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ASTRONOMY CLUB OF TULSA

OBSERVER

JUNE 2016

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TOP: Mars rises over the AT&T building, ACT Public Night

CENTER: Jupiter in Leo in the Southwestern sky, ACT Public Night

BOTTOM: Mars with Scorpius in the Southeastern sky, ACT Public Night




THE ASTRONOMY CLUB TULSA
IS A PROUD MEMBER OF



THE ASTRONOMICAL LEAGUE

All photos taken at the Astronomy Club of Tulsa Public Star Party, May 28, 2016, by Tamara Green.

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 AND 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

UPCOMING EVENTS:

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' NIGHT**	FRI, JUL 1	8:45 PM	ACT OBSERVATORY
MEMBERS' NIGHT BACKUP**	SAT, JUL 2	8:45 PM	ACT OBSERVATORY
SIDEWALK ASTRONOMY	SAT, JUL 9	8:00 PM	BASS PRO
PUBLIC STAR PARTY	SAT, JUL 23	8:30 PM	ACT OBSERVATORY
MEMBERS' NIGHT**	FRI, JUL 29	8:30 PM	ACT OBSERVATORY
MEMBERS' NIGHT BACKUP**	SAT, JUL 30	8:30 PM	ACT OBSERVATORY

**MEMBERS AND FAMILY ONLY PLEASE.

JULY 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 & HOLIDAYS:



NEW MOON MON JUL 4
INDEPENDENCE DAY MON JUL 4
FIRST QUARTER MON JUL 11
FULL (Buck) MOON TUES JUL 19
LAST QUARTER TUES JUL 26

PRESIDENT'S MESSAGE

BY RICHARD BRADY



Hi everyone!

Mars was at opposition on May 22nd and closest to the Earth on May 30th. This difference is caused by Mars having a slightly elliptical orbit. The eccentricity is only 0.0934, but that's enough to cause the different dates. (0 means the body orbits in a perfect circle while 1 or greater means the object will escape from the parent body.) The eccentricity also causes the closest approach to vary enough to be noticeable in a telescope from opposition to opposition. This time it will be closer than it has been in 10 years. At closest approach it had an apparent diameter of 18.6". There is a good article on Sky and Telescope's News page, "Mars Opposition: Best Showing in a Decade". Here's the link: <http://www.skyandtelescope.com/astronomy-news/observing-news/mars-opposition-best-showing-in-a-decade/>

Also this month, Saturn is at opposition this Friday, June 3rd. Its globe is 18" across, and the rings are 42" across. They are tilted 26 degrees now, which is close to the maximum. Saturn is at magnitude 0.0, while Mars is at magnitude -2.0. Hovering close by is Antares, Alpha Scorpii, at magnitude 1.1. Saturn is to the left as you view them, brighter Mars to the right, and Antares below them. Back on May 21st the Moon was also nearby. Anyone see them? (Probably not. It's been too cloudy recently to observe much.) The Moon will be in the vicinity again on June 17th. If you happen to get any pictures, I'm sure Tamara would love to put them in next month's newsletter. And if that isn't enough for your viewing pleasure, the king of the planets, Jupiter, is still in the southwest. It is also at magnitude -2.0. It is still 52 degrees up at nightfall. All five naked-eye planets will be visible in August; Jupiter, Mercury, and Venus low in the west, and Mars and Saturn in the south-southwest, soon after sundown.

Speaking of Jupiter, the Juno mission is scheduled to arrive at Jupiter on July 4th. The scientists will be gathering input on imaging opportunities from amateurs. While Juno has cameras on board, most of the science will come from non-imaging instruments. Last month's NSN Telecon was all about this mission. You can view the telecon through the NSN telecon page https://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=575. There is also an article at Sky and Telescope, "Amateur Astro-imagers Get Ready for Juno", at <http://www.skyandtelescope.com/astronomy-news/observing-news/juno-pro-am-workshop-05252016/>

The next NSN webinar is scheduled for Wednesday, June 22nd at 8 PM. This one is titled "NASA's Mars Trek: Powerful Online Tools for Exploring Mars". The speaker is Brian Day. He will talk about the latest visualization tools. More information is at https://nightsky.jpl.nasa.gov/news-display.cfm?News_ID=707. 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.

PRESIDENT'S MESSAGE

BY RICHARD BRADY, CT'D.

A new big dwarf planet has been found. (I know "big dwarf" sounds like a contradiction but it's not.) Discovered nearly 10 years ago, 2007OR₁₀ has been found to be the sixth dwarf planet in the solar system. It is out in the Kuiper Belt along with Pluto, Eris, Haumea, and Makemake. (The other is Ceres in the asteroid belt.) It is estimated to be 955 miles in diameter, which makes it bigger than Haumea and Makemake. The reason this wasn't realized before now is that its albedo is only 9%, so it is extremely dark even for a Kuiper Belt object. More information is at Sky and Telescope <http://www.skyandtelescope.com/astronomy-news/dwarf-planet-2007-or10-big-dark-slow/>

Closer to home, (by a factor of several million or so, but what's a few million among astronomers) we've been making several improvements to the observatory. We have a new sign at the lower gate, we've installed a bat house on a tall pole on the southwest side of the building, and we've painted the classroom (assuming the humidity will go down enough for the paint to dry.) Thanks go to Chris Proctor, Adam Proctor (Chris' son), Steve Barteau, and a great big thanks to James Taggart who did the painting, installed the sign, and kept us all busy. Plus a very special thank you to Davis Taggart, James' dad, who donated all the paint supplies and helped do the work too. I was also there.

Finally, for the Members Observing Night scheduled for Friday, July 29th, we would like to have a potluck supper before it gets dark. More details coming soon. Any volunteers to help coordinate this event?

Clear Skies!
Richard Brady

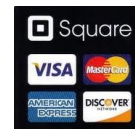
TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



Astronomy Club of Tulsa: 179 members, including 38 new members in 2016.

Welcome to our new members this month: Stoney Rohling, Lucas Driezen, Eric Holsten, Robert Herden and Jon Morrison



Club Accounts as of May 31, 2016:

Checking: \$8,690.64; Savings: \$4,775.50; Investment accounts: \$19,000.25 (*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

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!



NOAA's Joint Polar Satellite System (JPSS) to revolutionize Earth-watching

By Ethan Siegel

If you want to collect data with a variety of instruments over an entire planet as quickly as possible, there are two trade-offs you have to consider: how far away you are from the world in question, and what orientation and direction you choose to orbit it. For a single satellite, the best of all worlds comes from a low-Earth polar orbit, which does all of the following:

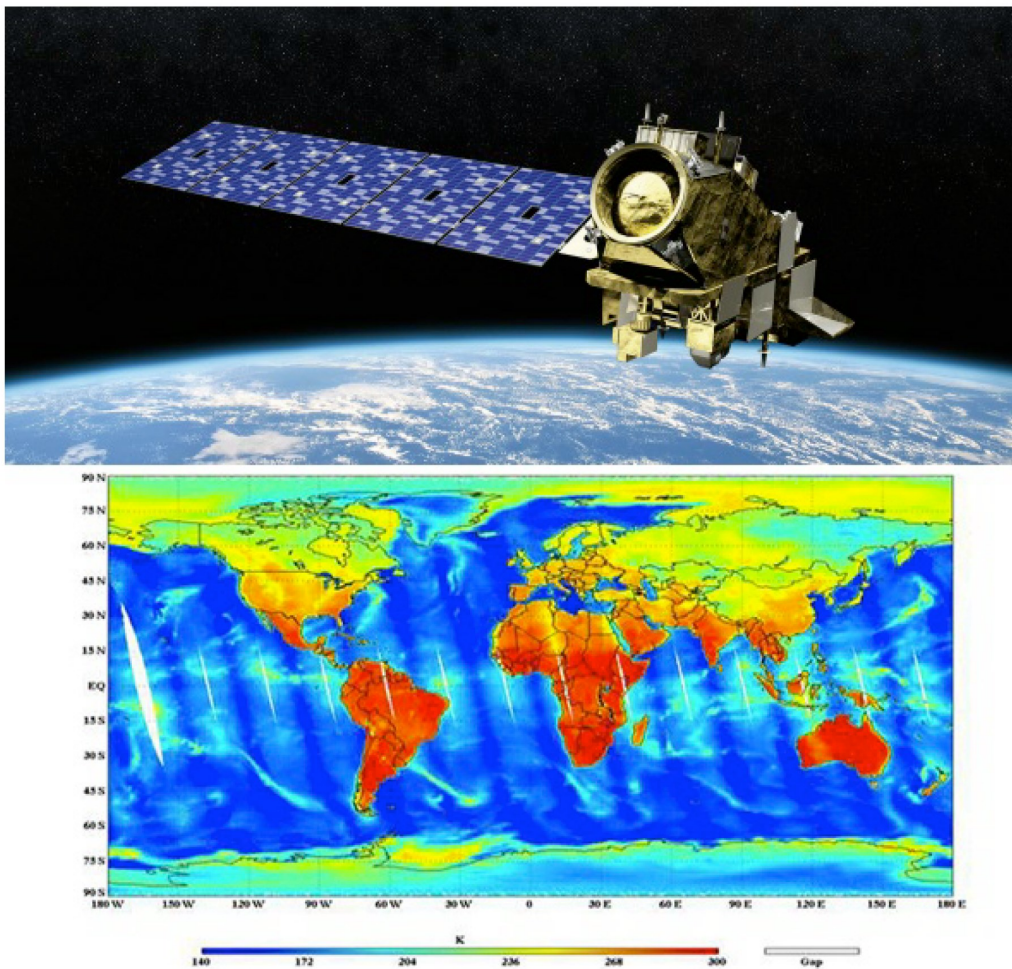
- orbits the Earth very quickly: once every 101 minutes,
- is close enough at 824 km high to take incredibly high-resolution imagery,
- has five separate instruments each probing various weather and climate phenomena,
- and is capable of obtaining full-planet coverage every 12 hours.

The type of data this new satellite – the Joint Polar Satellite System-1 (JPSS-1) -- will take will be essential to extreme weather prediction and in early warning systems, which could have severely mitigated the impact of natural disasters like Hurricane Katrina. Each of the five instruments on board are fundamentally different and complementary to one another. They are:

1. The Cross-track Infrared Sounder (CrIS), which will measure the 3D structure of the atmosphere, water vapor and temperature in over 1,000 infrared spectral channels. This instrument is vital for weather forecasting up to seven days in advance of major weather events.
2. The Advanced Technology Microwave Sounder (ATMS), which assists CrIS by adding 22 microwave channels to improve temperature and moisture readings down to 1 Kelvin accuracy for tropospheric layers.
3. The Visible Infrared Imaging Radiometer Suite (VIIRS) instrument, which takes visible and infrared pictures at a resolution of just 400 meters (1312 feet), enables us to track not just weather patterns but fires, sea temperatures, nighttime light pollution as well as ocean-color observations.
4. The Ozone Mapping and Profiler Suite (OMPS), which measures how the ozone concentration varies with altitude and in time over every location on Earth's surface. This instrument is a vital tool for understanding how effectively ultraviolet light penetrates the atmosphere.
5. Finally, the Clouds and the Earth's Radiant System (CERES) will help understand the

effect of clouds on Earth's energy balance, presently one of the largest sources of uncertainty in climate modeling.

The JPSS-1 satellite is a sophisticated weather monitoring tool, and paves the way for its' sister satellites JPSS-2, 3 and 4. It promises to not only provide early and detailed warnings for disasters like hurricanes, volcanoes and storms, but for longer-term effects like droughts and climate changes. Emergency responders, airline pilots, cargo ships, farmers and coastal residents all rely on NOAA and the National Weather Service for informative short-and-long-term data. The JPSS constellation of satellites will extend and enhance our monitoring capabilities far into the future.



Images credit: an artist's concept of the JPSS-2 Satellite for NOAA and NASA by Orbital ATK (top); complete temperature map of the world from NOAA's National Weather Service (bottom).



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!

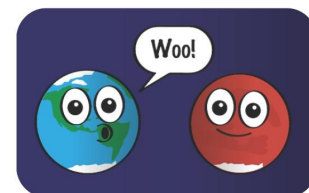
<http://spaceplace.nasa.gov/all-about-jupiter>



Subscribe to our Monthly E-newsletter!

Interested in keeping up with the latest and greatest news from NASA Space Place? Subscribe to the NASA Space Place Gazette! The NASA Space Place Gazette is for educators, parents, and space enthusiasts of all ages. It includes special bulletins near noteworthy days and NASA events, such as a lunar eclipse, planet flyby, or rover landing. It's easy to subscribe – just click here!

<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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CHRISTOPHER PROCTOR

JAMES TAGGART

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JAMES LILEY

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FACILITIES MANAGER JAMES TAGGART

astrotulsa.obs@gmail.com

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.

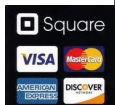
IF YOU ARE AN EXISTING S&T SUBSCRIBER, YOU CAN RENEW DIRECTLY WITH S&T AT THE SAME CLUB RATE. BOTH S&T AND ASTRONOMY NOW HAVE DIGITAL ISSUES FOR COMPUTERS, IPADS AND SMART PHONES.

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 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.



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:

DR. ETHAN SIEGEL

RICHARD BRADY

TIM DAVIS

TAMARA GREEN

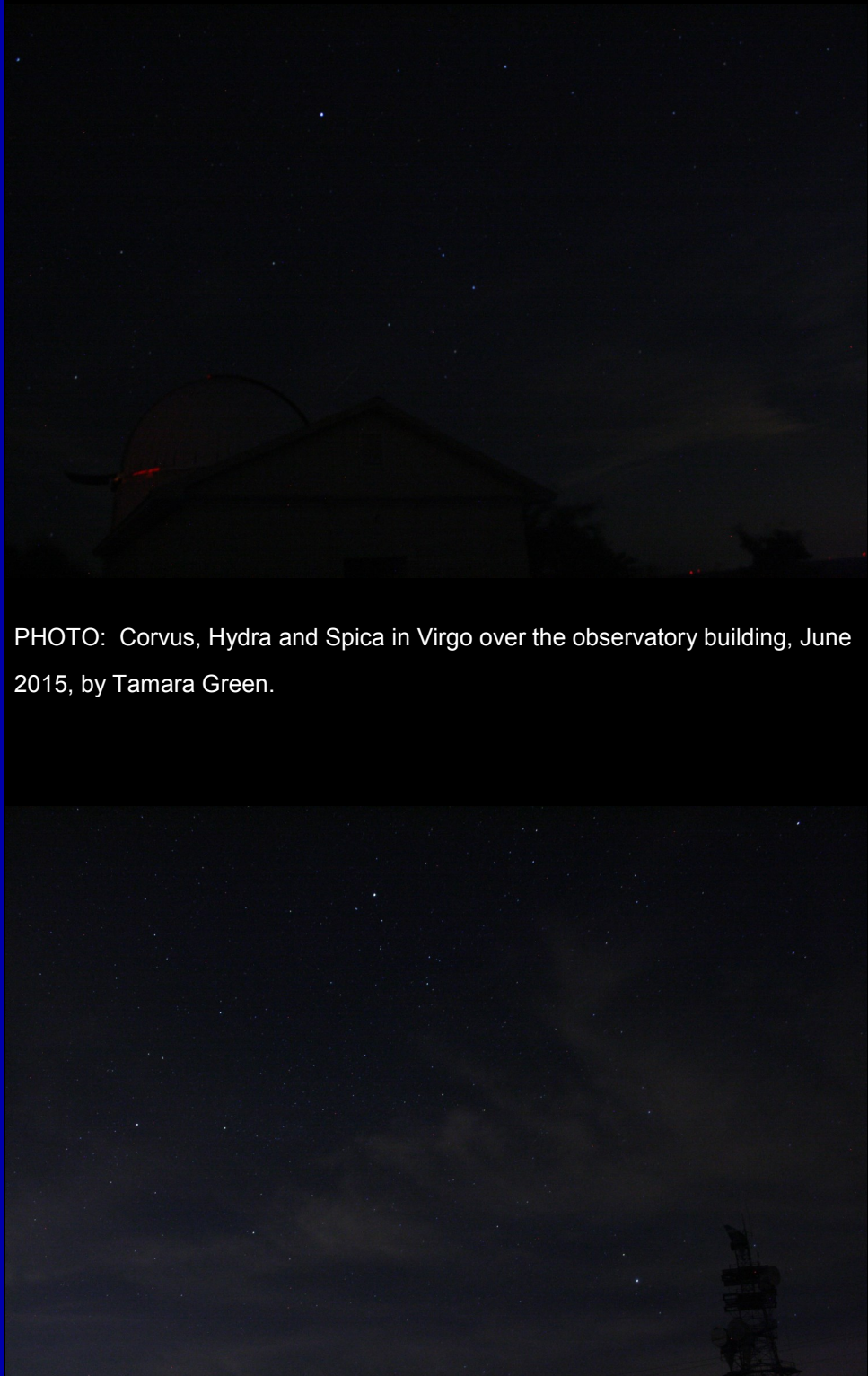


PHOTO: Corvus, Hydra and Spica in Virgo over the observatory building, June
2015, by Tamara Green.

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