Astronomy Club of Tulsa

Observer

December 2013

Photo: Orion Rising. by Tamara Green.

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UPCOMING EVENTS

Public Star Party	Fri, Dec 6	ACT Observatory	7:00 PM
General Meeting	Fri, Dec 20	TCC NE Campus	7:00 PM
Sidewalk Astronomy	Sat, Dec 21	Bass Pro	6:00 PM
Christmas Eve	Tues, Dec 24		
Christmas Day	Wed, Dec 25		
New Year's Eve	Tues, Dec 31		
New Year's Day	Wed, Jan 1		
Members' Night	Fri, Jan 3	ACT Observatory	7:00 PM
Club Work Day	Sat, Jan 4	ACT Observatory	TBA
Back-Up Night	Sat, Jan 4	ACT Observatory	7:00 PM
Telescopes 101	Sat, Jan 11	TASM	2:00-4:00 PM
General Meeting	Fri, Jan 17	TCC NE Campus	7:00 PM
Sidewalk Astronomy	Sat, Jan 18	Bass Pro	6:00 PM
Public Star Party	Fri, Jan 24	ACT Observatory	7:00 PM
Back-Up Night	Sat, Jan 25	ACT Observatory	7:00 PM
Members' Night	Fri, Jan 31	ACT Observatory	7:00 PM

Telescope workshop 101 - Saturday Jan. 11 from 2:00 to 4:00 PM

So you got a telescope for Christmas, now what? Tulsa Air & Space Museum (TASM) is here to help!

Bring your telescopes to the planetarium on Saturday - January 11 from 2 to 4 pm. Volunteers from

the Tulsa Astronomy Club will be available for hands-on instruction and help with your telescope. Get started with the astronomy "bug" for a fun and exciting hobby. This is a Telescope 101 class for first time users and those who need to be reacquainted with the scope that's been hiding in the closet.

Call 918-834-9900 Ext 116 to enroll.

Details at **http://www.tulsaairandspacemuseum.org/index.php**

President's Message

By Mandy Nothnagel

December 2013

Hello everyone!

First and foremost, I would like to thank you for electing me as the new President of the Astronomy Club of Tulsa! I can sincerely say that I am honored and looking forward to another great year with the club. I would also like to thank Lee Bickle, the rest of the officers, and all of our volunteers for their dedication and for doing such a great job over the last year!

For those of you that do not know me, my name is Mandy Nothnagel and I am a science nerd. I love my job at Melton Truck Lines and will be completing my degree in Marketing and International Business at OSU (go Pokes!) next summer.

Although my degree will be in business, I have always been most fascinated by the complexity of science and the way it can explain *anything*- I was that kid that collected rocks, loved science class, and begged for a microscope when I was in 2nd grade. In fact, I would still have that cheap, little microscope if it didn't magically disappear during a move in college; but I guess things happen for a reason, right? Who knows, maybe I would have ended up in a biology club instead? Or maybe I AM in a biology club in a different universe… (I told you I'm a nerd, haha!)

The cosmos are so HUGE and there are SO many possibilities! That has always been my favorite thing about science. No matter who you are, what you've seen, what you've done, or what you've heard, there *is always* something out there that is so much bigger and so much more powerful that it will completely blow your mind! And it all exists because one, single, infinitesimally small speck exploded billions of years ago… that is just amazing! But I don't need to tell *you* this, my fellow nerd friends! We're all part of the club because we share a fascination for what *is* out there and what *could* be out there that we haven't discovered yet.

I would like to challenge each and every one of you to find at least one way to expand and share your interest in the cosmos per week. I'm not saying you need to read textbooks, dress up, and go door-to-door preaching about the Big Bang, but if you are out at night and want to start a conversation, point to Venus, Jupiter, or Mars and say "I bet you [a drink, dollar, etc.] that you can't name that star."

There are so many people, and of all ages, that are drawn to the mysteries of Astronomy that haven't had the chances to learn much about it. For someone that is merely interested, there really aren't many obvious opportunities to develop that interest into something more. Most people in Tulsa have no idea our club or observatory even exist! We need to change that!

At the "BBQ and Baklava" Annual Dinner last month (which, I must add, was a huge success!), you joined me in saying "thank you" to some of our volunteers of 2013. I cannot stress enough exactly how important and appreciated our volunteers are. They donate their time, knowledge, and experience to the community, which, in my opinion, is priceless. I have developed so many lifelong friendships during our events- I strongly encourage you to come and participate or volunteer in as many events as your schedule allows so that you can get to know these awesome people! Contact me if you are interested!

As you can tell, the Astronomy Club of Tulsa has a lot of potential and I want to help us reach it. Richard, our new Vice President, the Board, and I have discussed a lot of great ideas and goals that will grow our community involvement; boost our membership and their involvement; make our events more fun, convenient, and engaging for all demographics; and help us raise money so that we can continue to maintain and improve our observatory. One goal that I am very excited about achieving this year is building a strong partnership with the Jenks High School Planetarium. I have spoken with their director and I think that the relationship could prove to be beneficial for both the planetarium and for the club.

I would appreciate any ideas, advice, suggestions, or concerns related to events, activities, or the club in general that you would like to share. Of course, all submissions will be confidential and taken into consideration. Please do not hesitate - your thoughts are important to me!

Again, I am excited for 2014! We have a great Board of Directors this year and I am confident that we will get a lot accomplished!

Thank you and I look forward to seeing you soon!

Mandy Nothnagel

Astronomy Club of Tulsa

President

ACT_Pres@AstroTulsa.com

Treasurer's Report

By Tim Davis

Treasurer and Membership Report

Tim Davis, ACT Treasurer

Astronomy Club of Tulsa: 114 members, including 41 new members in 2013.

Welcome to our new members this month: Ronald Philips, Alexander Kitchens, Anthony Ladd, Clayton Crider, Nancy Baumann, James Haddock, Christopher Pinson, Rod Abbott

Club Accounts as of Dec 1, 2013:

Checking: $ 10,074.04

Savings: $ 767.54

Investment account: $ 19,736.36 (Value Fluctuates with Market)

PayPal: $ 0

The club now has PayPal available for you to start or renew memberships and subscriptions using your credit or debit cards. Fill out the registration form at http://astrotulsa.com/page.aspx?pageid=16 Click Submit and you will be given the choice of either mailing in your dues with a check or using PayPal which accepts most major credit cards. A modest processing fee is added to PayPal transactions.

NEWS NOTE: Both Sky & Telescope and Astronomy have free Digital subscriptions available with print subscriptions, or Digital subscriptions may be purchased separately. Contact their websites for details.

Membership rates for 2014 are as follows:

Adults: $ 45 per year, includes Astronomical League Membership.

Sr. Adult: $ 35 per year for those 65 or older, includes Astro League Membership.

Students: $ 30 with League membership; Students: $ 25 without League membership.

Additional Family membership: $ 20 with voting rights and League membership, $ 15 with voting rights but without League Membership.

The regular membership allows all members in the family to participate in club events

but only ONE Voting Membership and one Astronomical League membership.

Join Online – Add or renew magazine subscriptions. http://www.astrotulsa.com/page.aspx?pageid=16

Magazine Subscriptions: If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Forms are available on the club website.

Astronomy is $ 34 for 1 year, or $ 60 for 2 years. www.astronomy.com

To get the club discount you must go through the club group rate.

Sky & Telescope is $ 33 per year www.skyandtelescope.com

Sky & Telescope also offers a 10% discount on their products.

Note: You may renew your Sky & Telescope subscription directly by calling the number on the renewal form, be sure to ask for the club rate.

NEW SUBSCRIPTIONS must still be sent to the club.

The Secretary's Stuff

By Tamara Green

ASTRONOMY CLUB OF TULSA – MINUTES – ANNUAL DINNER MEETING AND ELECTIONS, NOVEMBER 15, 2013

PRESENT:

Lee Bickle, President

Stan Davis, Vice President

Tamara Green, Secretary

John Land, Treasurer

Mandy Nothnagel, Board, Group Director

Michael Blaylock, Board

James Taggart, Board, Facilities Manager

NOT PRESENT:

Jody Ray-Fleetwood, Board

The meeting was held at Tulsa Air and Space Museum Planetarium. There were 54 attendees, 30 of whom were voting members.

WELCOME AND INTRODUCTION: Lee called the meeting to order at around 6:30 PM and welcomed everyone.

PROGRAM: The meeting began with dinner catered by Billy Simms BBQ. Festivities included a short presentation on Greek astronomy by Mandy, a silent auction, a prize drawing, recognition and appreciation of people who have served the club in one capacity or another, a planetarium show, and a group photo.

OFFICERS'/STAFF REPORTS:

PRESIDENT – Lee had passed out printed pages of information about the roof repair at the observatory and went over the quote. He stressed how important it is to protect our investment in the building and what we have in it. Lee then made a motion to carry the roof repair through, and suggested that members donate whatever they can to help with the cost. Mandy seconded. All were in favor, and motion carried. Lee then announced that it was time for the election of officers and board, and told everyone that since the ballots only had the names of the candidates for offices and board positions, to write down "Roof Repair" and either "Yes" or "No" at the bottom of the ballot.

Candidates for each office were:

Mandy Nothnagel, President, uncontested.

Richard Brady, Vice President, uncontested.

Tamara Green, Secretary, uncontested.

Tim Davis, Treasurer, uncontested.

Lee Bickle, Board

Michael Blaylock, Board

Stan Davis, Board

John Land, Board

Christopher Proctor, Board

James Taggart, Board

Skip Whitehurst, Board.

While Tamara and her husband Owen counted the ballots, Mandy began the ceremony of recognizing everyone who served the club in one capacity or another, either as an officer, board member, staff member or volunteer, giving certificates to those who served.

Following the ceremony was a door prize drawing.

After that, Lee made a motion to keep former treasurer John Land on as an assignee for our paperwork at our bank, with all the assignees being Tim Davis, Treasurer, Mandy Nothnagel, President, Richard Brady, Vice President and John Land, former Treasurer. Mandy seconded. All in favor, motion carried.

Secretary Tamara announced the results of the election:

President – Mandy Nothnagel

Vice President – Richard Brady

Secretary – Tamara Green

Treasurer – John Land

Board – Lee Bickle, Michael Blaylock, Stan Davis, John Land, Christopher Proctor, James Taggart and Skip Whitehurst.

The roof repair was approved by a majority vote.

Following the election results announcement was a planetarium show and then a group photo.

After that, volunteers cleaned up the planetarium lobby and the meeting/party ended.

A Message from the Vice President, by Richard Brady

Hi. I'm Richard Brady, your new vice-president. I joined the club last summer. I've been interested in astronomy for years (I would say decades, but that would be dating myself.) I have an unused BS in Astrophysics from the late '70s. (Oops. There I go dating myself again.) I also enjoy space exploration and photography and science fiction.

I am planning on writing a monthly column for the newsletter. In it I want to answer member's questions about astronomy and space exploration and any related topics. Please send me any questions you might have by selecting the Vice President button on the contact page on our website. I'll pick one or two to answer each month.

I would like to see a couple of things happen with the club. First I would like to see us have more Sidewalk Astronomy events. One venue that we might be able to use is Guthrie Green in downtown Tulsa (just two blocks west of the baseball park). I noticed they had a movie night each Thursday this summer and fall. If they have this next year we could show up at some (with their permission of course). If we can get more volunteers, the more nights we could be there. I wouldn't expect the same few people to show up each week. Plus you get to see a free movie. Go to guthriegreen.com for more info about Guthrie Green. Another place we might consider is the Owasso Gathering on Main. The first Thursday evening in the spring, summer and fall the town gets together with music, food and other attractions on Main Street. You can check it out on Facebook.

I would also like to see the club do something for Astronomy Day next spring, May 10th, and/or fall, October 4th, 2014. The Astronomical League has lots of stuff specific to Astronomy Day activities.

One other thing I would like to see is further improvements to our website. It is much better than what it was before, but I think we could improve it even more. Personally I would like to see a gallery page where members could post their astronomy related photographs (maybe some of these could go on the front page replacing the three big ones at the top), an FAQ section, and a message board. You can also sent me suggestions of what we might do.

To do these things, or anything else, we need volunteers. Actually, I should say more volunteers. Anyone reading this can be a volunteer. And you don't need to have a scope. If you think you don't know enough about astronomy to help, remember that with your interest in astronomy, you know more than the average person on the street. At any event, others in the club would be there with you to answer any questions you don't know or weren't sure about. And you get to hang out with others who share your interest in astronomy.
So in closing, please send me your questions through the website, or I won't have anything to write about next month. (I don't want to get Tamara mad at me by saying I'll have something for the next newsletter, but then not. Bad way to start out!) And your suggestions for the website too. And anything else you want to talk about.

Clear Skies!
Richard

Here is a nice winter (or any time of the year) recipe to try!

For those of you who like to have a nice, warm treat while cuddling with your cat (or dog, or whichever critter companion you may have) in a soft blanket on your sofa or who like to enjoy a little something to help you along on those cold observing nights, below you will find a recipe that I'm sure you will find delightful! I have personally made up a batch or two of this myself and it is really something special, especially with my homemade marshmallows!

I invite you to enjoy this recipe contributed by John Land!

Astronomer's Starlight Cocoa

"One sip of this and you'll think you're in Chocolate Heaven"

5 Cups Instant Milk

1/2 Cup Hershey's Cocoa Unsweetened powder

16 oz. Coffee Creamer

Large container Instant Cocoa Mix (16 to 30 oz size)

Blend above ingredients thoroughly in a large covered container.

Put 1/3 cup of powder in a ceramic or insulated cup

Add Hot Water while stirring it into the powder.

Stir until all powder is dissolved then enjoy!

Drive Me to the Moon *By John Land*

"Ole Blue Eyes", Frank Sinatra, is famous for his rendition of the song **"Fly Me to the Moon"**

http://www.youtube.com/watch?v=qtFBRJFN3p8

But what's this about driving to the moon? Below are images of my wife's faithful 1999 Mitsubishi Mirage that has literally driven enough miles to reach the moon. **238,800 Miles** that's more than 9.5 laps around the Earth. We bought the car from Enterprise rental in July 2000 to take on vacation because our other cars were getting old and unreliable. At the time I figured we'd get 4 or 5 years out of the little four cylinder car. After driving old gas thirsty V8 American cars I was pleasantly surprised to be getting 33 mpg and filling up the car for less than $ 10 of gas. Although gas has more than tripled in price since then its still getting around 30 mpg. We're now going on 13+ years and it's still running well. A few tune-ups, tires, struts and a couple of timing belts is all the maintenance we've had to do.

Below is an image I took at the "Super Moon" on June 23, 2013 when the full moon coincided with the moon's perigee - closest approach to the earth for the year. At that time it had already surpassed the moon's perigee distance of 220,066 miles. On Dec. 6, 2013 we reached the moon's average orbital distance of 238,800 miles and are now headed on to Mars. Just 34,424,983 more miles to go!

May You also enjoy many more Moonlight and Starlight Nights

with someone special in your life.

Photos from our November Dinner Meeting!

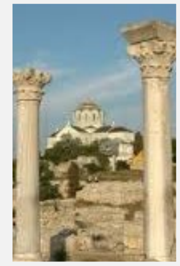
Photos contributed by Richard Brady and Tamara Green

On November 15, 2013, over 50 Astronomy Club of Tulsa members and their family members gathered at the Tulsa Air and Space Museum Planetarium for our “BBQ and Baklava” Event, featuring great food from Billy Simms BBQ, plus some delicious Pad Thai from Wimara Bickle and some rum balls from Tamara, an awards ceremony recognizing those of us who have served club in one way or another, a planetarium show and group photo, and the election of our officers and board members-at-large for 2013. Our new President Mandy and new member Clyde even went all-out and dressed in Greek costume for the event!

Above: Group Photo of Astronomy Club of Tulsa members and family members, by Tamara Green.

Now, On to the fun! Below are some photos from our new VP Richard Brady *(with some ancient Greek art pics, thrown in for flavor, courtesy of Google Images)!*



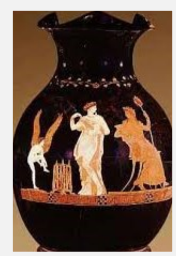




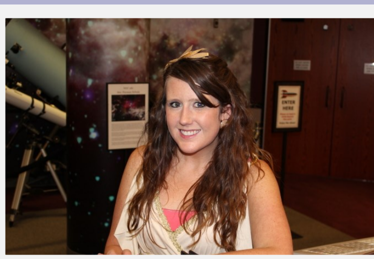












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PLANETOLOG





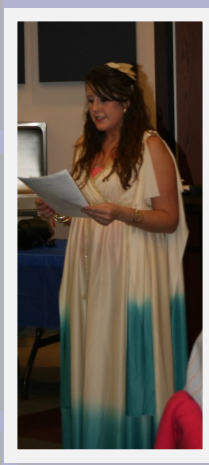
Thank you Richard for these wonderful photos! Now, below are some from Tamara!





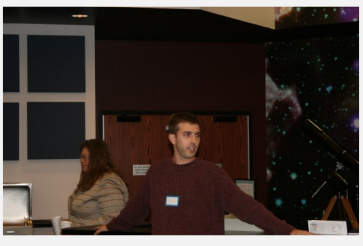
























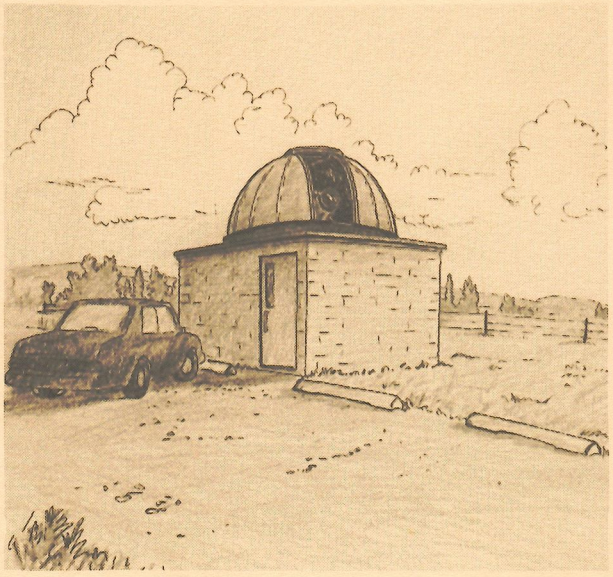

We thank you all for coming and doing your part to make this a memorable celebration! May we have many, many more like it in the years to come!

Image of the Partenon was an image found using Google Images. I felt it went along with out Greek/Astronomy theme.

Here is a bit of our Club's history, found and e-mailed to me by John Land!

ASTRONOMY CLUB

OF TULSA



THE OBSERVATORY

For Further Information:

Call Dr. Klaus Brasch at 918-631-2761
or write to
Astronomy Club of Tulsa
P.O. Box 740611
Tulsa, Oklahoma 74147-0611

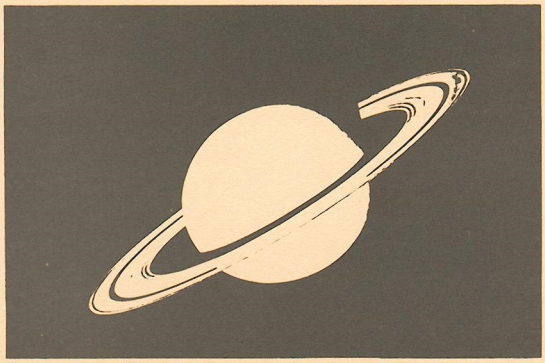
THE OBSERVATORY

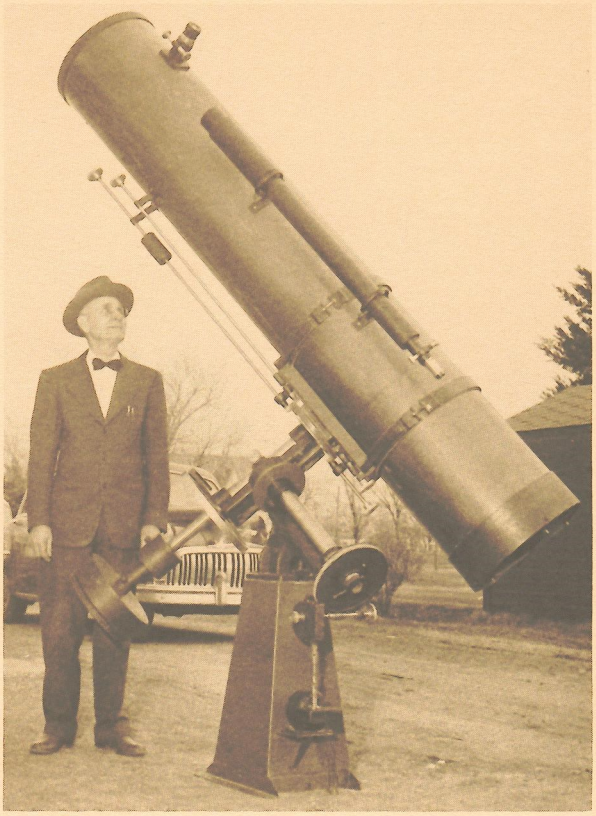
SITE:

The Observatory will be built on 0.8 acres of land donated by the Patricia Wheeler family. Located approximately 4 miles southwest of Mounds, Oklahoma, the site is adjacent to AT&T's microwave tower complex. The property is an ideal site for an observatory for several reasons. First, it is located a significant distance from city lights and thus provides the requisite dark skies for astronomical observing. Second, the 1,050 foot elevation provides an unobstructed view of the skies. Third, water, electricty and access roads are available.

PROJECT:

The observatory building will be constructed with a concrete foundation floor, masonary block walls and an 18 foot diameter, aluminized steel dome. Donated funds will be used for site preparation, fencing, construction materials and labor and the motorized dome. The estimated cost of this project is $25,000.





TELESCOPE:

The purpose of the observatory is to house the Astronomy Club of Tulsa's large reflecting telescope. This instrument is 16 inches in diameter, 8 feet long, and weighs approximately 1000 pounds. This telescope was originally built for Oklahoma State University ("OSU") in 1958, by master optician and craftsman, A.H. Hearn. (shown above) The telescope was acquired from OSU and donated to the Astronomy Club of Tulsa. The instrument, including electronic clock drive and German equatorial mounting, has been completely refurbished, and is valued at $20,000. Approximately $5000 worth of accessories have been donated to the Astronomy Club of Tulsa for use with the telescope.

NITELOG - **N**orway **I**n**TE**rurban **L**ocal **O**bserving **G**roup

By Tom Hoffelder

The goal of all the M's in 12 months and the H 400's in 24 is not working out exactly as I planned. Because there are so few objects in the fall and winter skies, compared to the spring with all the galaxies, we continue to run ever further ahead of the sky. What I mean by that is I previously presented objects that were within two hours RA of the meridian at the end of twilight. This month's objects don't begin to approach the meridian until around 10, and that is at the end of December. I guess the thing to do is save the sheets from previous months and work on them the best we can. And again, we've still got a bunch of comets to keep us up all night, so that should help! (No mention of the Geminid meteors this year due to the moon being near full.)

OBSERVING: For the Norway/South Paris area, the Twitchell Observatory, weather permitting of course,**Monday Dec 2nd**, which is New Moon. Maybe we'll stay all night to see how many of those comets we can catch! Possible impromptus on the 9th (next item) and late in the month once the moon is out of the way; those involved will receive emails.

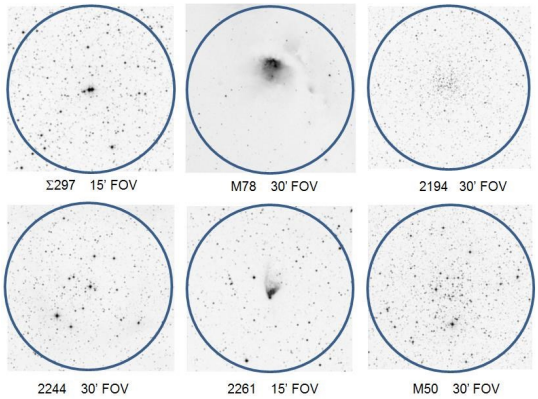
MOON: It's Lunar X time and this one is good across the whole US of A! It goes complete around 8 PM EST on Dec 9th. Attached is a brief summary of viewing conditions at some sample locations; you can get a good idea of your conditions based on the data. The X is visible for a couple hours after the time noted.
(S = setting, R = rising.)

Location	Local Sun Set	Local X Time	Moon Altitude
Norway, ME	16:03	20:00	37° S
Tolland, CT	16:18	20:00	40° S
West Palm Beach, FL	17:28	20:00	56° S
Ft. Wayne, IN	17:12	20:00	46° S
Tulsa, OK	17:09	19:00	53° S
Las Vegas, NV	16:25	17:00	52° R

COMETS: As some of you know, I was able to view the five comets in one night (11/3-4), but more notably I was able to see the four morning ones with an 8 inch scope in a matter of 40 minutes. This month again could present the possibility of a five comet night, with a slight change of characters, Encke being replaced by Nevski. Of course with comets there is no knowing for sure (especially ISON if you've been following the news - the latest: it is very doubtful it will be naked eye), but with all the possible activity, I have created a separate comet spreadsheet this time. Experiencing a visually impressive goose bump creating comet is a rarity; I've only seen it three times in 40 years. Seeing four or five comets in one night is a different type of experience but just as rare. Did not have time to fill in all the sweeps, but few if any use them. I will be filling in the blanks for my use, so if you would like the completed sheet please send me a request.

PLANETS: Venus hangs around low in the southwest the whole month, very low at month's end, especially for us in the north woods. With inferior conjunction on Jan 11th, the crescent continues to wane and by the 28th will cover only 6% of the planet. That's a beautiful sight in any scope so check it out if you can! Uranus is pretty much stationary on the Pisces/Cetus border the whole month. Look near 0 hr 33 min RA and +2 deg 48' Dec, which is 5.0 S, 4.0 W of delta Psc. Jupiter in Gemini has risen high enough in the east for observation starting around 8 on the 1st and around 6 by the end of Dec. Red spot and shadow transits attached; note combo on the 21st.

STARS: With the comets having their own list, lotsa stars this month. Five carbons, four doubles and four triples are included; since they are more in line with the meridian at the end of twilight, you can start working on them while waiting for the M's and H's to get higher. That was not done last month, so I am re-listing 40b Eridani. Why? Because I want everyone to see not only a white dwarf (something not easily done in most scopes), but a white dwarf in the company of a red dwarf. Stellar integration!



THE GOOD STUFF: Five Messier (4 OC's and 1 DN) and 15 Herschel 400 (13 OC's, 1 PN and 1 DN) objects. Also the Rosette Nebula and a diffuse nebula that looks like a comet!

QUESTIONS: As always, questions and comments are welcome!

tom hoffelder
rocksnstars@gmail.com

Come with me now, Pilgrim of the stars,
For our time is upon us and our eyes
Shall see the far country
And the shining cities of infinity ~ Robert Burnham, Jr.

Comet	RA	Dec	Star	N/S	E/W	Mag[1]	Urano I	Alt[2]	Date	EST
Lovejoy 2013R1	15 01.8	+40 01	β Boo	0.4 S	-	4.5	78	10	12/1	1800
Brewington 154P	22 43.4	+09 45	ζ Peg	1.1 S	0.5 E	10	213	55	12/1	1800
Nevski 2013V3	10 07.9	+17 36	η Leo	0.8 N	0.2 E	9	144	63	12/2	0530
Lovejoy 2013R1	15 07.4	+39 40	β Boo	0.7 S	1.0 E	4.5	78	40	12/2	0530
LINEAR 2012X1	14 59.8	+17 04	ζ Boo	3.4 N	4.4 E	9	198	29	12/2	0530
ISON 2012S1	16 16.7	-11 05	ξ Sco	0.2 N	3.0 E	?	290	-5	12/2	0530
Lovejoy 2013R1	15 23.9	+38 30	β Boo	1.9 S	4.2 E	4.5	78	10	12/3	1800
Brewington 154P	22 46.9	+10 20	ζ Peg	0.5 S	1.4 E	10	213	55	12/3	1800
Nevski 2013V3	10 12.9	+18 38	γ Leo	1.2 S	1.8 W	9	144	64	12/4	0530
Lovejoy 2013R1	15 28.7	+38 08	β Boo	2.3 S	5.3 E	4.5	78	37	12/4	0530
LINEAR 2012X1	15 05.7	+16 40	ζ Boo	3.0 N	5.8 E	9.1	198	28	12/4	0530
ISON 2012S1	16 14.2	-07 21	ε Oph	2.6 S	1.0 W	?	290	0	12/4	0530
Lovejoy 2013R1	15 42.7	+36 56	μ Boo	0.4 S	3.7 E	4.5	112	11	12/5	1800
Brewington 154P	22 50.6	+10 55	ζ Peg	-	2.4 E	10	213	56	12/5	1800
Nevski 2013V3	10 17.7	+19 41	γ Leo	0.2 S	0.5 W	9.1	144	64	12/6	0530
Lovejoy 2013R1	15 46.7	+36 33	μ Boo	0.8 S	4.6 E	4.5	113	35	12/6	0530
LINEAR 2012X1	15 11.6	+16 16	ζ Boo	2.6 N	7.2 E	9.1	198	29	12/6	0530
ISON 2012S1	16 12.4	-03 40	δ Oph	-	0.4 W	?	245	4	12/6	0530
Nevski 2013V3	10 22.4	+20 45				9.2		65	12/8	0530
Lovejoy 2013R1	16 02.0	+34 59				4.5		32	12/8	0530
LINEAR 2012X1	15 17.5	+15 52				9.2		29	12/8	0530
ISON 2012S1	16 11.3	+00 09				?		8	12/8	0530
Nevski 2013V3	10 27.0	+21 51				9.2		66	12/10	0530
Lovejoy 2013R1	16 15.1	+33 28				4.7		31	12/10	0530
LINEAR 2012X1	15 23.5	+15 28				9.2		29	12/10	0530
ISON 2012S1	16 10.6	+04 11				?		13	12/10	0530
Nevski 2013V3	10 31.5	+22 57				9.3		67	12/12	0530
Lovejoy 2013R1	16 26.4	+31 59				4.7		29	12/12	0530
LINEAR 2012X1	15 29.5	+15 04				9.3		29	12/12	0530

ISON 2012S1	16 10.4	+08 32				?		17	12/12	0530
Nevski 2013V3	10 35.8	+24 05				9.3		68	12/14	0530
Lovejoy 2013R1	16 36.2	+30 34				4.7		28	12/14	0530
LINEAR 2012X1	15 35.5	+14 40				9.3		29	12/14	0530
ISON 2012S1	16 10.5	+13 15				?		22	12/14	0530
ISON 2012S1	16 13.8	+31 53				?		3	12/20	1800
Lovejoy 2013R1	17 01.0	+26 20				4.8		6	12/20	1800
Brewington 154P	23 21.3	+15 22				10		59	12/20	1800
ISON 2012S1	16 15.9	+38 35				?		8	12/22	1800
Brewington 154P	23 25.7	+15 58				10		59	12/22	1800
ISON 2012S1	16 18.7	+45 38				?		13	12/24	1800
Brewington 154P	23 30.3	+16 33				10		59	12/24	1800
Nevski 2013V3	10 56.6	+30 16				9.4		27	12/24	2300
ISON 2012S1	16 22.4	+52 53				?		18	12/26	1800
Brewington 154P	23 34.9	+17 08				10		59	12/26	1800
Nevski 2013V3	10 59.9	+31 27				9.5		28	12/26	2300
ISON 2012S1	16 27.5	+60 08				?		23	12/28	1800
Brewington 154P	23 39.6	+17 43				10		60	12/28	1800
Nevski 2013V3	11 03.1	+32 37				9.5		30	12/28	2300
Lovejoy 2013R1	17 23.0	+21 34				5		25	12/29	0530
LINEAR 2012X1	16 20.9	+11 37				9.9		29	12/29	0530
ISON 2012S1	16 29.1	+61 50				?		50	12/29	0530
ISON 2012S1	16 35.2	+67 10				?		29	12/30	1800
Brewington 154P	23 44.4	+18 18				10		60	12/30	1800
Nevski 2013V3	11 06.0	+33 47				9.5		31	12/30	2300
Lovejoy 2013R1	17 27.2	+20 33				5		25	12/31	0530
LINEAR 2012X1	16 27.0	+11 13				10		29	12/31	0530
ISON 2012S1	16 37.6	+68 48				?		50	12/31	0530
ISON 2012S1	16 40.6	+70 33				?		31	12/31	1800
Brewington 154P	23 46.8	+18 36				10		60	12/31	1800
Nevski 2013V3	11 07.4	+34 21				9.5		32	12/31	2300

[1]http://www.aerith.net/comet/future-n.html

[2]Maine, at time noted

JUPITER IN DEC 2013 (EST)

DATE	GRST*	I SHAD	E SHAD	G SHAD	C SHAD
1	02:55 & 22:46				04:05-07:08
2					
3	04:33				
4	00:24 & 20:15	01:40-03:55			
5		20:09-22:23			
6	02:02 & 21:53				
7			19:14-21:54		
8	03:40 & 23:31				
9	19:22				
10	05:18				
11	01:09 & 21:00	03:34-05:49			
12		22:02-			
13	02:47 & 22:38	00:17			
14			21:50-		

15	04:25		00:30		
16	00:16 & 20:07				
17					22:04-
18	01:54 & 21:45				01:17
19					
20	03:32 & 23:23	00:00-02:11		17:15-20:22	
21	**19:14**	**18:24-20:39**			
22	05:09		00:26-03:07		
23	01:01 & 20:52				
24					
25	02:38 & 22:30				
26	18:21				
27	04:16	01:50-04:05		21:14-	
28	00:08 & 19:59	20:18-22:33		00:22	
29	05:54		03:03-05:44		
30	01:45 & 21:37				

*Transit, visible +/- 50 min

12/2					12/27				
SS	CTE	NTE	ATE	MS	SS	CTE	NTE	ATE	MR
16:04	16:37	17:13	17:48	-	16:10	16:43	17:20	17:55	01:43

Object (Type)	RA	Dec	Star	N/S	E/W	Mag*/(# of Stars)	Size (')/ *Sep (")*	Spect/ M# or H#	Dist (ly)	Urano I Page	Comment [B-V] (optimum x)
R For (CS)	02 29.3	-26 06	$\tau 3$ Eri	2.5 S	7.5 W	7.5-13		Ne		310	[5.4]
UY And (CS)	02 38.4	+39 10	16 Per	0.9 N	2.3 W	7.4-12.3		N		93	[4.9] 1023 0.5 WSW
Y Per (CS)	03 27.7	+44 11	κ Per	0.7 S	3.2 E	8.1-10.9		Revar		63	[2.9]
V466 Per (CS)	03 41.5	+51 30	α Per	1.7 N	2.5 E	8.4-8.9		Nv		39 (ns)	[4.0] 1348 1.0 W
U Cam (CS)	03 41.8	+62 39	γ Cam	8.8 S	0.9W	7.7-9.5		Ne		18 (ns)	[4.1]
ι Cas (MS)	02 29.1	+67 24	---	---	---	4, 7, 8	*2.2, 7.3*	A5,F5,G4		17	(220)
η Per (MS)	02 50.7	+55 54	---	---	---	4,8.5,10	*28, 66*			38	(18)
η_c Per (MS)	---	---	---	---	---	10, 10.5	*5.2*			38	(90)
Σ297* (MS)	02 45.4	+56 34	prev	0.7 N	0.7 W	8,8.5,10.5	*16, 28*			38 (ni)	(30)
Σ270 (MS)	*02 31.0*	*+55 33*	prev	1.0 S	2.1 W	7.5, 9.5, 10.5	*22, 38*			38 (ni)	(25)
Pi 97 (MS)	03 42.7	+59 58	η Per	4.0 N	6.6 E	6, 8.5	*55*	gK5, B8		39 (ni)	(10)
40 Eri (o^2) (MS)	04 15.3	-07 39	γ Eri	5.8 N	4.2 E	4.5, 9.5	*83*	K1	16	268	(6)
40b Eri (MS)	---	---	---	---	---	9.5, 11	*7.6*	dA,dM4	16	268	(65)
NGC 2068* (DN)	05 46.8	+00 05	ζ Ori	2.0 N	1.5 E	8.0	8x6	M78		226	
NGC 2099 (OC)	05 52.3	+32 33	θ Aur	4.7 S	1.6 W	(150)	15	M37		98	
NGC 2168 (OC)	06 09.0	+24 21	η Gem	1.8 N	1.3 W	(120)	25	M35	2600	137	

NGC 2158 (OC)	06 07.4	+24 06	prev	0.3 S	0.3 W	(40)	5.0	*H17-4	16K	137	
NGC 2169 (OC)	06 08.4	+13 58	γ Gem	2.4 S	7.0 W	(18)	6.0	*H24-8		182	
NGC 2194* (OC)	06 13.8	+12 48	prev	1.2 S	1.3 E	(100)	9.0	*H5-6		182	
NGC 2185 (DN)	06 11.0	-06 14	γ Mon	-	0.8 W		1.0	*H20-4		272	
NGC 2186 (OC)	06 12.1	+05 26	α Ori	2.0 S	4.2 E	(30)	5.0	*H25-7		182	
NGC 2237 (DN)	06 30.9	+05 03	ε (8) Mon	0.4 N	2.0 E		80x50	-		227	Rosette
NGC 2244* (OC)	06 31.9	+04 57	prev	0.1 S	-	(16)	24	*H2-7		227	inside Rosette
NGC 2251 (OC)	06 34.6	+08 22	prev	3.5 N	0.6 E	(35)	10	*H3-8		182	
NGC 2261* (DN)	06 39.2	+08 45	prev	0.4 N	1.1 E		3.0x1.0	H2-4		182	Hubble's Variable Neb
NGC 2281 (OC)	06 48.3	+41 05	θ Gem	7.1 N	0.7 W	(30)	25	*H71-8		68	
NGC 2286 (OC)	06 47.7	-03 09	δ Mon	2.7 S	6.1 W	(50)	15	*H31-8		228	
NGC 2287 (OC)	06 46.0	-20 45	α CMa	4.0 S	0.4 E	(50)	39	M41		318	
NGC 2301 (OC)	06 51.8	+00 28	δ Mon	0.9 N	5.0 W	(60)	15	*H27-6		228	
NGC 2304 (OC)	06 55.2	+17 59	γ Gem	1.6 N	4.0 E	(30)	3.0	*H2-6		138	
NGC 2311 (OC)	06 57.8	-04 37	δ Mon	4.1 S	3.6 W	(25)	7.0	*H60-8		228	
NGC 2323* (OC)	07 02.7	-08 23	θ CMa	3.7 N	2.1 E	(100)	15	M50		273	
NGC 2324 (OC)	07 04.1	+01 03	δ Mon	1.5 N	1.9 W	(30)	8.0	*H38-7		228	
NGC 2392 (PN)	07 29.2	+20 55	δ Gem	1.1 S	2.1 E	9.1	0.9	*H45-4		139	
NGC 2395 (OC)	07 27.2	+13 36	β CMi	5.3 N	0.1 W	(30)	15	*H11-8		184	

*DSS image

*[Surf Brtnss for GX's] - mag per square arcmin

*H400

not identi-fied

ni=shown but

The most volcanically active place is out-of-this-world!

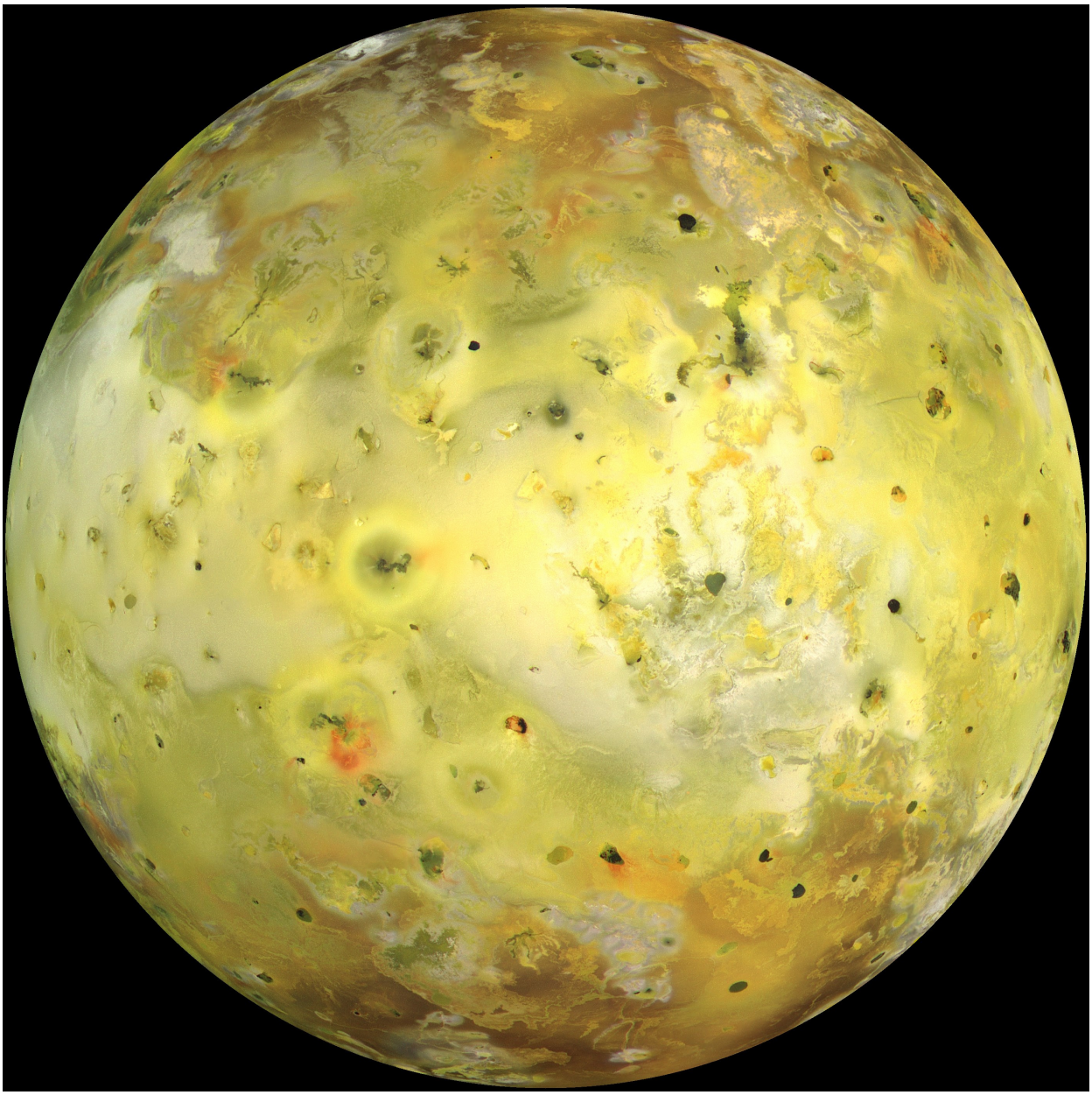
By Dr. Ethan Siegel

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large. Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior, from a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!

Yet volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes, as 4.5 billion years is more than enough time for it to have cooled and become stable. Yet Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view it up close. When the Voyager 1 spacecraft visited, it found no impact craters on Io, but I nstead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometers high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.

Where does the energy for all this come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average, far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause the world itself to stretch and bend by an astonishing **100 meters** at a time! This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface opens up, that I nternal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions, too (like Enceladus around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's Innermost moon, Io!



Io. Image credit: NASA / JPL-Caltech, via the Galileo spacecraft.

Download photo here: http://photojournal.jpl.nasa.gov/catalog/PIA02308

Learn more about Galileo's mission to Jupiter: http://solarsystem.nasa.gov/galileo/.

Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: http://spaceplace.nasa.gov/volcanoes.

National Aeronautics and Space Administration

the Space Place

November – December 2013 / Vol. 6, Issue 5

NEWS AND NOTES FOR FORMAL AND INFORMAL EDUCATORS

The Space Place is a NASA website for elementary school-aged kids, their teachers, and their parents.

It's colorful!
It's dynamic!
It's fun!

It's rich with science, technology, engineering, and math content!

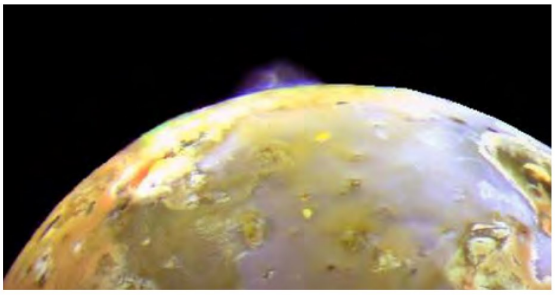
It's informal.
It's meaty.
It's easy to read and understand.
It's also in Spanish.
And it's free!

It has over 150 separate modules for kids, including hands-on projects, interactive games, animated cartoons, and amazing facts about space and Earth science and technology.

The Space Place isn't just a great place to find material for formal school lessons, it also has exciting hands-on activities and fun interactive web games for afterschool, too. Check out the "Do" and "Play" menus and start planning your afterschool activities today!

What's New? Space Volcanoes!

Did you know that there are volcanoes all around our solar system? From the dormant volcanoes of Mars to the mysteriously active cryovolcanoes of Saturn's Moon Enceladus, there's a whole lot of cool volcanism in our Solar System. Space Place has a new "Space Volcano Explorer" that lets students and teachers alike navigate through the solar system to find images and descriptions of some of the coolest volcanic features around. Check it out at http://spaceplace.nasa.gov/volcanoes. Want to learn more about volcanoes? Check out its new companion article "What is a volcano?" http://spaceplace.nasa.gov/volcanoes2.



Spotlight on Solar Fun

The sun is vitally important for literally every aspect of life, yet many students and educators know very little about how it actually works. Space Place's newest web game, "Solar Tricktionary," aims to fix that in characteristically silly fashion. In this game,

the student is given a term to define and four possible answers. Three of the answers are hilariously incorrect. Obviously solar wind is not "what happens when the sun eats too many beans," but at least students will be entertained as well as educated as they follow a chain of incorrect answers to the correct one. http://spaceplace.nasa.gov/solar-tricktionary.

Spotlight on Comets

With Comet ISON fast approaching its brightest stage in our night sky in late November, now's a great opportunity to teach a little something about why scientists care about comets in the first place. One big reason is that the water in our oceans may have come from the ice that makes up comets. Space Place's article "Thirsty? Have a comet!" explains why scientists think this could be the case and how incredibly precise telescopes can actually identify subtle chemical clues to figure out where these ocean-forming comets could have come from. http://spaceplace.nasa.gov/comet-ocean/.

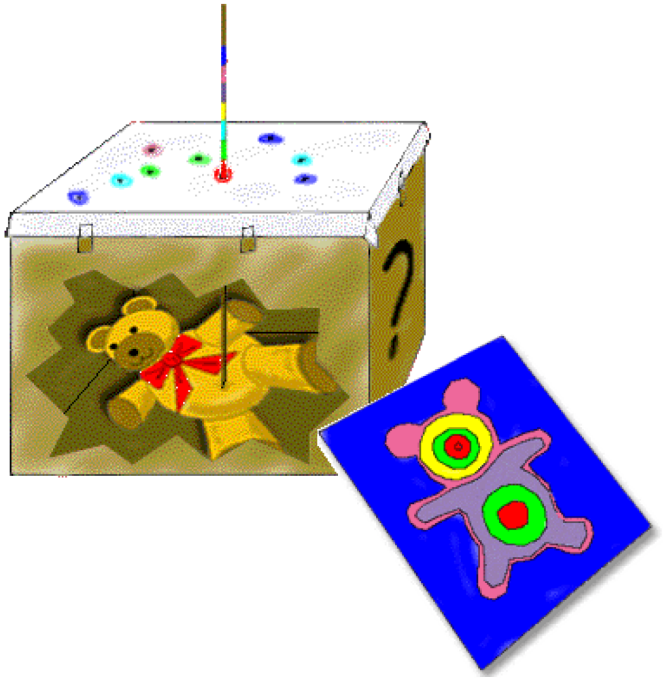
Where kids and grown-ups have fun with space science and technology

For the Classroom

Not only a sun and a collection of planets, our solar system is full of small bodies like moons, dwarf planets, comets, asteroids, and meteors. Space Place has created a new four-page brochure, geared toward a middle-school-and-up audience, that explains what these smaller objects are, and why they are important for understanding our solar system's history. The brochure is formatted to be easily printed and can make a great addition to any teacher's bulletin board. Download it here: http://spaceplace.nasa.gov/posters#small-bodies.

For Out of School Time

Figure out what's inside a closed box by creating a hand-made topographic map of its contents. This clever activity is a fun way to keep students entertained and educated outside of the classroom. Have your students challenge each other to figure out what each of them put inside their boxes. As they get more and more invested, they will become intimately familiar with how topographic maps work in the first place. An important lesson that feels like a fun game. Take a look: http://spaceplace.nasa.gov/topo-bear/.



Special Days

November 3rd: Daylight Saving Time ends. How did timekeeping ever get started? http://spaceplace.nasa.gov/classroom-activities/#time.

November 7th: Marie Curie born in 1867. A physicist, she won a Nobel Prize for discovering two new elements. NASA has many women scientists. http://spaceplace.nasa.gov/mission-chronicles.

November 9th: National Young Readers Day. Read and listen to Dr. Marc's answers to great questions about space. http://spaceplace.nasa.gov/dr-marc-space.

November 17th: Leonid meteor shower at maximum early this morning. What causes a meteor shower? http://spaceplace.nasa.gov/meteor-shower.

November 28th: Thanksgiving Day. Did the pilgrims on the Mayflower navigate by the stars? With our starfinders, they could have. http://spaceplace.nasa.gov/starfinder.

November 28th: Comet ISON makes closet approach to the sun. What's inside a comet anyway? http://spaceplace.nasa.gov/comet-nucleus/.

December 4th: Pioneer 10 flew past Jupiter in 1973. Play "JunoQuest," about a new mission to Jupiter. http://spaceplace.nasa.gov/junoquest.

December 14th: Geminids meteor shower at maximum early this morning. http://spaceplace.nasa.gov/meteor-shower.

December 25th: Christmas Day. If you get an iPad or iPhone for Christmas, we have some more gifts for you. http://spaceplace.nasa.gov/ios.

Send Feedback

Please let us know your ideas about ways to use The Space Place in your teaching. Send to info@spaceplace.nasa.gov.

And For The Young Stargazers:

Check out these fun websites from NASA!

http://climate.nasa.gov/kids

http://scijinks.gov

http://spaceplace.nasa.gov

Happy Holidays!

Where We Meet:

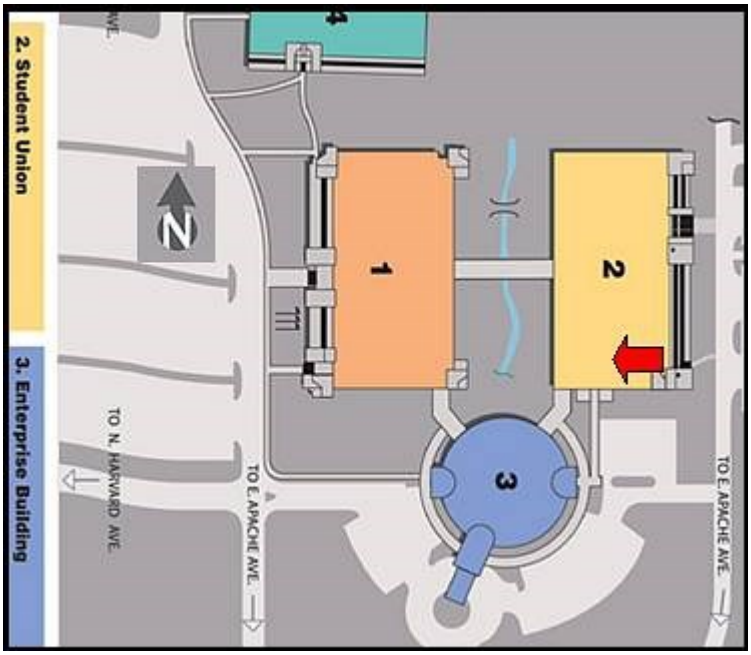
TCC Northeast Campus, 3727 E. Apache St., Student Union Bldg. 2, Room 1603

There is PLENTY of parking, lighting and security on this campus.

To get to TCC NE Campus, take the Harvard Exit off of Hwy. 11 (Gilcrease Expressway). Go south for about 1/2 mile to the campus located at the corner of N. Harvard and Apache. Turn east on Apache and take the entrance in front of Bldg. 3 (the large round building). Then turn right and park in front of Student Union Building #2. Room 1603 is just off of the lobby.

Google-type driving direction map at http://www.tulsacc.edu/13273/

We hope to see you there!



Our next General Meeting will be on Friday, January 17, 2014 at 7:00 PM.

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MEMBERSHIP INFORMATION

MEMBERSHIP RATES FOR 2013 WILL BE AS FOLLOWS:

Adults - $45 per year. Includes Astronomical League membership.

Senior Adults - $35 per year. *For those aged 65 and older.* Includes Astronomical League membership.

Students - $30 per year. Includes Astronomical League Membership.

Students - $25 per year. *Does not include Astronomical League membership.*

The regular membership allows all members of the family to participate in Club events, but only ONE voting membership and ONE Astronomical League membership per family.

Additional Family Membership - $15 with Astronomy Club of Tulsa voting rights, $20 with Club voting rights *and* Astronomical League membership.

THOSE WISHING TO EARN ASTRONOMICAL LEAGUE OBSERVING CERTIFICATES NEED TO HAVE A LEAGUE MEMBERSHIP.

MAGAZINES:

Astronomy is $34 for one year or $60 for 2 years.

www.astronomy.com

Sky & Telescope is $33 per year.

www.skyandtelescope.com

Sky & Telescope offers a 10% discount on their products.

If you are an existing S&T subscriber, you can renew directly with S&T at the same Club rate. Both S&T and Astronomy now have digital issues for computers, iPads and smart phones.

ONLINE REGISTRATION

We now have an automated online registration form on the website for new memberships, membership renewals and magazine subscriptions. Just simply type in your information and hit “send” to submit the information. You can then print a copy of the form and mail it in with your check, or pay with a debit or credit card with PayPal!

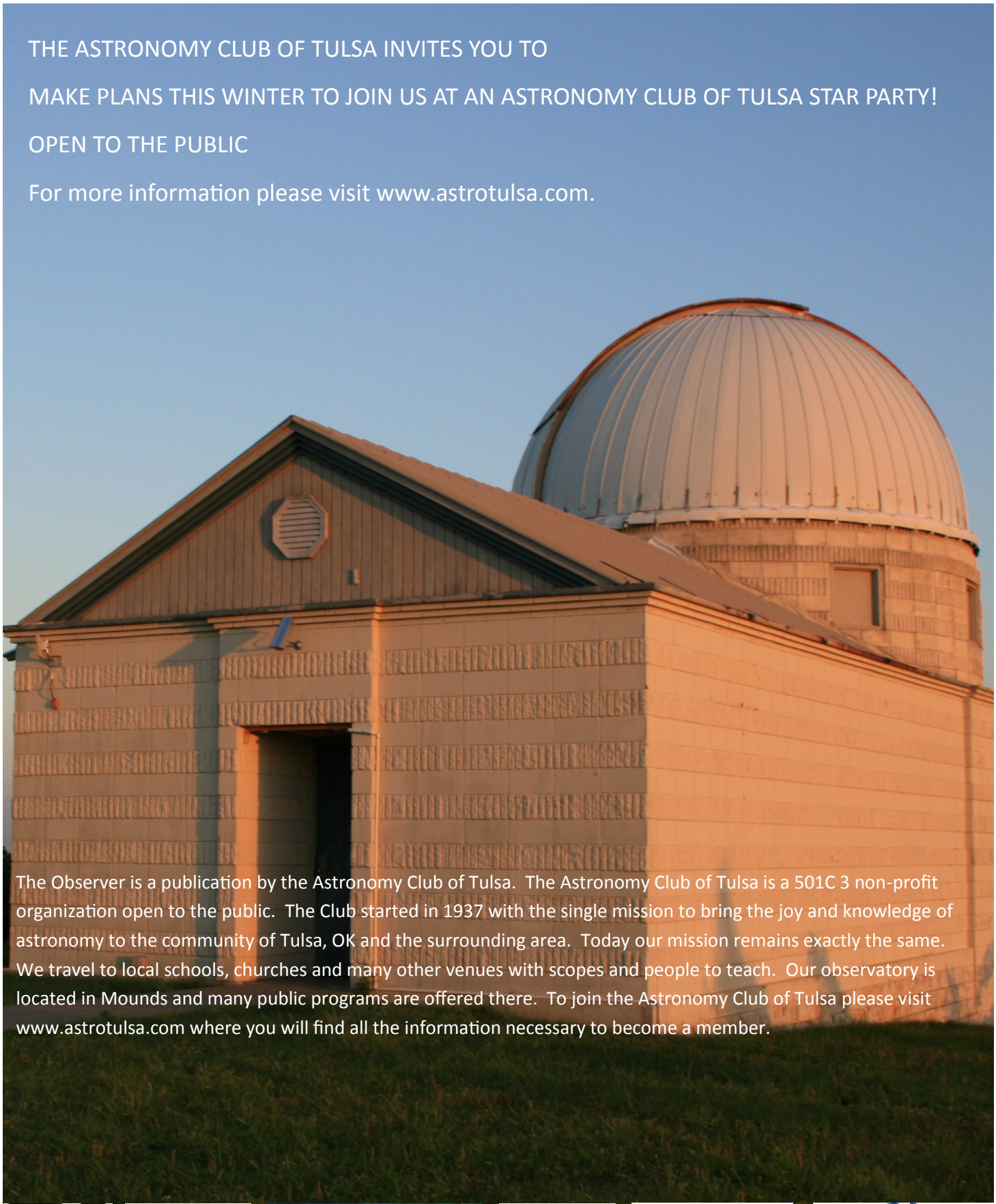
Link: http://www.astrotulsa.com/Club/join.asp

THE ASTRONOMY CLUB OF TULSA INVITES YOU TO

MAKE PLANS THIS WINTER TO JOIN US AT AN ASTRONOMY CLUB OF TULSA STAR PARTY!

OPEN TO THE PUBLIC

For more information please visit www.astrotulsa.com.



The Observer is a publication by the Astronomy Club of Tulsa. The Astronomy Club of Tulsa is a 501C 3 non-profit organization open to the public. The Club started in 1937 with the single mission to bring the joy and knowledge of astronomy to the community of Tulsa, OK and the surrounding area. Today our mission remains exactly the same. We travel to local schools, churches and many other venues with scopes and people to teach. Our observatory is located in Mounds and many public programs are offered there. To join the Astronomy Club of Tulsa please visit www.astrotulsa.com where you will find all the information necessary to become a member.