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ASTRONOMY CLUB OF TULSA

OBSERVER

MAY 2016

IMAGE OF THE MONTH: M106, by Gerald Miller.

<http://www.tuvaclub.org/M106Final65.jpg>

About 24 hours of data, with 4.5 hours in each RGB, and another 12 in Ha alone.

PERMISSION TO REPRINT ANYTHING FROM THIS NEWSLETTER IS GRANTED, **PROVIDED THAT CREDIT IS GIVEN TO THE ORIGINAL AUTHOR AND THAT THE ASTRONOMY CLUB OF TULSA "OBSERVER" IS LISTED AS THE ORIGINAL SOURCE.** FOR ORIGINAL CONTENT CREDITED TO OTHERS AND SO NOTED IN THIS PUBLICATION, YOU SHOULD OBTAIN PERMISSION FROM THAT RESPECTIVE SOURCE PRIOR TO REPRINTING. THANK YOU VERY MUCH FOR YOUR COOPERATION. PLEASE ENJOY THIS EDITION OF THE OBSERVER.







**THE ASTRONOMY CLUB TULSA
IS A PROUD MEMBER OF**



THE ASTRONOMICAL LEAGUE

MAY 2016

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6 	7
8	9	10	11	12	13 	14
15	16	17	18	19	20	21 
22	23	24	25	26	27	28
29 	30	31				

MOON PHASES AND HOLIDAYS:

NEW MOON	FRI MAY 6
MOTHERS' DAY	SUN MAY 8
MERCURY TRANSIT	MON MAY 9
FIRST QUARTER	FRI MAY 13
ARMED FORCES DAY	SAT MAY 21
FULL (Flower) MOON	SAT MAY 21
LAST QUARTER	SUN MAY 29
MEMORIAL DAY	MON MAY 30



UPCOMING EVENTS:

MEMBERS' NIGHT**	FRI MAY 6	8:15 PM	ACT OBSERVATORY
MEMBERS' NIGHT BACKUP**	SAT MAY 7	8:15 PM	ACT OBSERVATORY
MERCURY TRANSIT VIEWING	MON MAY 9	6:12 AM	JENKS HS PLANETARIUM—SEE PAGE 3 OF THIS ISSUE
GENERAL MEETING	FRI MAY 13	7:00 PM	JENKS HS PLANETARIUM
SIDEWALK ASTRONOMY	SAT MAY 14	7:30 PM	BASS PRO
PUBLIC STAR PARTY	SAT MAY 28	8:30 PM	ACT OBSERVATORY
MEMBERS' NIGHT**	FRI JUN 3	8:30 PM	ACT OBSERVATORY
MEMBERS' NIGHT BACKUP**	SAT JUN 4	8:30 PM	ACT OBSERVATORY
SIDEWALK ASTRONOMY	SAT JUN 11	8:15 PM	BASS PRO
PUBLIC STAR PARTY	SAT JUN 25	8:30 PM	ACT OBSERVATORY

**MEMBERS AND FAMILY ONLY PLEASE.

JUNE 2016

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4 
5	6	7	8	9	10	11
12 	13	14	15	16	17	18
19	20 	21	22	23	24	25
26	27 	28	29	30		

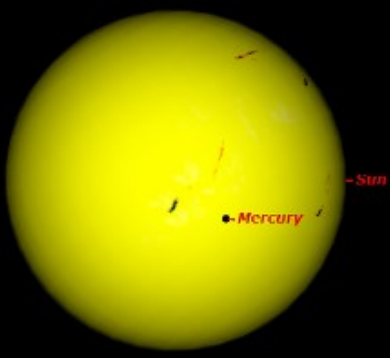
MOON PHASES & HOLIDAYS:

NEW MOON	SAT JUN 4
FIRST QUARTER	SUN JUN 12
FLAG DAY	TUES JUN 14
FATHERS' DAY	SUN JUN 19
FULL (Strawberry) MOON	MON JUN 20
LAST QUARTER	MON JUN 27



SPECIAL EVENT: THE TRANSIT OF MERCURY 2016

BY JOHN LAND



Mercury Transit May 9, 2016

First Contact **06:12** Mid-Transit **09:57** Last Contact **13:42**

During the Transit the planet Mercury will be passing in front of the Sun. It will appear as a small dark dot slowly moving across the Sun.

(**Caution: NEVER LOOK at the SUN without SAFE SOLAR FILTERS**)

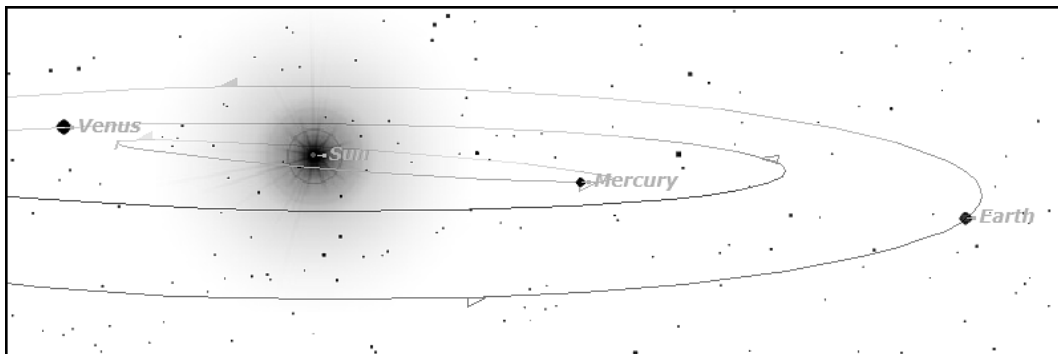
Some cheap telescopes come with a small green "SUN" filter that fits in an eyepiece. These are **NOT SAFE** and should be **THROWN AWAY!**

Come us at Jenks High School from 06:45 AM to 1:30 PM

Sunrise is 06:22 AM (Event is Weather Permitting)

Astronomy Club members will have safe solar viewing telescopes set up on the east side of the Jenks High School Planetarium building and on the roof observing deck. It's a come and go event.

Since Mercury's disk is only 12 arcsec across (1/300 degree) a safely filtered telescope will be required to see its tiny disk. It will appear as perfectly round dark dot. Sunspots may also be visible at the time of the transit but they generally are irregularly shaped and often have a shaded area (penumbra) surrounding the darker central umbra area. Also Mercury will be slowly moving across the background of the Sun. It may take a few minutes to notice the change since the whole event lasts 7 ½ hours. Sunspots stay in the same region on the sun's surface and can be seen rotating with the sun from one day to the next. You can see a great animation of the transit at <http://www.shadowandsubstance.com/>



Mercury orbits the sun every 88 days. However its orbit is inclined 7° to the plane of Earth's orbit (the Ecliptic) So most of the time Mercury is either above or below the Sun when it passes between the Earth and Sun. (Inferior Conjunction) During its orbit Mercury must cross the ecliptic plane twice. The points it crosses are called nodes. At the ascending node it moves above the ecliptic and at descending node it drops below the ecliptic. The Earth is lined up with these nodes during the months of May and November. If Mercury also is crossing one of its nodes at the same time a transit is possible.

Transits of Mercury happen 13 or 14 times in a century. The May 9, 2016 transit is the 3rd transit of the 21st century. The next transit we'll see will be Nov. 11, 2019. The transits in 2032 and 2039 are not visible from the USA so you'll have to wait until May 7, 2049 to see the next one.

Other Resources: (Times are given in UT - to find CDT subtract 5 hrs or for CST subtract 6 hrs)

Simple 5 min video explanation <http://stargazersonline.org/episodes/1617.html>

Tables on future transits <http://eclipse.gsfc.nasa.gov/transit/catalog/MercuryCatalog.html>

Complete Transit info <http://eclipsewise.com/oh/tm2016.html>

PRESIDENT'S MESSAGE

BY RICHARD BRADY



Hi everyone!

There is an interesting article in the June Sky & Telescope magazine discussing the use of red light to help keep our night vision during observing runs, specifically the new LED lights. These new LED red lights are very deep red (about 650 nm), so deep red that our eyes do not see this color very well. To read star charts we have to increase the intensity which can hurt our dark adaptation more. Older type incandescent and florescent bulbs are not as deep red, so the intensity can be less and not impact our dark adaptation as much. The author of the article tried using low intensity amber or yellow LED lights, just bright enough to read his star charts. He measured how long for his night vision to return after using each type, and found that his night vision returned faster when using the low intensity yellow light. So if you are looking to try out these new LED lights, you might pick up a low intensity yellow LED light too and see which color affects you the least.

The transit of Mercury is coming up Monday, May 9 from 6:12 AM (9 minutes before sunrise in Tulsa) to 1:42 PM. The club will be hosting an event at the Jenks Planetarium. **Anyone who can come and help out will be greatly appreciated.** This is a school day, and Dan said there will be several classes showing up. Please let me know beforehand if you plan on being there. Dan will make arrangements with Jenks security to rope off parking for us, so we need to know who all is coming. I plan on being there by 6:00 to get set up.

The next NSN webinar is scheduled for Wednesday, May 11. The topic for this one will be the upcoming mission to Jupiter called Juno. It is scheduled to arrive at Jupiter on July 4th. Go to NASA.GOV and search "Juno" for more information. You must be signed in to the NSN network view the webinar. If you've never signed in to NSN, please do so a day or two before the webinar to be sure you can. If you have problems let me know and I will try to help you.

At the General Meeting on Friday, May 13th, we have Dr. Jiri Polivka coming down from Springfield to speak on amateur radio astronomy. The title of his talk is "Radio Astronomy, a Bit of History and What It All Means". This is the last General Meeting until September, as usual. We still have Sidewalk Astronomy, Public Observing Night, and Member Observing Night scheduled for each month.

For the Members Observing Night scheduled for Friday, July 29th, we would like to have a potluck supper before it gets dark. More details to follow.

Jupiter is up high in the south in early evening ("early" only if you consider sundown at 8:10 being early) at the beginning of the month and sets around 4 AM. By the end of the month it will be transiting around 7:45 (before sunset which is at 8:34 then) and setting around 2:15. Mars rises around 10 PM at the beginning of the month and around 7:30 by the end of the month. Saturn rises around 10:40 PM on May 1st and 8:30 on May 31st. Mars and Saturn are at opposition next month.

Clear Skies!
Richard Brady

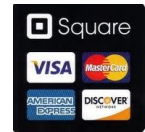
TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



Astronomy Club of Tulsa: 179 members, including 33 new members in 2016.

Welcome to our new members this month: Steve Loder, Destiny Hrnir, Richard Bonaventura, Ashley Hitchner and Rebecca McEver



Club Accounts as of April 30, 2016:

Checking: \$8,431.31; Savings: \$4,775.50; Investment accounts: \$19,047.44 (*Value Fluctuates with Market*); PayPal: \$ 0.00

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.

You may also renew your membership or join at one of our club events using your credit card by seeing one of our officers. We can take payments with the Square card reader. A small fee is also added on to these transactions.

ALSO NOTE: For our current members who are renewing their memberships, you can now go to a new link on the website to start your renewal process. On the home page, hover over the "Member" tab on the ribbon menu near the top of the page. Then select the "Membership Renewal" link and this will take to a page to fill out your information. Fill this out, submit it, then pay your dues by whatever method you choose.

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 2016 are as follows:

Adults: \$45.00 per year, includes Astronomical League Membership.

Sr. Adult: \$35.00 per year for those 65 or older, includes Astro League Membership.

Students: \$30.00 with League membership; **Students: \$25.00** without League membership.

Additional Family membership: \$20.00 with voting rights and League membership, **\$15.00** 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

SECRETARY'S CORNER

BY TERESA DAVIS



April 15, 2016

ACT Public Meeting at Jenks Planetarium

At 7pm we took the group of 28 people present out to the roof for solar observing.

Richard started the meeting at 7:20pm after the solar observing out on the roof adjacent to the planetarium.

Richard went over a few of our up and coming events.

He then shared the agenda from the last board meeting. Teresa gave a short list of a few outreach activities coming up this spring:

Fri April 29th at Roy Clark Elementary

Saturday, May 14 BTW @ the observatory.

Next Richard reviewed some of the latest image and from APOD and information about Comet 252/P linear ad M13 Which was on as an APOD image a few days before. John gave an account of what he could see of the comet as it passed 14 lunar distances from Earth last month. Last week it was at a magnitude 6 roughly.

Another APOD 4/12/16 Solar Eclipse from Earth and Space. The eclipse was last month on March 9th.

Next up was a short video and image of a Gravity Map of Mars, we then took a look at tonight's sky on the dome with an emphasis on Mercury.

Then we looked at today's APOD: crescent moon with mercury.

Update on Kepler Spacecraft: It had recovered from the emergency mode.

NSN Outreach Award Pins for 2016: the 3 pins that our club received were awarded to Owen Green, Tamara Green, and Dan Zielinski

Richard then went over the next several events on the calendar for the club.

Announcement: Volunteers needed for Special Event for the Transit of Mercury on Monday, May 9th. The event will start at 6:12am the sunrise is at 6:23am.

Then Upcoming event: NSN Webinar titled Updates from Mercury. Next a long list of upcoming Jenks Planetarium Shows on Tuesdays all the way through June 28.

Any Questions? None.... So Richard introduced James Maxin PhD, TU visiting Assistant Prof of Physics.

His topic: Evolution of our Universe from before the Big Bang to the Present

SECRETARY'S CORNER

BY TERESA DAVIS, CT'D.

ACT Board Meeting April 9th, 2016

Have Saturday after Members Night as back-up night for members.

Observatory work.

-James Taggart, Skip Whitehurst, Richard Brady worked on cleaning up overhanging tree branches along the driveway. -outlet left of the front door to the observatory was repaired and made a double outlet. We discussed adding a new outlet on the right side.

-James Taggart has requested 2 or 3 people to help with the interior painting. As a board we discussed the colors and will be going with a light grey for the walls and the ceiling will be a medium blue all flat/non shiny surface. The painting will require everything to be moved out of the work area. This includes all telescopes, furniture, and anything.

- Saturday May 7th, is a members weekend but we will need to use the morning for a work day for the purpose of prepping for paint.

-Saturday, May 21st will be painting day.

3. Groups – What is scheduled should be put on a google document to share with the volunteers including the board.

- The topic of keeping Facebook up to date was discussed. For now Tamara Green will be taking care of this until we can find another member to volunteer to be an administrator for the club Facebook page.

4. Grant Writing Committee – The grant committee will be meeting this summer when everyone has more time.

5. Annual Dinner Committee – Teresa Davis and Tamara Green will be planning the meal and putting this together. The dinner will be at Jenks Planetarium again.

6. Handling large crowds at the observatory – We need more of our members to volunteer for helping out with the public. We need to start a 20mn. video before it gets dark. After dark, everyone should park in the overflow parking. This includes members.

7. From last board meeting: the survey told us that new members need help with telescopes.

8. How do we get more members involved with the club? We now have 187 members and we are still growing but we are not getting people to help with public events.

9. ASTRO-ALERT: will someone step up to do a weekly astro alert. This should be very short and to the point: what is up to observe this week and a quick note of the latest astro news with a link. Two or three lines in an email.

10. Having a group pot luck/cook out on July 29th.

11. We need to up-date our website. Richard will be contacting Jennifer on the updates we need.

12. John Land shared information about an add he found in the back of the Sky& Telescope magazine, it is a color CCD video cam that comes with a 7 inch monitor screen.

13. The board looked over the unresolved items from our last meeting which included purchasing a red dot or Telrad finder and eyepieces for the dome scope. As a result, at the meeting the board members went on line and made the purchase of:

A Red Dot Finder for the clubs binoculars, Nebula filter for dome scope, 32mm eye piece for dome scope, two- 15mm and two – 25mm eye pieces for the loaner telescopes.

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!



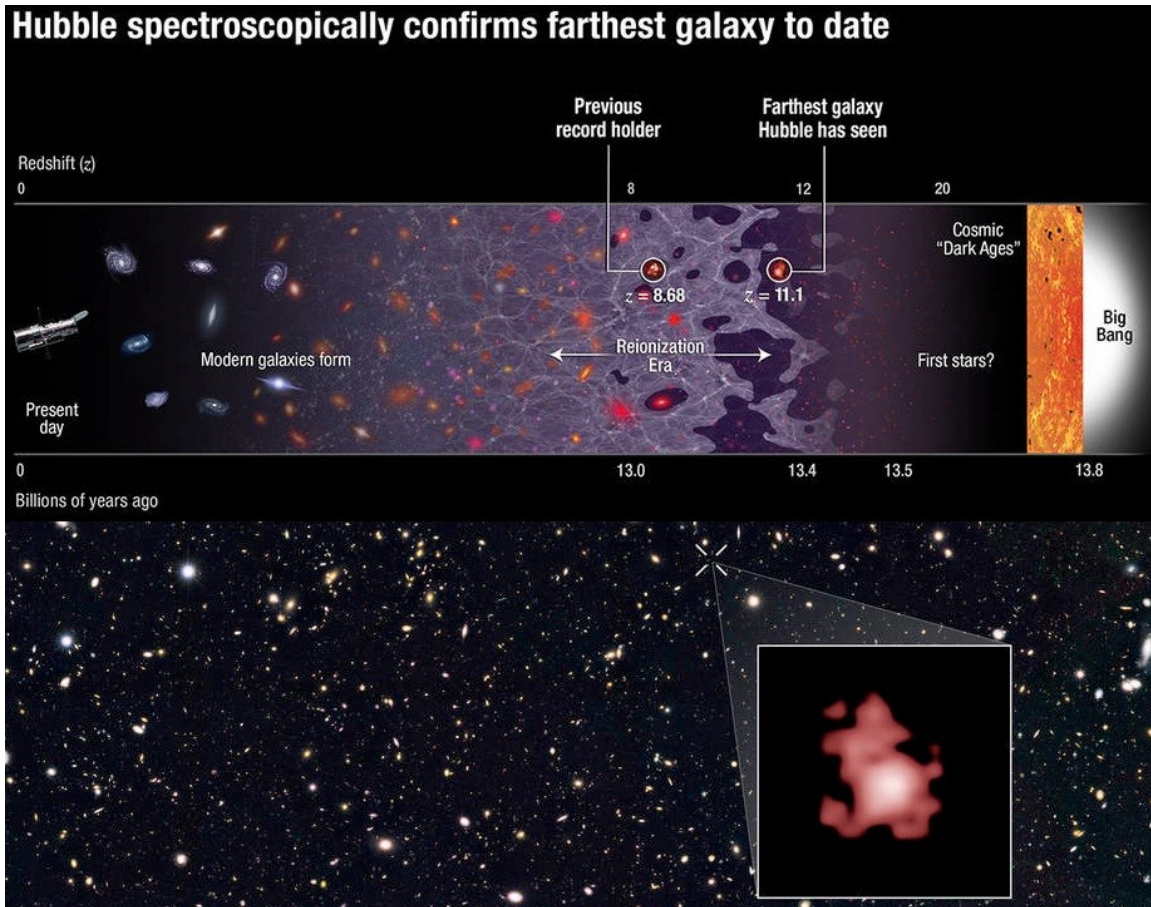
Hubble Shatters The Cosmic Record For Most Distant Galaxy

By Ethan Siegel

The farther away you look in the distant universe, the harder it is to see what's out there. This isn't simply because more distant objects appear fainter, although that's true. It isn't because the universe is expanding, and so the light has farther to go before it reaches you, although that's true, too. The reality is that if you built the largest optical telescope you could imagine -- even one that was the size of an entire planet -- you still wouldn't see the new cosmic record-holder that Hubble just discovered: galaxy GN-z11, whose light traveled for 13.4 billion years, or 97% the age of the universe, before finally reaching our eyes.

There were two special coincidences that had to line up for Hubble to find this: one was a remarkable technical achievement, while the other was pure luck. By extending Hubble's vision away from the ultraviolet and optical and into the infrared, past 800 nanometers all the way out to 1.6 microns, Hubble became sensitive to light that was severely stretched and redshifted by the expansion of the universe. The most energetic light that hot, young, newly forming stars produce is the Lyman- α line, which is produced at an ultraviolet wavelength of just 121.567 nanometers. But at high redshifts, that line passed not just into the visible but all the way through to the infrared, and for the newly discovered galaxy, GN-z11, its whopping redshift of **11.1** pushed that line all the way out to 1471 nanometers, more than double the limit of visible light!

Hubble itself did the follow-up spectroscopic observations to confirm the existence of this galaxy, but it also got lucky: the only reason this light was visible is because the region of space between this galaxy and our eyes is mostly ionized, which *isn't true* of most locations in the universe at this early time! A redshift of 11.1 corresponds to just 400 million years after the Big Bang, and the hot radiation from young stars doesn't ionize the majority of the universe until 550 million years have passed. In most directions, this galaxy would be invisible, as the neutral gas would block this light, the same way the light from the center of our galaxy is blocked by the dust lanes in the galactic plane. To see farther back, to the universe's first true galaxies, it will take the James Webb Space Telescope. Webb's infrared eyes are much less sensitive to the light-extinction caused by neutral gas than instruments like Hubble. Webb may reach back to a redshift of 15 or even 20 or more, and discover the true answer to one of the universe's greatest mysteries: when the first galaxies came into existence!



Images credit: (top); NASA, ESA, P. Oesch (Yale University), G. Brammer (STScI), P. van Dokkum (Yale University), and G. Illingworth (University of California, Santa Cruz) (bottom), of the galaxy GN-z11, the most distant and highest-redshifted galaxy ever discovered and spectroscopically confirmed thus far.



National Aeronautics and Space Administration



NASA Space Place

Educator Newsletter

May-June 2016 / Vol. 9, Issue 3

NEWS AND NOTES FOR FORMAL AND INFORMAL EDUCATORS

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, Earth science, and technology.

NASA Space Place has a new look! We've now made our content more accessible – check it out here: www.spaceplace.nasa.gov. To keep up with all the latest, follow us on Facebook and Twitter @nasaspaceplace.

New!

Sunspot Cookies

Fun Fact: Our sun has sunspots, which are a result of the changes in magnetic field. Sometimes, these spots can last for a few days – or even a few months!

Learn more about sunspots by making your very own sunspot cookies.

<http://spaceplace.nasa.gov/sunspot-cookies>



All About Jupiter

Have you heard of NASA's Juno mission? Launched on August 5, 2011, this mission will help us gain a better understanding of the formation and structure of Jupiter. Juno is expected to

arrive at the gas giant in just a few months - on July 4, 2016! Learn all about Jupiter here!

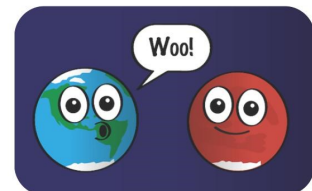
<http://spaceplace.nasa.gov/all-about-jupiter>



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<http://spaceplace.nasa.gov/subscribe>



Explore Earth and space at spaceplace.nasa.gov

Get Ready for Summer!

It's almost time for summer in the Northern Hemisphere. Before you head straight to the beach, learn all about the sun and how it can affect you!



Where does the sun's energy come from?

<http://spaceplace.nasa.gov/sun-heat>

How old is the sun?

<http://spaceplace.nasa.gov/sun-age>

Why does the sun burn us?

<http://spaceplace.nasa.gov/sunburn>



Make sun paper!

<http://spaceplace.nasa.gov/sun-paper>

Hosting Any Summer Programs?

Download our NASA Space Place make-and-do activities! We have PDF versions of all our favorites – from “Make Oreo Moon Phases” to “Build a Bubble-Powered Rocket.” These are perfect for the classroom, after school, and summer camps!

<http://spaceplace.nasa.gov/make-do-pdf>



Special Days

Noteworthy days in NASA and space history you can observe in your classroom.

May 9 — Today, Mercury will move directly between Earth and the Sun.

Learn more about Mercury, the smallest planet in our solar system!

<http://spaceplace.nasa.gov/all-about-mercury>

May 14 — Happy Astronomy Day!

Are you part of an astronomy club? Join our Astronomy Club Partner Program:

<http://spaceplace.nasa.gov/astronomy-clubs>

May 30 — Mariner 9 launched to Mars on this day in 1971.

Did you know that Mars is a cold desert world? Learn more here!

<http://spaceplace.nasa.gov/all-about-mars>

June 3 — The first U.S. spacewalk took place on this day in 1965.

See more astronauts in action!

<http://spaceplace.nasa.gov/gallery-technology>

June 16 — Valentina Vladimirovna Tereshkova became the first woman in space in 1963.

She orbited 48 times in the Russian (USSR's) spacecraft, Vostok 5. See other women in space at the astronaut image gallery.

<http://spaceplace.nasa.gov/gallery-technology>

June 22 — James Christy discovered Pluto's moon Charon in 1978.

Explore this icy dwarf planet!

<http://spaceplace.nasa.gov/ice-dwarf>



WHERE WE MEET

JENKS HS PLANETARIUM



**Our Club General meetings are held at the
Jenks Public Schools Planetarium
105 East B St, Jenks, OK**

When you enter the building lobby, take the elevator to the 3rd floor.

Meetings begin at 7:00 PM

Printable Detailed map available at http://astrotulsa.com/cms_files/

We hope to see you there!

MEMBERSHIP INFORMATION

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MEMBERSHIP RATES FOR 2016 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.

MAGAZINE SUBSCRIPTIONS:

ASTRONOMY IS \$34 FOR ONE YEAR OR \$60 FOR 2 YEARS.

WEBSITE: www.astronomy.com

SKY & TELESCOPE IS \$33 PER YEAR.

WEBSITE: www.skyandtelescope.com

SKY & TELESCOPE OFFERS A 10% DISCOUNT ON THEIR PRODUCTS.

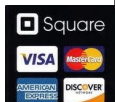
IF YOU ARE AN EXISTING S&T SUBSCRIBER, YOU CAN RENEW DIRECTLY WITH S&T AT THE SAME CLUB RATE. BOTH S&T AND ASTRONOMY NOW HAVE DIGITAL ISSUES FOR COMPUTERS, IPADS AND SMART PHONES.

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 USE OUR CONVENIENT PAYPAL OPTION. .

LINK: <http://www.astrotulsa.com/Club/join.asp>

OR, IF AT A STAR PARTY OR MEETING, SIMPLY FIND A CLUB OFFICER TO ASK ABOUT JOINING OR RENEWING WITH YOUR DEBIT OR CREDIT CARD THROUGH OUR CONVENIENT SQUARE OPTION!



THE ASTRONOMY CLUB OF
TULSA INVITES YOU TO MAKE
PLANS THIS SUMMER TO JOIN
US AT A STAR PARTY!

OPEN TO THE PUBLIC

FOR MORE INFORMATION
PLEASE VISIT
WWW.ASTROTULSA.COM.

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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.



Also find us on Facebook!

<https://www.facebook.com/AstronomyClubofTulsa>



WE ALSO ARE A PROUD PARTICIPANT IN NASA'S NIGHT SKY
NETWORK.

THE EDITOR WISHES TO THANK THE FOLLOWING FOR
THEIR CONTRIBUTIONS TO "THE OBSERVER" FOR
THIS ISSUE:

GERALD MILLER

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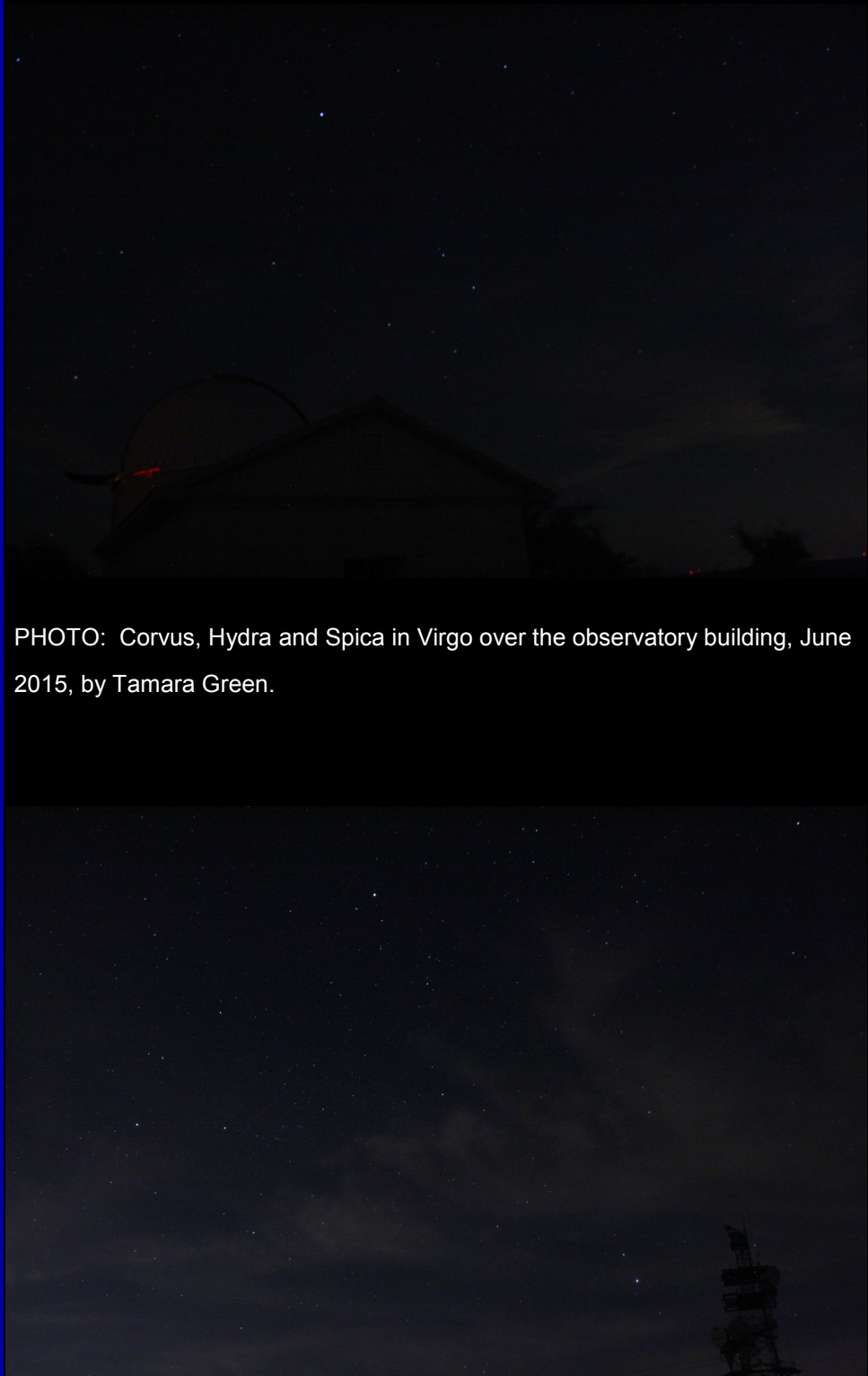


PHOTO: Corvus, Hydra and Spica in Virgo over the observatory building, June
2015, by Tamara Green.

PHOTO: The Summer Triangle over the observatory, June 2015,
by Tamara Green.