RA 9 hours, 44 mins., 53 secs. and Dec. -10 degrees, 23 minutes. This put Pallas only a few degrees to the east-southeast of Alpha Hydrae, Alphard, “The Solitary One” as named by Arabic astronomers. Alphard is conspicuous for its orange color and magnitude of 2.0, so star-hopping over to the asteroid's position was straightforward. Pallas was about mid-way between two easily identified little asterisms that could

be seen roughly 1.5 degrees east of the star 37 Hydrae, all of which were shown readily in my 4.2 inch Astroscan at about 18 power in its generously wide field. Pallas shone at magnitude 7.0 and was located exactly where its coordinates indicated it'd be at that time; no stars of comparable brightness were right next to it, fortunately. Positive identification was therefore simple and left no room for doubt. (I should add that it isn't always this easy!) Pallas was located in extreme southwestern Sextans, a short ways over the border with Hydra. By the way, Ceres and Vesta are both coming to opposition at the same time in mid-April and are very close to each other on the sky in Virgo. Vesta is the brightest asteroid and will attain a magnitude of 5.8; Ceres will be at magnitude 7.0, so it'll be a good chance to see these “minor planets” if you've not done so – they're worth the effort, for those inclined. The major astronomy publications will have charts and observing information, and you can find extensive data on several key websites. Good star atlases and/or finder charts will show you the way. Perhaps special observing sessions could be arranged by Skyscrapers, but be forewarned: the mid-April time involved is approximately 11:30 p.m., D.S.T.





Open Cluster & Planetary Nebula in Puppis M46 & NGC 2438

Glenn Chaple

There's a saying that goes, "You can't see the forest for the trees." In the case of the planetary nebula NGC 2438, "you can't see the nebula for the stars." NGC 2438 lies within the northern portion of the open cluster Messier 46 and is often overshadowed by the surrounding stars.

M46 and NGC 2438 are located in a rather star-poor region in the northwest corner of Puppis. To find them, trace an imaginary line from beta (β) Canis Majoris through Sirius and extend it about 14 degrees eastward. Here, binoculars and finderscopes will reveal a pair of clusters just 1 ½ degrees apart. The brighter, splashier one is M47 (we'll look at that one another time). The fainter, more concentrated one to its east is M46.

M46 was discovered by Charles Messier in 1771. Shining at 6th magnitude, it spans an area about 20 arc-minutes across and contains some 180-plus stars brighter than 13th magnitude. My first encounter with

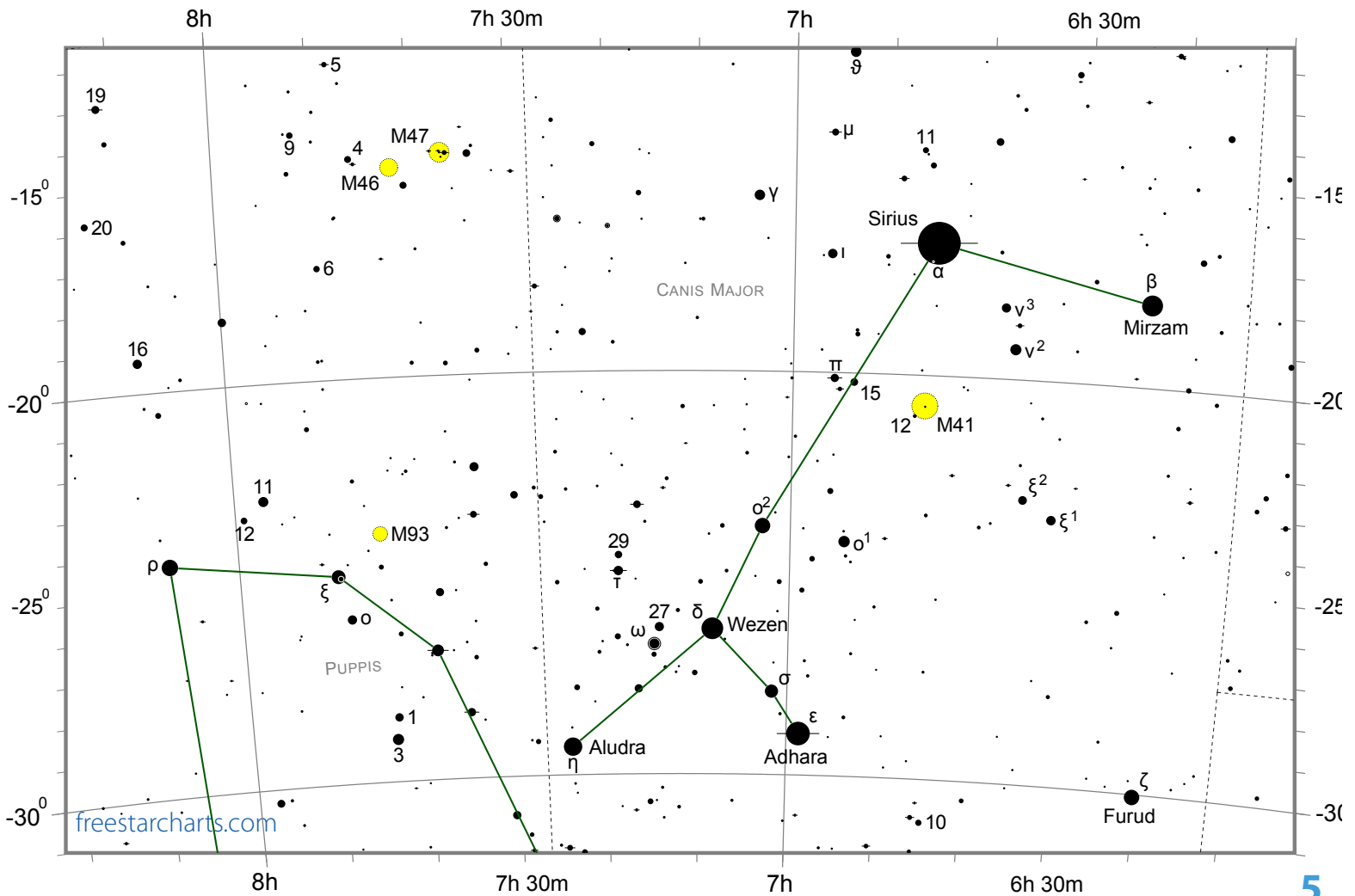
M46 came in 1978 when I viewed it with a 3-inch reflector and magnifying power of 30x. My logbook entry reads, "much fainter than 388 (note: my 1966 edition of *Norton's Star Atlas* plotted M47 using its Herschel designation of 388); individual stars hinted at with averted vision." In 2010, I revisited M46, using a 4.5-inch reflector and the same 30x magnification. The cluster was more readily resolved, and I noted "numerous mag 10-11 members." On both occasions, NGC 2438 went unobserved. I had failed to see "the nebula for the stars."

That changed last winter when I made a purposeful search for NGC 2438. Using a 10-inch reflector and a magnification of 80x, I easily spotted the 11th magnitude "puff-ball," which is about an arc-minute across. Knowing where to look, I switched to the 4.5-inch reflector – this



Photo by Mario Motta, M.D.

time with 75x. Sure enough, I could make out a faint, averted vision glow in the correct spot. By the way, Messier also failed to see "the nebula for the stars." NGC 2438 was discovered by William Herschel 15 years after Messier found M46.



freestarcharts.com



Highlights of the Spring Sky

Francine Jackson

One of the problems of working a lot is that often the magazine reading pile becomes like a mini Mt. Everest; however, don't throw any of it away, as sometimes the information found in this pile can be too informative to pass up. Such as happened recently, as I was looking through the May 2012 issue of *Astronomy* magazine. In it is an invitation by Phil Harrington to become introduced to some great, yet not too difficult, springtime celestial objects. And, the best part of this is they should all be able to be captured with just a pair of binoculars.

Harrington begins with a unique feature many of us have probably not thought of: using Polaris as the diamond of a circlet of stars forming a loose engagement ring. From there, he directs you to the spiral M101. Then, it's off to M106, a beautiful spiral in an often forgotten part of the sky, Canes Venatici, the Hunting dogs, resting comfortably below the tail of Ursa Major, the Big Bear. Also within the hunting dogs is M94, not as easily observable, but still accessible with binoculars. We often think of the region of Canes Venatici as the home of

globular cluster M3, so it was nice of Phil Harrington to remind us of other important deep-sky objects within this patch of sky.

On to Leo, and NGC 2903, right off Leo's head, southwest of the tip of the sickle. This is noted to be the dimmest of these 10 objects, at magnitude 9, so consider this the greatest challenge of the group.

Harrington then has us going to Leo's back legs, then following a curving line to Tau Leonis, which makes a nice-looking set with a star just off to its southeast. Placing these to the upper right corner of the field, you might be surprised to see three faint apparent doubles. He has named this his asterism the Double Cross. By the way, he does note that none of these do form a true binary, but this is still a nice part of the sky to observe.

Probably the hardest part of this voyage through the sky is the next object, barred spiral M83, located low in Hydra. This time, instead of having to look for a very dim object, you might have to look for a good south exposure.

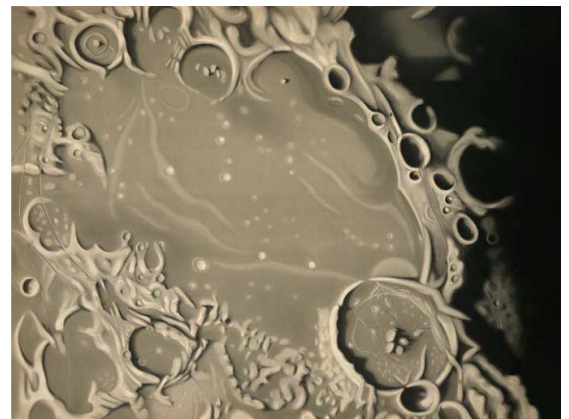
Heading back north, looking just off the kite shape of Boötes, will be a not-to-be-missed optical double, Nu Boötis. They, like summer's Albireo, are golden and bluish. Continuing upwards, stop at 16 and 17 Draconis, another – as Harrington puts it – set of stellar headlight s.

Finally, his journey ends in Corona Borealis, to the star R, a variable star just about 3 degrees east-northeast of the constellation's brightest star, Gemma (or Alph-ecca). It is said R's magnitude can go from a rather bright 6 all the way to 14th. Let's end our trek by determining approximately where it is brightnesswise.

As mentioned above, this information comes from an article written in the May 2012 *Astronomy* magazine, which does give more in-depth information than this short note. But, whether you read just this or find the entire article, this might be a good introduction to the sky for a new person starting out in the subject, or for the seasoned observer, just for a fun change of pace. Anyone up for it?



Mare Humorum, as photographed by Bob Horton using the 16" telescope at the B&H Observatory, and an artistic view, as painted by Trouvelot in 1875 using Harvard's 15" refractor. Ladd Observatory has six Trouvelot lithographs on display, including this one.





March 1 We got bused about 30 miles out of town last night to a dark site. Moderate level aurora with some decent structure and rays at times.



From Fairbanks, February 27 After 15 hours and 3 planes we got in to clear skies and -6F. This is hand held for 1 second out of the airplane window. Still going on when we got to the hotel but not as bright and the street lights were bad all around. Too top irked to get away from the lights. Hopefully more chances later.

HUBBARDS IN ALASKA

FEBRUARY REPORTS



Secretary

Tom Thibault

Skyscrapers January Meeting Minutes – 2/7/14

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

President, Ed Haskell: Ed began our meeting by informing the membership that resolution has been achieved in regards to insurance coverage for the organization. • Ed noted the proposal for the creation of a 3rd Vice President will be tabled for now. The next administration will review and discuss the viability of the creation of this position. • Ed presented Presidential Awards to Jim Hendrickson and Dave Huestis. Ed noted the many contributions to Skyscrapers over the years of both Jim and Dave. Jim's continued outstanding efforts as Skyscrapers Editor and Web Master continues to promote our organization to our members and the public. Dave's long standing support for the organization and maintaining the historical aspects of the society. Dave has held numerous positions and continues to be involved with Outreach Programs to promote Skyscrapers to local communities.

2nd Vice President, Bob Horton: Bob is organizing a trip to the Springfield Science Museum on March 22nd that will include a visit to Wilder Observatory which houses the 18" Clark Refractor. The trip will also include a show at the Museums Planetarium. Those interested in participating should contact Bob. • Bob Horton proposed a Lifetime Membership be presented to Al Hall for his continued support of

Skyscrapers over the decades. Al has been instrumental in the continued maintenance of the 8" Clark Refractor including the recent total restoration completed in 2010. Ed called for a vote and the membership approved the proposal.

Treasurer, Linda Bergemann: 2014 Membership Dues are being accepted, payment of dues can be completed by either or check to Linda or online via the Skyscrapers web site.

Secretary, Tom Thibault: Notified the membership of the upcoming elections. • Identified Dave Huestis and Jim Hendrickson as Nomination Committee members. • Noted that all positions are open to nomination. • Urged all members with an interest to speak with a Nomination Committee members or indicate by utilizing the sign-up sheet provided at the meeting.

Historian, Dave Huestis: Five (5) Centennial Seagrave Observatory Calendars are available for a \$20.00 donation.

Trustee, Steve Siok: Steve is organizing a viewing session of the upcoming asteroid occultation of Regulus. 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.

1st Vice President, Kathy Siok: Kathy introduced Tim Goudge, our featured speaker for the evening. Tim's presentation was followed by a short presentation by Francine Jackson's.

Speakers: Tim's presentation, "The Role of Water in Shaping the Surface of Early Mars" was well received invoking numerous questions from those attending. Presented with numerous graphic and data based on recent observations was enlight-



Treasurer

Linda Bergemann

Cash Flow YTD as of February 17, 2014 (4/1/13 through 2/17/14)

INFLOWS

AstroAssembly	
Banquet	\$1,220.00
Grill	\$421.50
Misc	\$300.00
Raffle	\$506.00
Registration	\$1,540.00
TOTAL AstroAssembly	\$3,717.50
Centennial Calendar Donation	
Misc Donation	\$263.00
Refreshment Donation	\$172.20
TOTAL Donation	\$435.20
Dues	
Contributing	\$154.05
Family	\$300.00
Junior	\$15.00
Regular	\$1,240.00
Senior	\$650.00
TOTAL Dues	\$2,359.05
Misc Income	
Sale of Items	\$630.00
TOTAL Misc Income	\$630.00
Star Party Donations	
Subscription Income	\$74.00
Astronomy	\$358.00
Sky & Telescope	\$230.65
TOTAL Subscription Income	\$588.65
FROM Preservation Fund (See note below)	\$96.30
TOTAL INFLOWS	\$8,500.70

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	\$299.60
Corporation, State Fee	\$30.00
Postage and Delivery	\$18.40
Presidential Fund	\$55.07
Property Insurance	\$2,566.00
Refreshment Expense	\$138.59
Subscription Payments	
Astronomy	\$392.00
Sky & Telescope	\$230.65
TOTAL Subscription Payments	\$622.65
Trustee Expense	\$1,252.79
Utilities	
Electric	\$169.92
Porta-John	\$693.00
Propane	\$80.25
TOTAL Utilities	\$943.17
TO Preservation Fund (See note below)	\$96.30
TOTAL OUTFLOWS	\$8,148.91
OVERALL TOTAL	\$351.79

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

Cash and Bank Accounts - As of 2/17/14

Capital One Bank	\$12,332.49
Checking	\$11,186.80
TOTAL Bank Accounts	\$23,519.29



Tim Goudge



Francine Jackson

ening. • Francine's presentation, "The Central Falls Train Wreck of 1853 and the Institution of Time Zones" outlined the local tragic event that resulted in technological advances in time keeping.

Meeting adjourned at 9:45PM

Submitted by Tom Thibault - Secretary

Board of Directors Meeting Minutes – 2/24/14

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

Ed Haskell, President: Meeting called to order at 7:00PM offsite.

Kathy Siok, 1st Vice President: March 7th speaker Adria Updike presenting "Observing the Early Universe with Gamma Ray Bursts". • April 4th speaker Dr Katrien Kolenberg presenting "Stellar Music". • Future speakers are being confirmed.

Bob Horton, 2nd Vice President:

The planned March 22rd Springfield Science Museum was well received and a large number of members signed up to participate. • Membership Dues payments can now be completed on our web site via the Paypal system.

Tom Thibault, Secretary: Reported on the current activities and status to date of the Nomination Committee.

Trustees: Steve Siok noted planning for the Asteroid occultation of Regulus continues with a site in New York just over the Hudson River has been selected with more information to be provided. • Jim Crawford discussed the PA system recently acquired for use by the organization at meeting and events. • Jim Crawford outlined a number of grounds projects to 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 current status of the Au-

tomation Committee. Discussions focused on next steps and equipment improvements needed to take full advantage of the remote viewing capabilities.

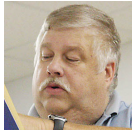
Ed Haskell, President: Appointed Conrad Cardano and Jim Crawford as the Election Committee for this year's elections. • Noted the dramatic reduction in Outreach income this year. Discussion ensured regarding reasons leading to this condition and possible improvements that could minimize the impact that weather conditions contributed to this year's results.

Meeting adjourned at 8:45PM

Submitted by Tom Thibault - Secretary

Jim Hendrickson and Dave Huestis receive Presidential Awards from Ed Haskell at the February 3 meeting.





Sunspot Count Project Challenge for Science Teachers

Dave Huestis

General knowledge of basic science concepts and processes is severely lacking among students of all ages in the United States. What I learned in grade school back in the 60s is unfamiliar to many university level students today. This educational disparity is especially true for the science of astronomy, which is the reason why I devote so much of my time enlightening students and the general public about the wonders and beauty of the universe.

With that said, I hereby challenge local science teachers to introduce their students to the most important (for Earthlings anyway) astronomical object in the universe—the Sun. It’s something we all take for granted, but very few students really know anything about our life-giving star, other than it rises and sets and provides light and heat. Adding a semester-long sunspot count project to a science class would be a worthwhile educational experience.

A comprehensive article about the Sun’s origins and activity has been posted on this Science Teachers Sunspot Count Project Challenge webpage: (<http://www.theskyscrapers.org/science-teachers-sunspot-count-challenge>). Feel free to use and modify the contents to suit your own requirements. Once your students have gained some insight into the Sun and how it works, the key component of this challenge is to have them safely observe the Sun online to conduct sunspot counts. Please be sure to counsel them never to look directly at the real Sun with the eyes or any instrument such as a telescope or binoculars.

Why is it important to monitor solar activity? The Sun is not the perfect unblemished body it was once thought to be. A casual review of daily solar images will reveal dark spots crossing the solar disk. Solar activity waxes and wanes over an average period of 11 years (called the solar cycle), and the presence of sunspots is a visual indicator of the level of this cyclic activity. By monitoring the sunspots and other related solar phenomenon, researchers can better forecast when the Earth will be affected by increased (or decreased) solar activity.

What are sunspots? Basically sunspots result from very intense magnetic fields breaking through to the Sun’s surface (called the photosphere) from below as

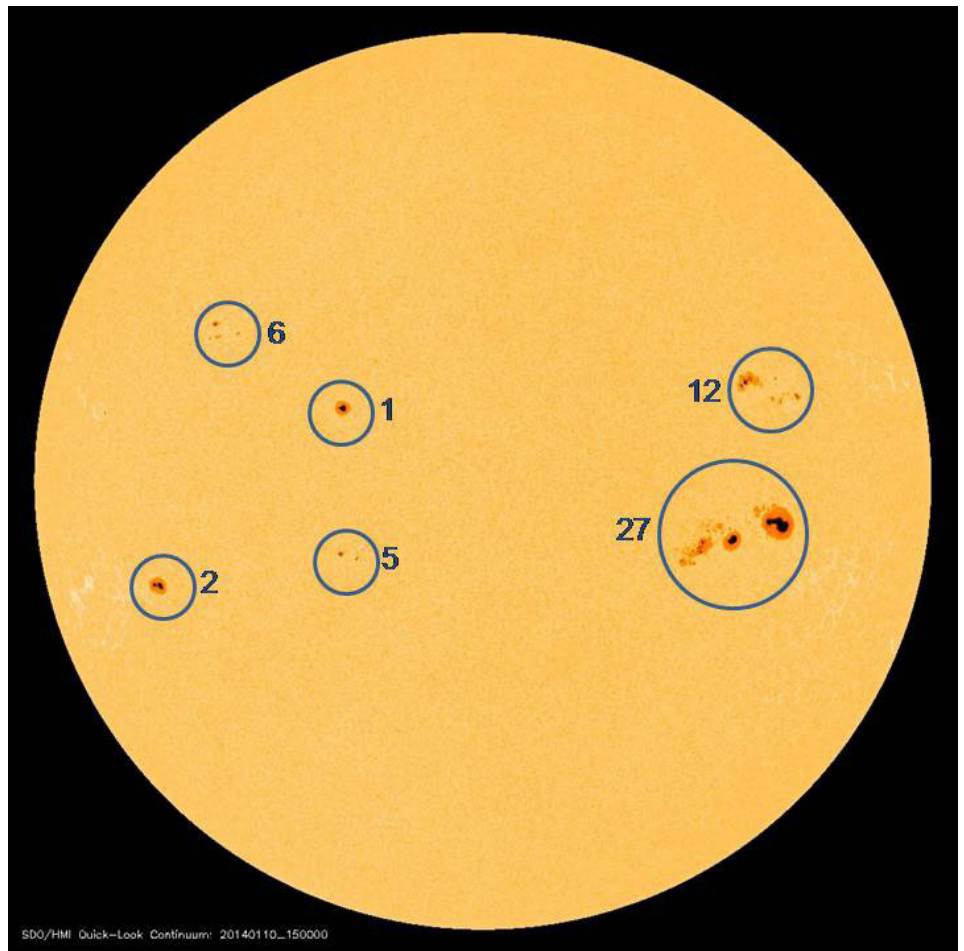
twisted magnetic loops with one end having a north polarity and the other end a south polarity. These magnetic fields effectively isolate the region from the surrounding area, causing the area to cool. That is why sunspots appear darker. Clusters of sunspots form intricate groups. Day-to-day changes are easily noted as groups evolve into larger and more complex magnetic clusters or disintegrate and diminish in size and complexity as the magnetic fields break down.

Though the Sun’s energy output usually only varies by a small percentage, solar activity (or the lack of it) can have drastic consequences for the Earth. It is well documented that from 1645 to 1715, the solar cycle was completely disrupted. For 70 years the number of sunspots was incredibly low and did not follow the average 11 year period. In fact, within this Maunder Minimum there was a 30-year period where solar observers recorded only about

50 sunspots total! A more “normal” period would have produced an estimated 40 to 50 thousand spots!

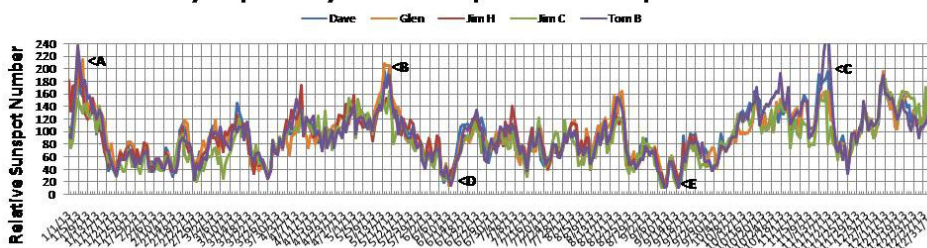
This extended period of solar inactivity coincided with the middle and coldest part of the Little Ice Age in Europe and North America. In Europe starvation was widespread, and in 1709 the Rhine River remained frozen until summer. When the spots returned in 1715 after such a long absence, several scientific papers were written because the phenomena were once again considered unique.

While ground-based telescopic sunspot observations are still being performed by dedicated astronomers today, the Sun is being continually scrutinized by a host of orbital solar observatories. Members of Skyscrapers and I conduct our sunspot counts using solar images from SOHO (Solar & Heliospheric Observatory: http://sohodata.nascom.nasa.gov/cgi-bin/data_query) obtained at 15:00 UTC (UTC is a



SDO/HMI Quick-Look Continuum: 20140110_150000

Skyscrapers Daily Relative Sunspot Number Comparisons



worldwide time standard used by astronomers – currently five hours ahead of EST). The HMI Continuum image we examine is similar to a visible spectrum view we would see with a properly filtered telescope. The Challenge webpage provides a Sunspot Count Project Details guide.

All one has to do is count the number of groups and the number of dark spots. Then you can use a formula developed in 1848 by astronomer Rudolf Wolf so solar observers could uniformly report sunspot numbers. The formula is: $R(\text{relative number}) = (10 * \text{number of groups}) + (\text{number of spots})$. On the accompanying solar image from 1/10/2014, I have circled the groups and have indicated the number of spots counted. The resulting relative sunspot number would be: $(10 * 6) + (6+1+12+2+5+27) = 60 + 53=113$. That relative number is then inputted to an Excel spreadsheet and a graph can be created to display the data. Download a sample spreadsheet template from the Challenge webpage to help get you started.

Please see the accompanying graph of the Skyscrapers Sunspot Count Project for 2013. Should this graph or the solar image referenced above not be included with this column due to space limitations, they can be accessed on the Skyscrapers website (<http://www.theskyscrapers.org>).

Notice the semi-regular highs and lows. However, note the high around January 5 (label A on the graph). The counts then dropped dramatically and leveled off. Another peak came in mid-May (label B), followed by another decline. During mid-June the numbers bottomed out (label D). Then the counts rose, but not attaining a high level of activity. Then in mid-September the number of spots hit rock bottom (label E). In fact, on September 16, there was only one spot visible on the solar disk. The counts then rose to another plateau (C), though it was not as dramatic as the graph shows. One observer over-counted the number of tiny spots, causing the graph to spike. After that the numbers fell once again. Through the remainder of the year the counts continued their variable high and low cycle of activity, with no extreme

peak numbers. The relative sunspot numbers so far for 2014 have remained at modest levels with no peaks like those reported during 2013.

Astronomers have been tracking and numbering the 11-year solar cycle since 1755 with a sequential number starting at 1. Cycle 23 started in 1996, peaked in 2001, and was predicted to end in 2007. It didn't! New Cycle 24 didn't begin until January 4, 2008. However, Cycle 24 didn't "ramp up" as expected. In 2008 there were 266 out of 366 days that the Sun was spotless. This trend continued into 2009 as well. Only as the Sun progressed deeper into Cycle 24 was there an increase in the number of sunspots.

The initial forecast was for Cycle 24 to peak during late 2012. And it was originally predicted to be a large solar maximum. Coincidentally, the Mayan Long Count was ending on December 20, 2012 (Mayan Doomsday), prompting many apocalyptic scenarios, including the destruction of the Earth and its inhabitants by a huge solar event.

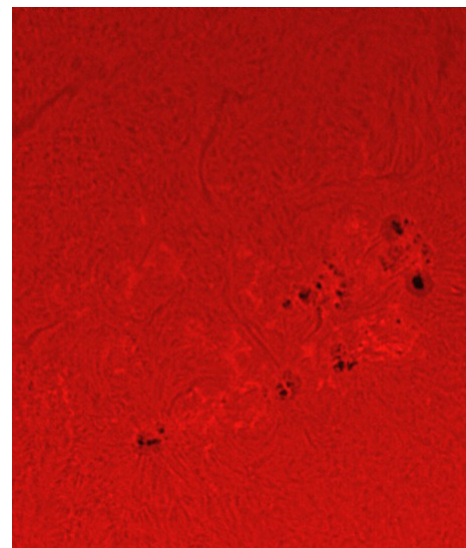
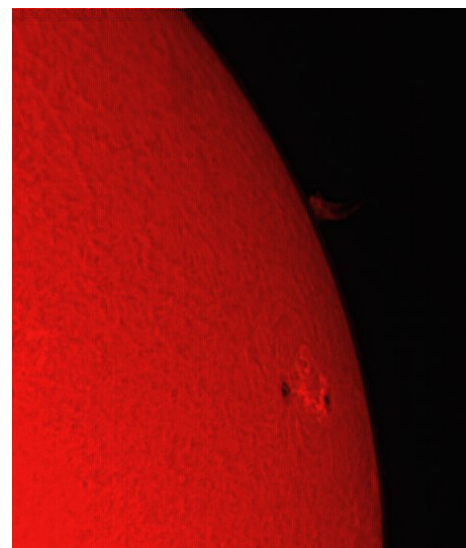
However, much before the alleged end of the world date, solar astronomers revised their date of solar maximum to May 2013. Not only that, but they also predicted the peak activity to be the lowest since around 1907! They later revised the solar max date again to the fall of 2013. Some researchers believed Solar Cycle 24 could show two peaks. We did observe two peaks in 2013, but only as Cycle 24 continues will we be able to state with confidence that solar maximum has already occurred.

I have been using a sunspot count project for my astronomy lab students at Bryant University for several semesters now. Since the weather usually prevents us from venturing outside to observe, this online observing project provides them with an insight into real science. And in fact, most of them become really good observers.

When inexperienced students first report their sunspot counts, graphed results are all over the chart. However, by the 3rd or 4th week, with feedback from yours truly, the plotted numbers start to merge on the

graph as they learn to become better observers. Some students have remarked that they enjoyed the exercise, since they had no idea beforehand that the Sun exhibited this dynamic activity. By the end of the semester many students' counts were almost identical to mine. And for that effort, extra credit was awarded to the top five observers in each lab.

So please consider accepting my challenge and introduce your students to an "eyes-on" activity that will help them understand our five billion year-old star, which many of us take for granted. Implementing a sunspot counting project can demonstrate that science can be educationally rewarding and fun!



February 22. Not too active, some small prominences along the edge. A very nice, large complex spot group near the center. Both taken with a Lunt 100 PT scope, ASI120MC imager and run thru ASI2 and then registax. Photos by Steve Hubbard.



What's Up in Space News?

Jason Major

If you're reading this then there's probably a good chance that, like me, you have a tireless fascination with space and astronomy. And while we may not have any Moon bases or footprints on Mars yet, that doesn't mean space exploration isn't very much alive and well! There are many exciting missions taking place right now that are expanding our knowledge of the Universe and the solar system we live in. Here's a look at just a few of the biggest stories in space exploration from the past several weeks.



Rosetta Wakes Up

On Jan. 20, the European Space Agency's Rosetta spacecraft awoke after spending over two and a half years in hibernation. Launched in March 2004, Rosetta has spent the past decade soaring through the inner solar system. It flew past Mars and Earth several times and visited two asteroids – 2867 Steins and 21 Lutetia.

Now that Rosetta is awake and its health confirmed, it will enter the home stretch of its ultimate mission: a rendezvous and orbit of the comet 67P/Churyumov-Gerasimenko (aka "Cherry-Gerry") in August and, in November, the deployment of its Philae lander onto the comet's nucleus. It'll be the first time a soft landing on a comet has ever been attempted... very exciting! [Read more about Rosetta here.](#)

The Moon "Photobombed" the Sun

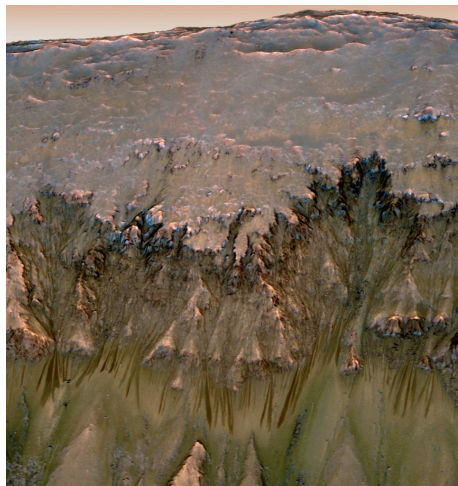
We didn't get to see an eclipse on Jan. 31, but that doesn't mean there wasn't one – NASA's Solar Dynamics Observatory had a front-row seat to its very own eclipse that day, from space! As SDO orbits Earth, during certain times of the year the Moon periodically passes between it and the Sun, creating brief partial eclipses as seen by the spacecraft. Jan. 31 was one of those times,

and it was the longest ever captured on camera by SDO. [Watch it here.](#)



Rocket Launch Seen From Space

There are six humans living and working aboard the International Space Station as you read this, collectively traveling 17,500 mph 260 miles or so above the Earth's surface. The views they get as they circle the world 16 times a day are, in a word, breathtaking, and on Feb. 6 NASA astronaut Rick Mastracchio got an extra surprise as he looked out his window: the launch of an Ariane 5 heavy-lift rocket from Europe's spaceport in French Guiana. He quickly snapped a photo and shared the image on [Twitter](#), to the instant delight of his 43,200 followers. (And who says social media is a waste of time?) Read more -- and watch a video of the launch -- [here.](#)



Signs of Water on Mars

As scientists explore Mars with orbiting spacecraft and six-wheeled roving robots, the Big Question remains yet unanswered: could there be life on the Red Planet, either now or some time in its past? In order for that to even be a remote possibility, researchers agree that one prerequisite must

exist – namely, liquid water. And while some water vapor can be found in Mars' thin atmosphere and plenty of water ice exists below its surface and in its polar caps, flowing H₂O on Mars' surface remains elusive.

That's why researchers are so interested in curious dark streaks that have been observed from orbit by NASA's Mars Reconnaissance Orbiter, appearing on steep slopes in Mars' mid-latitudes. Are they outpourings of salty water from melting subsurface ice? Or are they the result of a drier process in action? [Read more here.](#)



Curiosity Goes Dune Buggy

Now in its 556th "sol" on Mars (and counting) NASA's Curiosity rover continues to explore the interior of Gale crater, driving inexorably toward the hummocky slopes of Mount Sharp (aka Aeolis Mons). The rugged, rocky terrain of Mars has taken its toll on Curiosity's 20" wheels, though, gouging them with pits, cuts, and scrapes (good thing they're run-flats!)

In order to reduce wheel wear, mission engineers have chosen to take smoother paths where possible, and the rover just crossed through a sandy dune-filled pass nicknamed Dingo Gap into an open area called Moonlight Valley. After a little dune bugging, Curiosity turned around and is now roving in reverse in an attempt to further save tire wear. Moonwalking on Mars? [Read more.](#)

NASA's Newest Lunar Orbiter Returned First Moon Images

Launched back in September, NASA's LADEE (pronounced "laddie") lunar orbiter is currently in an equatorial orbit around the Moon, investigating the curious electrostatic effects of fine lunar dust on its incredibly thin atmosphere. (Yes, the Moon has an atmosphere of sorts, even if it's just composed of sparsely-held atoms and ions.)

On Feb. 8, LADEE snapped some images of the Moon while orienting itself with its star tracker camera, giving mission scientists – and space fans -- a treat when they downlinked the data. [See the images here.](#)

Saturn Slips Behind the Moon

As the Moon moves into an orbital orientation more in-line with the plane of the solar system, occultations of the planets by the Moon will become more and more common. One of the most dramatic ones to occur recently was an occultation of Saturn on Feb. 22. While we couldn't see it from here in Rhode Island, it was visible to skywatchers in Australia and astrophotographer Colin Legg captured the dramatic event on video from Perth early that morning. [Watch it here.](#)



Kepler's Exoplanet Count Doubles

There was a time not that long ago (at least it doesn't feel that long ago!) when the idea of finding planets outside our solar system was only in the realm of science fiction. Now exoplanets are science fact – and there's a lot of them out there! Just this past week the team from NASA's Kepler mission nearly doubled the total number of exoplanets discovered in our galaxy thus far with the announcement of **715 more confirmed extrasolar worlds.**

Many of the newly-confirmed exoplanets – “confirmed” meaning they aren't just

likely candidates but have actually been repeatedly detected using the [transit method](#) Kepler uses -- are large worlds known as mini-Neptunes and super-Earths orbiting closely to their host stars. But four of them are within the habitable “Goldilocks” zones of their stars, meaning that liquid water could stably exist on their surfaces.

Are we the only planet in the universe with life? With all of the other worlds that simply must be out there – including the ones scientists are now actually finding -- even if only a small fraction are habitable that still leaves a lot of possibilities. [Read more here.](#)

So as you can see there really has been

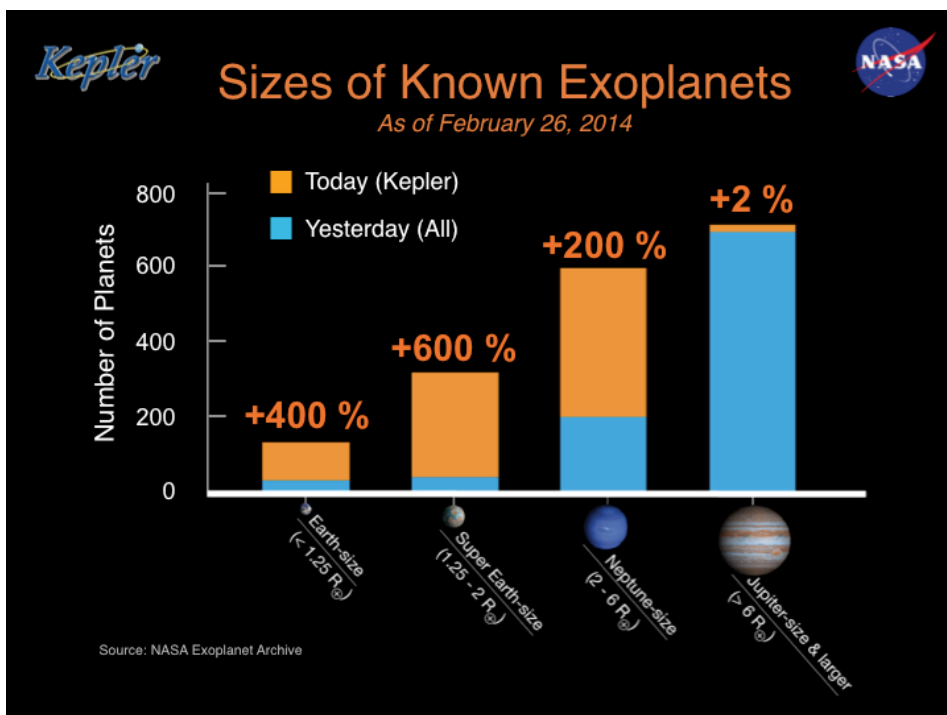
a lot going on “up there” -- and those were only just a few of the recent stories from the space news world! There were many more, including:

...a [visual demonstration of gravity](#) courtesy of Saturn's moon Prometheus and the Cassini spacecraft... Jupiter's largest moon Ganymede [got a new map](#)... SDO celebrated [four years of observing the Sun](#)... a runaway star was seen [shocking interstellar space](#)... strange findings about the recent [supernova in M82](#)... China's Yutu rover survived two lunar nights but [suffers technical difficulties](#)... and yet another meteorite has been found holding tantalizing [hints at the possibility of ancient Martian life](#). It's an exciting time for space exploration, and there's only more to come. I can't wait to see what the next month brings!

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 [LightsInTheDark](#). 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/march-2014-space-news>





A December's Winter Night

Mark Sweberg

The deep, dark and incredibly cold winter's night had begun. It was going to be a good one.

It was 7pm, and already a steady stream of visitors was making its way to the sixteen-inch telescope in the dome, and a line was forming outside. This Friday night between Christmas and New Year's was a special and magical night. Visitors were in a festive mood - anticipation and excitement for the night ahead, mingled with new, sweet memories of the holiday season.

It was as if the Universe was in a festive mood, as well. The masterpiece above was unimpeded by any hint of cloud, or by any washing out by the Moon. The night was dark, still and cold; the crisp chill brought flushes to everyone's faces. Orion, Jupiter, and the Pleiades hung overhead, begging to be grabbed from the cosmos by eager hands, to be taken home as souvenirs.

We had ooh'd and ah'd during a four-minute pass of the International Space Station. With our naked eyes, we watched as it rose in the northwest and traversed the sky, shining ever so brightly. An enraptured man remarked he couldn't believe humans had put it up there. "Believe it," I intoned. "In fact, two cosmonauts are resting up there in that tiny point of light after today's record for longest Russian space walks in history."

Still, what was so special about the night was the composition of the crowd. It

abounded with families with young children, many visiting relatives in Rhode Island from far away. Yes, it was the magic in the children: the excitement in the faces; the urgency in their demeanor as they awaited their turn at the telescope.

From where I stood, I was reminded of a Facebook ditty I had seen a while back: a young boy and an old man, wearing matching tee shirts. The youth's shirt said: "If you want to learn something new, ask an old person." The old man's shirt replied: "If you want to learn something new, ask a young person."

So, I did.

I asked the young people what they thought, liked, felt. I told them I would dedicate an article to them.

This is that article. It's dedicated to the young astronomers who brazenly dragged their parents out with them to freeze one cold Friday night during the holiday season of 2013.

Among the several children I talked to that night was Tyler, age 7, who was visiting from nearby Connecticut, and was on his first visit to the Frosty Drew Observatory. As a regular backyard stargazer, he was no Johnny Come Lately to the evening sky. I enjoyed talking to him, and he later emailed me: "I had a great time! It was such a good view through the telescope. I loved seeing Jupiter and the Orion Nebula. Although it was a cold night, I did enjoy standing out to

stargaze. Even though a lot of people came, it was fun. I look forward to going again soon."

Tyler, it was great to see you! Come back again, maybe when the weather is warmer. The sky looks different in every season. But, if you come in the summer, get ready for the mosquitoes. They make dinner reservations, so wear long clothes!

And, to all the other young astronomers who gazed into the mystery of the nighttime sky and told me things from their perspective, I say thank you! Thanks for sharing your youthful enthusiasm and wonderment of the Universe with me. It's refreshing to see ruddy-cheeked faces peering into the eyepiece of a telescope through the lenses of young eyes. It figuratively opens up a whole new Universe for this old, tired, and well-traveled stargazer.

And, thanks for bringing out your parents. Tell them, gently, you'd like to come back again. Tell them you'll share the intelligence and excitement of youth with them. Tell them you'll teach them something new.

Frosty Drew is open every clear Friday night throughout the year. Visit Seagrave Observatory in North Scituate on Saturday nights, and Ladd Observatory in Providence on Tuesday nights, too. Just check in advance regarding opening times.

On behalf of the staff and other docents at Frosty Drew, I hope to see you back!

And, remember: Keep looking up!



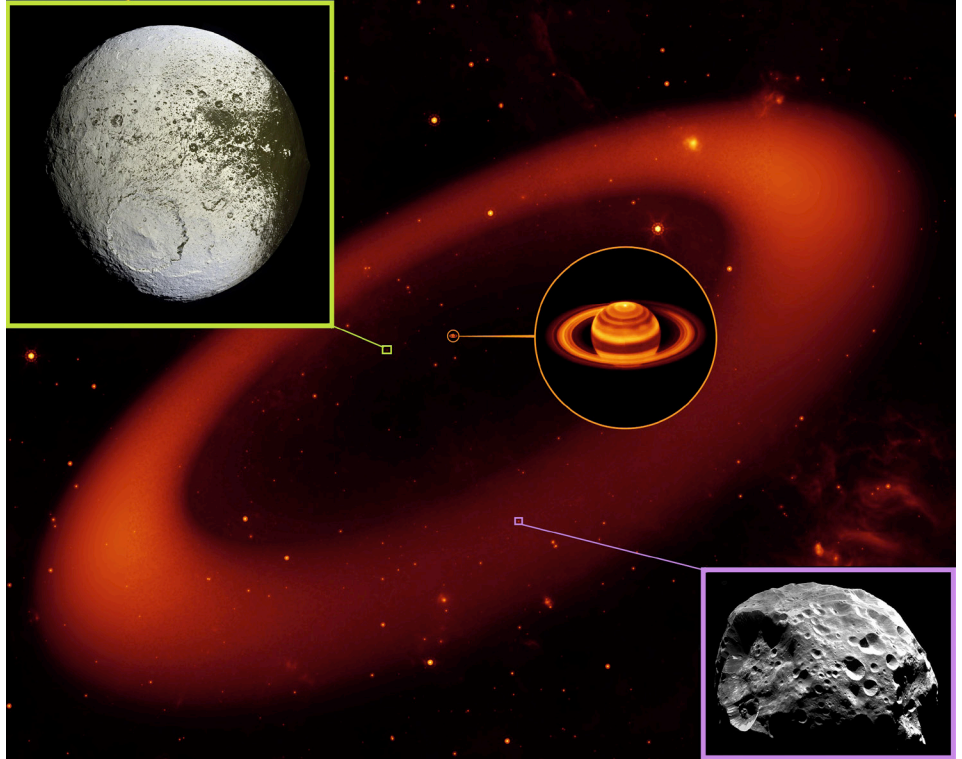
A Two-Toned Wonder from the Saturnian Outskirts

By Dr. Ethan Siegel

Although Saturn has been known as long as humans have been watching the night sky, it's only since the invention of the telescope that we've learned about the rings and moons of this giant, gaseous world. You might know that the largest of Saturn's moons is Titan, the second largest moon in the entire Solar System, discovered by Christiaan Huygens in 1655. It was just 16 years later, in 1671, that Giovanni Cassini (for whom the famed division in Saturn's rings—and the NASA mission now in orbit there—is named) discovered the second of Saturn's moons: Iapetus. Unlike Titan, Iapetus could only be seen when it was on the west side of Saturn, leading Cassini to correctly conclude that not only was Iapetus tidally locked to Saturn, but that its trailing hemisphere was intrinsically brighter than its darker, leading hemisphere. This has very much been confirmed in modern times!

In fact, the darkness of the leading side is comparable to coal, while the rest of Iapetus is as white as thick sea ice. Iapetus is the most distant of all of Saturn's large moons, with an average orbital distance of 3.5 million km, but the culprit of the mysterious dark side is four times as distant: Saturn's remote, captured moon, the dark, heavily cratered Phoebe!

Orbiting Saturn in retrograde, or the opposite direction to Saturn's rotation and most of its other Moons, Phoebe most probably originated in the Kuiper Belt, migrating inwards and eventually succumbing to gravitational capture. Due to its orbit, Phoebe is constantly bombarded by micrometeoroid-sized (and larger) objects, responsible for not only its dented and cavity-riddled surface, but also for a huge, diffuse ring of dust grains spanning quadrillions of cubic kilometers! The presence of the "Phoebe Ring" was only discovered in 2009, by NASA's infrared-sensitive Spitzer



Images credit: Saturn & the Phoebe Ring (middle) - NASA / JPL-Caltech / Keck; Iapetus (top left) - NASA / JPL / Space Science Institute / Cassini Imaging Team; Phoebe (bottom right) - NASA / ESA / JPL / Space Science Institute / Cassini Imaging Team.

Space Telescope. As the Phoebe Ring's dust grains absorb and re-emit solar radiation, they spiral inwards towards Saturn, where they smash into Iapetus—orbiting in the opposite direction—like bugs on a highway windshield. Was the dark, leading edge of Iapetus due to it being plastered with material from Phoebe? Did those impacts erode the bright surface layer away, revealing a darker substrate?

In reality, the dark particles picked up by Iapetus aren't enough to explain the incredible brightness differences alone, but they absorb and retain just enough extra heat from the Sun during Iapetus' day to sublime the ice around it, which resolidi-

fies preferentially on the trailing side, lightening it even further. So it's not just a thin, dark layer from an alien moon that turns Iapetus dark; it's the fact that surface ice sublimates and can no longer reform atop the leading side that darkens it so severely over time. And that story—only confirmed by observations in the last few years—is the reason for the one-of-a-kind appearance of Saturn's incredible two-toned moon, Iapetus!

Learn more about Iapetus here: <http://saturn.jpl.nasa.gov/science/moons/iapetus>.

Kids can learn more about Saturn's rings at NASA's Space Place: <http://spaceplace.nasa.gov/saturn-rings>.

New 13-part series
airs on Fox &
National Geographic
channels Sundays,
beginning March 9.



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