



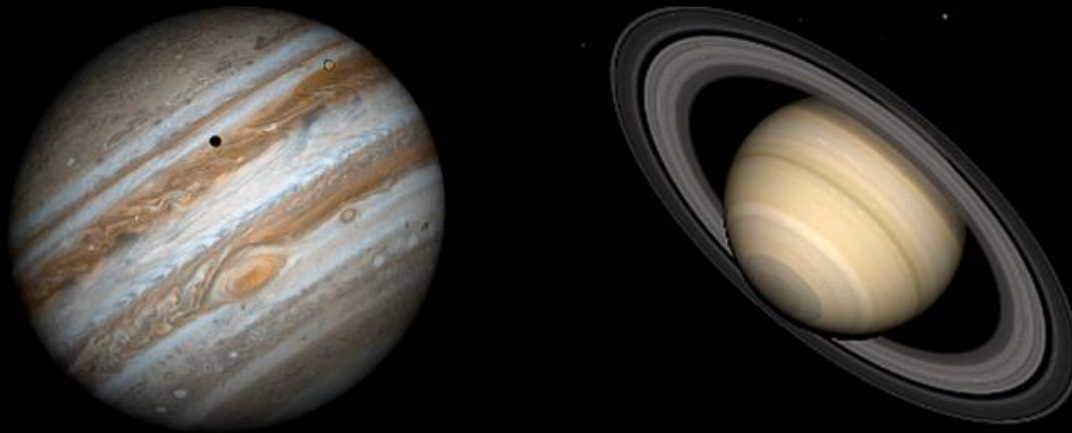
OBSERVER

June 2018

Bringing Stars to the eyes of Tulsa since 1937



Prime Time for Planets



**Saturn comes to opposition June 27. Mars at its best in 15 years!
Asteroid Vesta makes its best showing in 20 years.
Jupiter and Venus still shine brilliantly in the evening sky.
Mercury makes a good evening appearance. Details pages 7 & 8**

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Astronomy Club Events

Details at <http://astrotulsa.com/Events.aspx>

JUNE			
PUBLIC NIGHT	SAT JUN 9	8:00 PM	ACT OBSERVATORY
MEMBERS' NIGHT	FRI JUN 15	8:30 PM	ACT OBSERVATORY
SUMMER SOLSTICE	THU JUN 21		
MEMBERS' BACKUP NIGHT	SAT JUN 16	8:30 PM	ACT OBSERVATORY
FATHERS' DAY	SUN JUN 17		
SIDEWALK ASTRONOMY	SAT JUN 23	7:45 PM	BASS PRO
JULY			
INDEPENDENCE DAY	WED JUL 4		
PUBLIC NIGHT	SAT JUL 7	8:15 PM	ACT OBSERVATORY
MEMBERS' NIGHT	FRI JUL 13	8:30 PM	ACT OBSERVATORY
MEMBERS' CLUB PICNIC	SAT JUL 14	6:30 PM	ACT OBSERVATORY
Above Date and time tentative			
SIDEWALK ASTRONOMY	SAT JUL 21	7:30 PM	BASS PRO

PRESIDENT'S MESSAGE

BY TAMARA GREEN



Hey Y'all!

Summer is just about here! And we have some great events coming up that I hope you can all come out to and participate in. There will be a couple here and there we will need volunteers for.

The first one is on Monday, June 4 at the observatory. It is a group event, the ORU Summer Science Academy. It will be a large group of middle school kids and teachers coming out to the observatory for an astronomy session. We will need to be there around 7:30 PM to set up. Kids should arrive at about 8 PM. The backup date is Tuesday, June 5 in the event of clouds on Monday.

Our members' picnic is scheduled for Saturday, July 14 at the observatory. Time will be announced soon. We will have a potluck / picnic and observing. I believe meat will be provided by the club if I remember right, but if you want to bring a side dish, like potato salad, cole slaw, chips, watermelon, cookies, drinks, etc. please feel free to! We do have a couple of backup dates in mind for the picnic in the event of uncooperative weather. Please keep in mind that this event is for ACT MEMBERS AND IMMEDIATE FAMILY ONLY!!!

We are planning on having a big public event for the Perseid meteor shower on August 11, time and location will be announced. With a big event like this, we will need lots of volunteers! More details later.

We will be having an astronomy day at Woolaroc on Saturday, August 18. We will have astronomy-related activities during the day and a star party that evening. Details will be coming soon. We will need volunteers for that event as well, as they expect a crowd! I will let you all know as soon as the final details are hammered out. The Bartlesville club will be joining in with us on this one, so this has some good potential to be fun!

Since we did not get to have our Messier Marathon due to bad weather, I am planning a star party down at TUVA. I am shooting for Saturday, September 8. I am getting everything worked out with Ron and Maura, and hope that date works for them. I'm sure they will let me know, so when I get the plans finalized, I will send out the notification. Since this is being treated as a make-up event for our Messier Marathon, this event will be TUVA and ACT members and immediate family only.

If you plan to go to Okie-Tex this year, you will need to get your registrations in by no later than September 15. Details can be found at <http://www.okie-tex.com/>. The event is from October 6 thru 14 this year.

It looks like we will have a busy, and hopefully fun summer this year! I hope to see you at our events, both public and members-only!

*Clear Skies,
Tamara*



Bob Lieser Jr. - Happy 90th Birthday Bob

If you've been around the astronomy club very long you've no doubt met Bob and Judy Lieser who are regulars at almost all our events. They have been members of our club for over 45 years. Bob just celebrated his 90th birthday in February. Bob worked at the downtown Tulsa Library for many years overseeing the science research materials section. Below are Bob's recollections of his many adventures in astronomy.

My first encounter with astronomy, that I can recall, was in 1942 when I was 14 years old. I had read an article by Donald Menzel in the National Geographic which included depictions of constellations. Afterwards I looked at the night sky and was able to identify some of its features. But until Judy and I were married astronomy was mostly a passing interest.

We watched coverage of the moon landings on TV. The final Moon landing of Apollo 17 in 1972 involved geologist, Harrison Schmitt, who I believe, later gave a talk at T.U. Later in the 80's we enjoyed watching episodes of Carl Sagan's epic Cosmos series on PBS.

Judy had earlier attended some meetings of the Astronomy Club, so we began going to them together in the late 1960's. What a relief it was when the observatory was constructed and we had a regular destination we could rely on.

Our Meade telescope developed mirror problems after we had used it for a while, so we packed it in a trunk and became "*Lens Leeches*" to *Nth degree*. We would like to thank all the club members who share some of their telescope viewing time with us at the observing nights.

Besides the monthly meetings and lectures we have enjoyed many special club events and outings. Highlights include: an anticipated 1993 meteor shower and count at which channel 8 TV reporters were present with us at the Observatory. We have memories of a lunar eclipse at Mohawk Park; seeing amateur rockets launched at Pawhuska's airport. We enjoyed seeing Halley's Comet in 1986. Also watching a transit of Venus across the sun at Tulsa at the Air and Space museum in June 2012. Almost forgot! - to mention how much fun we had at Adam's ranch in Osage county using the telescopes set up on its private airplane landing strip.

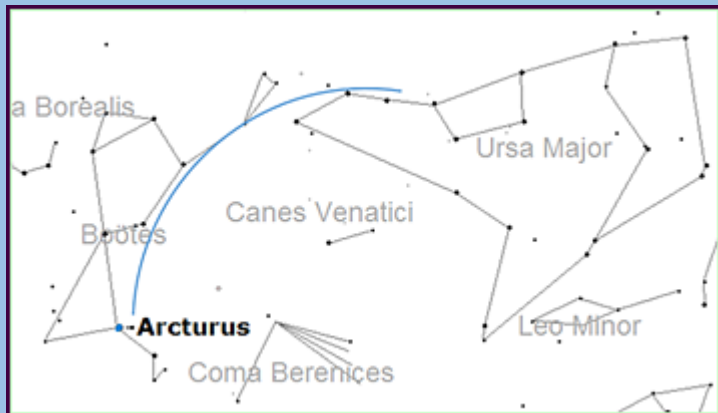
We've had great times and great food at Ron and Maura Wood's place near Chouteau for the annual Messier marathons. We enjoy spending a week under dark skies at the Okie-Tex Star Party in far western Oklahoma. Our *Thanks* goes to the ACT officers and members for keeping us informed on these many events and providing driving directions.

On our own, we have been to the night sky presentations at the Badlands National Park in South Dakota, Visited the solar telescope near Cloudcroft New Mexico, The Very Large Array of radio telescopes near Socorro, New Mexico, and learned of Clyde Tombaugh's discovery of Pluto at Lowell Observatory in Flagstaff, Arizona. These excursions were topped off by our August 2017 trip to Scotts Bluff, Nebraska to see and photograph the Total Solar Eclipse!



Some additional remarks from Judy: Our first observing session with the Astronomy Club was for a picnic at Keystone Lake. We had gone with a friend of Bob's from the library named Marian Lashley. Instead of seeing stars it really poured rain! All the telescopes people had brought were covered up in plastic wrap. We formally joined the club when our son Bobby was 8 years old. We took a sleeping bag to the star party held at someone's house so Bobby could sleep while we looked at the stars and planets. We had our club meetings at Art Sweeny's recording studio at 4929 S Columbia Ave. Before the meeting we discussed the latest ideas such as The Big Bang or the Steady State theories. One memorable series of meetings was when club treasurer, Nick Pottorf, demonstrated how to grind telescope mirrors demonstrating each stage at successive meetings. I thought grinding a mirror was hard. When the mirror was completed the club had a drawing to give the mirror away.

ARCTURUS –Orange Beacon of the Spring sky.



One of my favorite stars, Arcturus, rides high in the springtime sky. To locate Arcturus, find the Big Dipper high overhead in the north then follow the curve of the handle of the Big Dipper and “Arc to Arcturus” Shining at magnitude -0.05 it ranks as the fourth brightest of the nighttime sky. Its distinctive orange color makes it stand out among its rivals. Arcturus is the brightest star in the constellation of Bootes, the herdsman.

Its orange color is a result of its cooler surface temperature. Its spectral type is K1.5 III with a temperature of around 4,300 Kelvins. (compared to the Sun’s 5,770 K) Kelvin is a temperature scale that starts at Absolute Zero -273 C. While Arcturus is 170 times brighter than the Sun surprisingly its mass is only 1.08 times more than the Sun. The clue to its brilliance can be found in the 2nd part of its spectral classification, the Roman numeral III, indicating it belongs to the class of Giant stars. At 25 times the diameter of the sun, its outer surface would fill a quarter of the orbit of Mercury.

As you gaze at Arcturus you can get a glimpse of what our future Sun will be like. Our Sun is about 5 billion years old and derives its energy from the fusion of Hydrogen into Helium in its core at about 15 million K. Arcturus is 7 billion years old and has used up the hydrogen in its core. Helium has settled to its core where it must reach 100 million K before it can begin a carbon fusion cycle. In stars like Arcturus hydrogen fusion is taking place at a furious rate in a shell around the superhot core of helium. All this extra heat causes the star to swell to many times its original size.

I have fond personal connections to the star Arcturus. First of all, it was the first star that my three year old daughter, Jennifer learned to recognize. I remember holding her in my arms as she pointed toward the sky and smilingly said “Turus”.

The other reason is it gives me a connection to my now departed mother. Mom and I spent many nights looking at the sky and going out to see a satellite. There weren’t very many of them in my youth so the weather man would tell us when we could see one. Mom would sometimes tell me the story of how the light from Arcturus was used to turn on the lights for the 1933 Chicago World’s Fair (which she got to visit at the age of eleven).

In 1893 Chicago hosted the great Columbian Exposition to show off all the wondrous inventions of the Industrial Revolution era. At the time Arcturus was considered to be 40 light years away, meaning that the light from Arcturus that left in 1893 would just now be arriving at the Earth in 1933. The planners of the fair decided it would be a great way to open the fair using the light of Arcturus. North of Chicago was the largest refracting telescope in the world, the 40 inch Yerkes refractor. One of the new inventions was the photocell that could generate electricity when exposed to light and trip an electric switch. Thousands of people gathered for the grand opening on the night of May 27, 1933 as light streaming from Arcturus was fed through the giant refractor onto a sensor that would send a signal to the fairgrounds and turn on the lights.

Modern more accurate measurements place the distance of Arcturus at 36.7 Light years. Also it turns out they had a backup plan if it was cloudy on the appointed night.

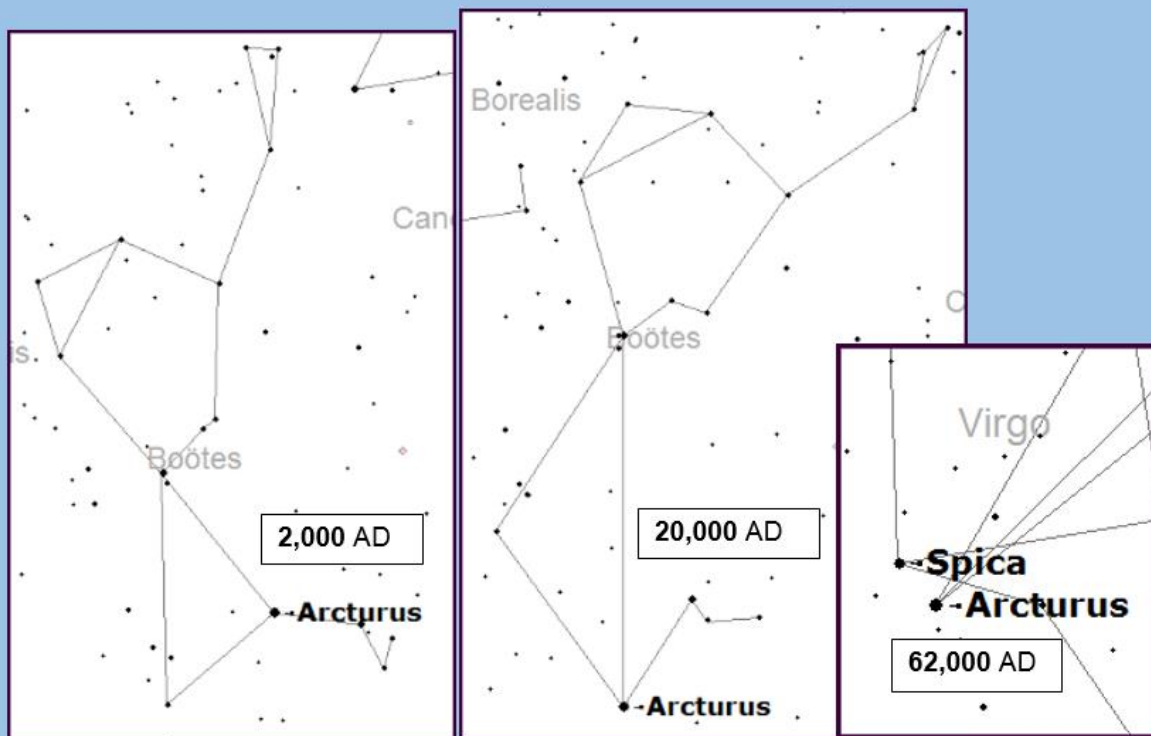
Details at [THE CURIOUS AND CONFOUNDING STORY OF HOW ARCTURUS ELECTRIFIED CHICAGO](#)

One last historical antidote associated with Arcturus. As star gazers we learn the constellations to be able to navigate our way among the stars. The names and myths associated with the constellation patterns date back to ancient times. Some objects like planets, comets and asteroids move against this background of stars but the patterns seem firm and fixed in place. However we know that we are just a tiny star whirling around in a giant galaxy of stars. Over long periods of time even the positions of the stars relative to each other will change. This movement of stars is called Proper Motion.

As we learned at our May 2018 club meeting dedicated astronomers have been carefully mapping the stars for many centuries. Each succeeding generation builds on the work of the former to reach an ever higher level of accuracy. Edmund Halley embarked on a mission to map the stars of the southern hemisphere to aid sailors as they navigated around the world. By 1718 Halley had noticed that Sirius, Arcturus and Aldebaran were over half a degree away from the positions charted by the ancient Greek astronomer Hipparchus roughly 1850 years earlier. Hipparchus made a map of 700 stars and was one of the first to attempt to plot the stars accurately in relation to each other. He introduced the system of magnitude numbers that we still use today to describe the how bright a star appears.

One half a degree is about the width of a full moon. However this half degree could not be ignored testifying to the skill and accuracy of these early charts. Today the GAIA astrometry satellite is measuring the position, parallax, and annual proper motion of 1 billion stars with an accuracy of about 20 microarcseconds. (A microarcseconds is 1 millionth of 1/3,600 of a degree)

Using this type data even our home computers can run software showing the Proper Motion of the stars over 1,000s of years. The images below were generated with Starry Night Pro.



Resources: <http://www.skyandtelescope.com/observing/walking-with-arcturus/>

Arc to Arcturus video https://www.youtube.com/watch?v=3_E-0sDp8hk

Numerous Wikipedia pages https://en.wikipedia.org/wiki/List_of_brightest_stars

I found a considerable range of values for data on Arcturus ranging from 25 to 69 solar radii

Wikipedia at least had annotations for the sources of their data

SUMMER 2018 - PRIME TIME TO OBSERVE THE PLANETS

By John Land

All the naked eye planets will be putting on a show this summer. Venus and Jupiter are well placed for viewing in the early evening in the west. For the best views of Venus try observing it in the twilight sky before it is completely dark. It's in a gibbous phase now but will swell to a huge crescent in late summer. Jupiter always puts on a good show. Even in small scopes its four moons and banded clouds can be seen. Try to catch a moon's shadow crossing the planet or search for the Great Red Spot. See page 8 of our [May 2018 newsletter](#) for details.

Saturn and Mars both reach opposition this summer. Saturn on June 27 and Mars July 27. At opposition an outer planet is in a direct line up with the Earth opposite the Sun. The planet will be closest to the Earth and appear largest and brightest in a telescope.

In early June, **SATURN** rises about 10:30 PM but you'll need a couple more hours for it to get high enough for best viewing. By month's end Saturn will at sunset and be up all night. Its rings are nicely tilted for viewing. Its brightest moon, Titan, is easy to spot and 3 or 4 of its dimmer moons may be visible in dark skies. See [Positions of Saturn's moons](#)

CALENDAR ALERT: Saturn Ring Occultation on the night of July 4-5, Saturn and its rings will slide in front of the 10th magnitude star, TYC 6277-323-1, I'll call it TYC 1 for short. The event starts about 11:10 PM CDT and ends at 1:38 AM on the 15th. A 10th mag star will be a challenge next to bright Saturn but may be viewable in a 8 to 10" scope at high magnification.

I saw a similar event of an 8.3 mag star in Nov of 2004. Was really spectacular to see it pop in an out of view as it drifted through the rings. See July issue of Sky & Tel or on the web later.

MERCURY puts on a good evening appearance the first two weeks of July. Look for it low on the western horizon soon after sunset. At 0 mag it's bright enough to see naked eye but binoculars help to locate it in the bright twilight.

The brightest **ASTEROID VESTA** is making its best approach in two decades. It won't be this close again until 2040. At opposition on June 19th Vesta will be 5.3 mag – viewable with the naked eye if you know where to look. Unfortunately, it's in the star filled sky of Sagittarius. Vesta should be easy in binoculars and wide field small scopes. Make a careful drawing of your viewing field and check back the next night or two to see which object moved. Once you've found it you can try spotting it naked eye. See Details at [VESTA MAPS](#)

SAVED THE BEST FOR LAST ! MARS – BEST VIEWING IN 15 YEARS !!



Mars reaches Opposition on July 27th bringing it the closest to Earth it has been since 2003. It won't be this good again until 2035! Although Mars rises a bit before midnight in June, the best viewing time is when it highest in the south between 3:00 AM and 4:30 AM (Dawn begins at 4:15 AM this time of year.) The predawn hours typically have the best viewing too.

Spring began in the Martian southern hemisphere on May 22. In early June its icy south polar cap is still large and bright but shrinking fast. Even small telescopes can make out the bright white polar cap. So don't wait around until late July. You'll miss the best part of the show. For about 6 weeks in July and August Mars will even out shine Jupiter becoming only second to Venus in brilliance. At opposition its disk appears over half the size of Jupiter. (in many telescopes South will be at the top of your view) See observing tips below.

TIPS for good planet viewing: Your telescope needs to be at the same temperature as the outside air. We call this **Ambient Temperature**. If you take the scope out of an AC cooled house to warm night air, three things are likely to happen. 1. Condensation will form on the colder scope 2. The glass will be expanding as it warms blurring the view 3. Internal air currents in your tube will also blur the view. So if possible set you scope outside (out of the sun) an hour or so before viewing. Cover it with a plastic bag or light weight cloth to keep it from dewing up. Same thing happens in reverse in the winter.

Try to **set up on grassy areas** so your line of sight is not over hot roofs or roadways. These hot surfaces make all sorts of air turbulence. Don't try to view the planet when it's close to the horizon. Wait for it to get higher in the sky. Start viewing at lower magnifications. Low power views are usually sharp even while the scope is reaching ambient temperature. Take time to look for the planet's moons or stars nearby. If you have a tracking scope make fine adjustments to its tracking. Step your magnification up to 80X – 100X and see if the viewing is good.

You can see a lot of detail at these levels. Sometimes the upper air currents won't allow much more magnification. Often the seeing is better after midnight.

Don't over extend your magnification. Your scope has its limits. Usually 50x per inch of aperture is the limit. (or 2x per mm) So a 4" telescope maxes out at about 200x. Even if you have a larger scope – it's a rare night that the seeing lets you exceed 250 X.

To find the magnification of your telescope Divide the Focal Length of the Telescope by the Focal Length of the eyepiece. Telescope 1000 mm / eyepiece 10 mm = 100 X Eyepieces with focal lengths less than 5 or 6 mm have tiny viewing lenses. So many observers will use a Barlow lens to boost the magnification. It has a tele-negative lens that usually double the power of any eyepiece. So using a 12.5mm lens with at 2X Barlow would give you 160X and give a more pleasant view than a 6 mm lens.

Try viewing filters if you have them. For brilliant Venus a neutral filter like a moon filter works well. Works well on Mars too. I've found my favorite filter for Mars is my old Light Pollution filter. It passes the reds and blues and gives Mars a light pink color but leaves the polar cap white. Try your own LPR and see what it does. People suggest a red for Mars – I found my orange to show the dark features better. A light blue works well for searching for the Jupiter's Great Red Spot. Try some out and share your favorites for our July newsletter.

FORGET PHOTOS – MAKE A DRAWING -Unless your scope and camera rigs exceeds the price of your car don't frustrate yourself trying to take photos. Get a sketch pad and a pencil and make a drawing. Your eye can see much more range of details than a camera can record.

Record the date and time – and make some notes of your memories of the evening.

Years later it's you notes that will bring the most pleasure.

SO WHY ARE YOU STILL INSIDE READING THIS NEWSLETTER – GET OUT OBSERVING!



REGISTRATION NOW OPEN for
OKIE-TEX STAR PARTY Oct 6 to Oct 14

<http://www.okie-tex.com/>

Registration is due by Sept 15th but don't delay.

Each fall amateur astronomers from all over the nation and beyond gather at the very tip of the Oklahoma Panhandle for a week long "Feast of Starlight" under some of the darkest skies on the planet.

The nearest town, Boise City, is 35 miles away except for the few dozen residents and ranchers around Kenton, OK on the west side of the mesa its open country.

Nearly 500 astronomy enthusiasts come each year bringing telescopes of all sizes to search out the hidden treasures of the night sky or just to sit around in the wee hours of the morning to swap tales of observing adventures. You don't have to have a telescope - there are always plenty of people willing to share.

The skies are dark! The food is great! Folks are friendly! Great Speakers & Door Prizes too! So tell your boss it's "Huntin' Season" and come track down some Nebula and Galaxies!
We'll keep the Lights Out for you!



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!



What Is the Asteroid Belt?

By Linda Hermans-Killiam

There are millions of pieces of rocky material left over from the formation of our solar system. These rocky chunks are called asteroids, and they can be found orbiting our Sun. Most asteroids are found between the orbits of Mars and Jupiter. They orbit the Sun in a doughnut-shaped region of space called the asteroid belt.

Asteroids come in many different sizes—from tiny rocks to giant boulders. Some can even be hundreds of miles across! Asteroids are mostly rocky, but some also have metals inside, such as iron and nickel. Almost all asteroids have irregular shapes. However, very large asteroids can have a rounder shape.

The asteroid belt is about as wide as the distance between Earth and the Sun. It's a big space, so the objects in the asteroid belt aren't very close together. That means there is plenty of room for spacecraft to safely pass through the belt. In fact, NASA has already sent several spacecraft through the asteroid belt!

The total mass of objects in the asteroid belt is only about 4 percent the mass of our Moon. Half of this mass is from the four largest objects in the belt. These objects are named Ceres, Vesta, Pallas and Hygiea.

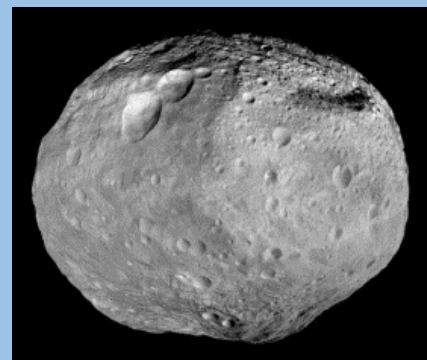


The **dwarf planet Ceres** is the largest object in the asteroid belt. However, Ceres is still pretty small. It is only about 587 miles across—only a quarter the diameter of Earth's moon. In 2015, NASA's Dawn mission mapped the surface of Ceres. From Dawn, we learned that the outermost layer of Ceres—called the crust—is made up of a mixture of rock and ice. Close up images revealed white patches thought to be salt deposits when briny water beneath its surface erupted onto the surface.

The Dawn spacecraft also visited the **asteroid Vesta**. Vesta is the second largest object in the asteroid belt. It is 329 miles across, and it is the brightest asteroid in the sky. Vesta is covered with light and dark patches, and lava once flowed on its surface.

The asteroid belt is filled with objects from the dawn of our solar system. Asteroids represent the building blocks of planets and moons and studying them helps us learn about the early solar system.

Images from Dawn spacecraft via [Astronomy Picture of the Day](#)
Click each image for links to more information.



For more information about asteroids, visit: <https://spaceplace.nasa.gov/asteroid>

TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



Astronomy Club of Tulsa: 174 members, including 24 new members in 2018.
New members for May: Vicky Escoe-Kelly, Aaron Fletcher, Zachary Pompa, Rick Cline, Donald Bradford and Bob Ferguson

Club Accounts as of May 28, 2018:

Checking: \$ 5,715.90

Savings: \$ 6,778.48

Investment accounts: \$ 22,766.79 (*Value Fluctuates with Market*)

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 **2018** 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



JENKS PLANETARIUM

Jenks High School Campus
205 East B Street, Jenks

TICKETS

\$5 online or \$7 at the door
Purchase online at jenkscommunityed.com
or call 918-298-0340

2018 [Go to Show Schedule](#)

Then click the Date Column to sort them by show date



Explore the night sky with engaging, awe-inspiring shows at the Jenks Planetarium. The 50-foot dome provides the ultimate screen for seeing planets up close, flying to distant galaxies, and even rediscovering our own earth in ways never thought possible.



CLASSIC COLLECTORS QUANTUM 6 TELESCOPE FOR SALE
Asking price \$ 3,900 for telescope, eyepieces and tripod.
6 inch aperture f/15 (90in" – 2286 mm focal length)
Maksutov-Cassegrain – 33% central obstruction – 1/20th wave
Optics by Cumberland optical in Maryland (same as Questar)

Purchased new 1979 (single owner). Scope is in excellent condition. This is a unique telescope as there were only 288 of these ever manufactured. It is similar to a Questar telescope (considered to be the best amateur scopes of that era). It includes a heavy-duty wedge and a detachable solar filter made by Orion. It takes 1 1/4" and 2" eye pieces and includes a University 55mm 42x, 2" plosll eyepiece, a Meade 26mm, 88x, 2" plosll, and a Brandon 48mm EFL 48x Vernoscope 2" eyepiece. Also heavy duty wedge and tripod.

David Schwartz dlsmsg@cox.net 918-814-3937



Meade Starfinder 10 inch F 4.5 Dobsonian - Reduced Price \$ 400

With Telerad finder and 6x by 30mm finder scope -
1.25 / 2.0 in rack and pinion focuser

Quality Upgraded Eyepieces with a **handy carrying case** and two red light accessories.

Meade 1.25 " Super Wide Angle 24.5 & 13.8 mm Orion 21mm to 7mm Zoom

Meade 2" Super Wide Angle 32 mm

Meade 2X Telenegative amplifier—and more

AstroSystems 2 inch Phase 4 Crayford style focuser

Details in [February newsletter](#) – page 13

Contact John at Tulsaastrobiz@gmail.com

You are invited to come join us to learn more about
Astronomy and view the wonderful sights in the night sky.

Check our Events Page of Dates [Link to Events Page](#)



During the school year our club holds a
Monthly General Club meetings at
Jenks Public Schools Planetarium
205 East B St, Jenks, OK
Located North of the intersection of
1st and B St

Meetings begin at 7:00 PM

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

[Click for Google Map Link](#)



Sidewalk Astronomy Night

East side of Bass Pro in Broken Arrow near the lake.
101 Bass Pro Drive, Broken Arrow, OK

[Click Map Link here](#)

On a Saturday evening near the 1st Quarter moon Astronomy Club volunteers set up telescopes to share views of the moon, planets and other bright objects. It's a come and go event where shoppers and restaurant goers get a chance to experience glimpses of the universe with their own eyes.



ASTRONOMY CLUB OBSERVATORY

Located on a hilltop about 25 miles SW of Tulsa
Features: classroom, restroom, dome with 14 inch telescope
and an acre to set up your telescopes.

Weather permitting we host two types of observing nights.

PUBLIC OBSERVING NIGHT on a Saturday

This event is open to individuals and families.
Club members set up telescope for public viewing.

* Groups need to make separate arrangements.

MEMBERS OBSERVING NIGHT usually on a Friday near new moon

Reserved for club members and their families to allow them to pursue observing projects.

The Observatory is **ONLY OPEN** for SCHEDULED EVENTS. [Link to Events Page](#)

[Click for Observatory Map](#)

CAUTION: **DO NOT** use **GPS** it will likely send you on some nearly impassible back roads.

The “Secret Language of Astronomy”

Every Science has its own “Language” of commonly accepted terms.

If you’re new to astronomy they can be confusing,

Below are simplified definitions of some of our “*Secret Astronomy*” terms.

Opposition – Date when an outer planet is in a direct line up with the Earth opposite the Sun.

The planet will be closest to the Earth and appear largest and brightest in a telescope.

The shape of a planet’s orbit around the sun is an **Ellipse** meaning it is not perfectly round.

There are more mathematical definitions if you care to look them up.

Eccentricity – the extent to which a planet’s orbit differs from a circle.

Perihelion – point in an object’s orbit when it is closest to the Sun.

Planets orbits fastest at Perihelion

Aphelion – point in an object’s orbit when it is farthest to the Sun.

Planets orbits slowest at aphelion. Greek word for Sun is Helios

Angle Measurements in the sky: We use angle measurements to describe how large or objects appear in the sky when viewed with the naked eye or a telescope.

One **Degree** in the sky is about the width of you little finger held at arm’s length.

Your closed fist held at arm’s length is about 10 degrees.

An **arcminute 1’** is 1/60 of a degree – the full moon is about 31’ wide or 1/2 degree

An **arcsecond 1”** is 1/3,600th of a degree. Jupiter appears about 44” wide in a telescope.

Typically stars closer than 2” or 3” apart are difficult to see separately in a telescope.

So when you see the ‘ **or** ‘ symbol beside a number it’s an angle measurement.

Magnitude – a numerical value used to describe how bright a star appears.

The brightest stars are 1st magnitude while the dimmest stars you can see in dark skies are around 6th magnitude. 6th Mag is 100 times dimmer than a 1st mag star..

In a race 1st place is better than 6th place. So the larger the magnitude # the dimmer the star.

Each magnitude step is 2.51 times dimmer.

Mathematically a magnitude step is the 5th root of 100. or $100^{0.2}$ power

Its exponential scale so that a 3rd magnitude star is $3^{2.51}$ power or about 15.8 times dimmer

Objects brighter than stars – Some stars and planets are brighter than the average

1st magnitude stars so we give them magnitudes of 0 or negative numbers.

Venus is a -4 mag object or about 100x brighter than a typical 1st mag star.

Occultation – an event when one object passes directly in front of another hiding it from view.

Generally it’s a planet or asteroid passing in front of a star. But the moon can also occult stars and planets. These events have scientific value in that they give accurate measurements of object’s orbit positions and profiles.

Confusing? You’ll get used to these terms as you continue to learn about astronomy.

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NIGHT SKY NETWORK –
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1860's Clark Refractor at Okie-Tex

Note Orion in the background
Photo by John Land

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