



# OBSERVER

## JULY 2024

*Bringing Stars to the eyes of Tulsa  
since 1937*

*Editor - John Land*



NGC7000/IC5070  
6/8/18



## NGC 7000 the North American Nebula

By Tim Gilliland

This huge nebula region covers an area about four times the apparent size of the moon. It can be found just north of the bright star Deneb in the constellation of Cygnus. The dark region which appears like the Gulf of Mexico is actually a region of obscuring interstellar dust.

Telescope - Stellarvue SV60EDS 330 mm, f5.5    Imaging Cameras SBIG ST-8300M  
Filters Astrodon OIII 3 nm · Astrodon Ha 5 nm · Astrodon Tru-Balance SII 3 nm  
Software - photoshop · Pixinsight 1.8

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## Stargazing Nights and Observatory Nights

Our GUESTS & Members nights are open to anyone. We do ask guests to try to RSVP.  
Large groups need to make separate arrangements.

Members Only Nights are Open to members and their family  
Details, Times and Direction Maps are posted on our Website

<https://www.astrotulsa.com/events>

### TWO Public Sidewalk Telescope viewing nights

Case Community Center [1050 W Wekiwa Rd, Sand Springs](https://www.google.com/maps/place/1050+W+Wekiwa+Rd,+Sand+Springs,+OK)

Bring your family and friends to enjoy an evening viewing the moon, planets and stars in this spacious park

**SATURDAY July 13 - 7:45 to 10 PM** in Sand Springs

**SATURDAY Aug 10 - 7:30 to 10 PM** in Sand Springs



### Guest and member Observatory nights

Come enjoy an evening of star gazing at our observatory located in dark rural skies SW of Tulsa

See details and directions on a [Website Events Page](#)

Guests are requested to RSVP

**Friday July 26 - 8:00 PM** Guest & Members Observatory Night

**Friday Aug 23 - 7:15 PM** Guest & Members Observatory Night

### Astronomy Club Members Nights

Our members are invited to come work on their observing goals, do some Astro imaging and share ideas.

**Friday July 5 - 8:15 PM**

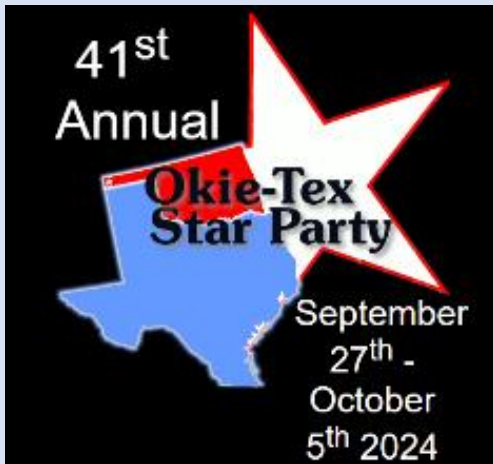
**Saturday August 3 - 6:30 PM ANNUAL CLUB PICNIC**  
and observing night - details to follow

**Friday Aug 30 - 7:30 PM**

If a Friday event must be cancelled due to weather, we will attempt to try again on Saturday at the same time.

- Always check the website for event updates





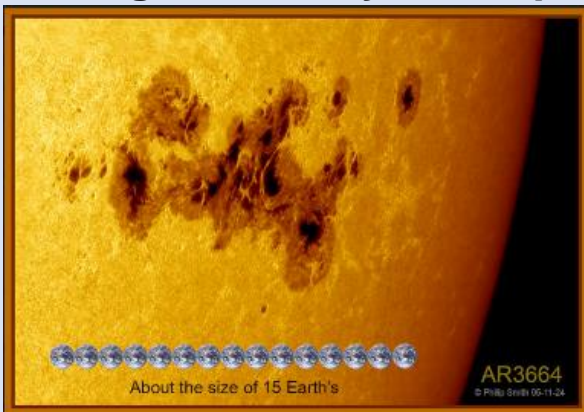
**OKIE-TEX STAR PARTY 41 is coming !!**  
**Friday Sept 27 to Saturday Oct 5**  
**Registration Deadline Sept 7**

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

Get your registrations in by Sept 7  
 Meals must be prepaid by Sept 7 !!  
 Nearest café is 34 miles away !!

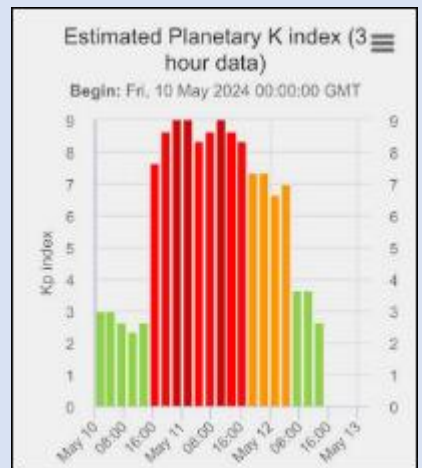
Each fall amateur astronomers from all over the country gather in the western Oklahoma Panhandle to enjoy a weeklong “Star Feast” under some the darkest Bortle 1 sky on the planet. It’s a memory you will cherish for a lifetime and yearn to go again. See Okie-Tex pages in [Oct 2022 Newsletter](#)

**“Energizer Bunny” Sunspot AR 3664 - just keeps going and going**

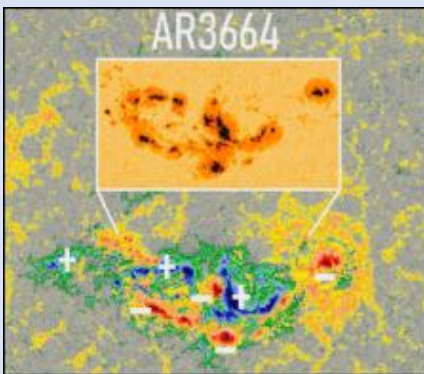


On May 10, 2024 people all over the world were thrilled to see Aurora displays as far south as Puerto Rica. On May 8 & 9 AR3664 hurled a series of **Four Conoral Mass Ejections** toward the Earth. Each bar on the graph represents 3 hours. The Earth’s magnetic field was at the Highest Storm levels for 27 hours and remained at high levels for another 12 hours.

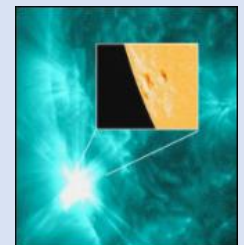
The regions high activity was the result of several oppositely charged regions in close proximity to each other producing numerous high energy X solar flares.



It first appeared as a disorganized region on the limb of the sun on May 2. By May 8th it was being compared to the infamous **1859 Carrington sunspot** that set telegraph lines on fire.



The Sun’s rotation period at mid-latitudes is about 27 days. This sunspot region is has remained at a high level of activity and is now making an unprecedented **THIRD passage** across the face of the sunspot. Most sunspot last only a couple of weeks or less. On June 23 it was still producing **strong solar flares** as it rounded the solar limb for its 3rd lap. It has been given a new number for each passage but it is still the same active region. It truly is the sunspot that won’t give up! Keep Up with Solar Activity at <https://spaceweather.com/>



## President's Message Don Bradford



We had our “Equipment Help” event at Reed Park on June 14, and it was a tremendous success! We had a very good turnout of people wanting help as well as qualified members to help. Several people brought their telescopes and either received help in setting up and using them or just used the convenient location to fine tune their skills at using their telescopes and observing. Although there were some parking lot lights that were not turned off as expected, there were enough visible stars to align go-to telescopes, and excellent views of the first quarter moon, M13 (Hercules Cluster), M57 (Ring Nebula) and other deep sky objects were had. The experienced members there to help seemed to enjoy the event as much or more than those seeking help. See the article elsewhere in this Newsletter on the event. We are planning another event like this before the end of Summer, at Reed Park if we can adjust the lighting, or at another comparable location that will offer a convenient, in-town location. Watch for announcements. And of course, we will continue our Members Nights and Guests Nights each month as usual, as well as the newly revived Sidewalk Astronomy events.

Members are also expanding their involvement with the creation of new ideas for Special Interest Groups (SIGs), as you have heard me discuss in every one of these President's Pages. In addition to currently active SIGs like “Observatory Upgrades”, “Women in Astronomy” and “Equipment Help” an area that is receiving attention is using astronomy for science. With the advent of new and mostly inexpensive astronomy instruments (as well as the creative use of old ones), amateur astronomers can accomplish interesting math and science like actual measurements of the size of the earth, size of the moon, distance to the moon, etc. One new activity grabbing the attention of some members is monitoring and measuring the progress of T CrB ( a recurring nova star ). Brad Young has been measuring the apparent magnitude of the binary stars and providing the information to AAVSO which is conducting massive data collection and analysis. Other members (including John Land and Tim Gilliland and others) are routinely photographing the T CrB to document its progress toward nova. See the article in this Newsletter pages 6 to 9 on the subject.

Dana Swift has spoken on possible subjects for creative SIGs, and he is actively engaging in several, including the physical upgrades to the operation of the Observatory Dome – an ongoing project. So, use your creativity and imagination and dream of new SIGs that interest you. Then start to work on it, and if you want help and participation by other members, contact me or use the “CONTACTS” link on the website. If you think using the dome telescope can facilitate your ideas, contact me ([astrotulsa.pres@gmail.com](mailto:astrotulsa.pres@gmail.com)) and arrange to learn to operate it. Can you think of a better bargain than membership in this Club !!

I look forward to discussing your ideas and to seeing you at one of our many events and projects.

*“Bringing Stars to the Eyes of Tulsa since 1937”*

*Don Bradford - President*

# Equipment Help Special Interest Group Initial Meeting

By Brad Young



The premier meeting of the Equipment Help Special Interest Group met at Reed Park on June 14th and was well attended by members seeking to get some advice on setting up and using their telescope. A dry run was tried at Whiteside Park earlier in the month to work out the logistics. Meanwhile, Krystal Reyes, Don Bradford and the Equipment Help Committee set up availability of a room to meet in and a parking lot for the observing field. A few of the external lights were dimmed, and it even came with a restroom!

The room proved to be a good cool respite from typical Tulsa summer heat and mosquitoes, but the real action was out on the observing field. Folks who brought in their telescopes had a wide selection of helpers to set up, adjust and work out the bugs in their equipment. Most of the kinks were worked out, and if the first expert couldn't figure it out (me) the next one usually knew what to do.



A fine time was had by all as it got dark and we observed the moon and a few deep sky objects such as M 13. Even just to the eye, a few stars were visible in the middle of the city. We'll announce soon the next meeting of the Equipment Help SIG and hope to see you there. Bring your telescope and we will help you out.

***Our motto is you bring it, we fix it.***

# Will the Star T CrB Blaze Overhead this summer?

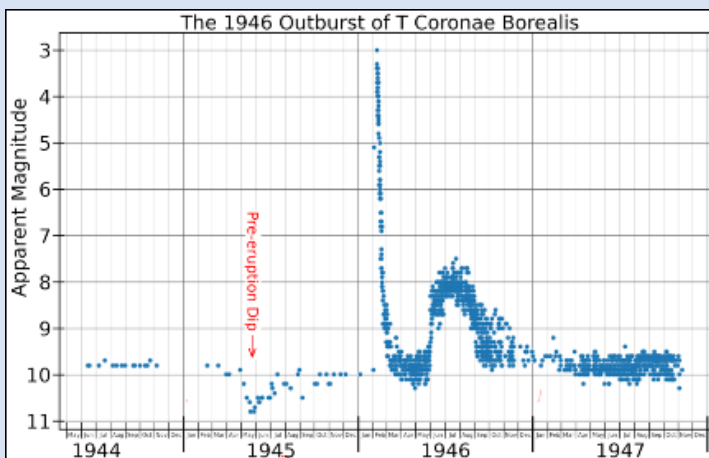
By John Land

( The information in this article has been gleaned from several resources. I tried to evaluate the ones that come from reputable sources vs some of the hype that is making the news feeds. You can explore the links at the end. )

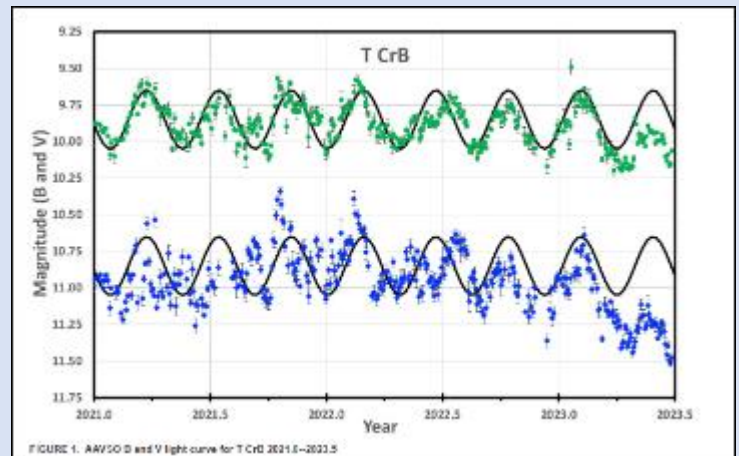
If you have browsed any sort of Astronomy information lately, likely your newsfeed is popping up articles - **“New Star Will Blaze in the heavens”** of similar attention-grabbing headlines. Observers are excited about the likelihood that the star Tau Corona Borealis, better known as **T CrB**, will once again “Blaze” in the sky. **T CrB** ( pronounced “tee core bore) **is known to be One of only 5 known Recurrent Nova stars in our galaxy.** ( More about this type later ) My phone astronomy app identifies it as a “Blaze Star” T CrB is a variable star that normally appears at 10th to 11th magnitude, just barely visible in binoculars in a rural sky. **However, on May 12, 1866 it suddenly brightened overnight to 2<sup>nd</sup> magnitude** - out shining all the other stars in Corona Borealis. Again, on February 9, 1946 it jumped to 3<sup>rd</sup> magnitude and could be easily seen with the naked eye. Older records show it erupted in 1787 as well. Doing the math, T CrB appears to blaze brightly with a time period of 78 to 80 years. Variable star observers with the [AAVSO](#) have been regularly measuring its magnitude changes for over 100 years accumulating over 120,000 observations since 1946.

**So Why is T CrB suddenly a Stellar Headliner?** In late 2015 it began to undergo a higher state of activity. This increased activity seemed to follow a similar pattern that had begun in 1938, eight years before its outburst in 1946. Then in March/April 2023 its magnitude took a notable dip that mirrored the dip just prior to its outburst in 1946. **Based on this data astronomers are anticipating it will erupt sometime soon in mid-2024 !**

\* Don't expect a brilliant Venus bright star. Look for an extra 2nd magnitude star like the ones in the Big Dipper.



AAVSO Light Curves 1944 – 1947



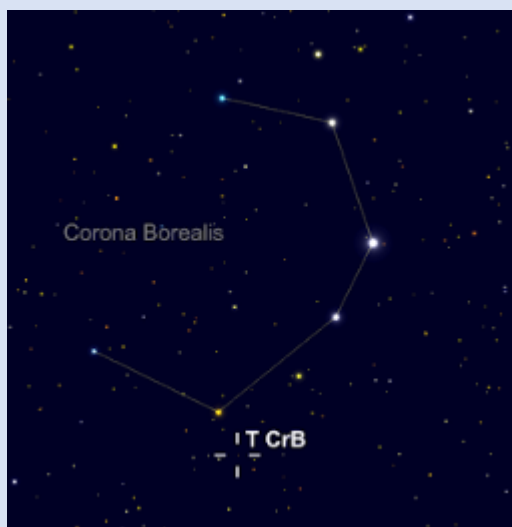
January 2021 to May 2023

**Note:** the dots represent actual observations turned in to AAVSO. The green and blue ones on the right are with specific type spectral filters

**How to find T Crb.** In early July the constellation Corona Borealis transits high overhead around 10:30 PM. Look for the Big Dipper in the NW and follow the curve of it handle around toward the bright orange star Arcturus in Boötes. ( shown on the image ) Turn facing south and

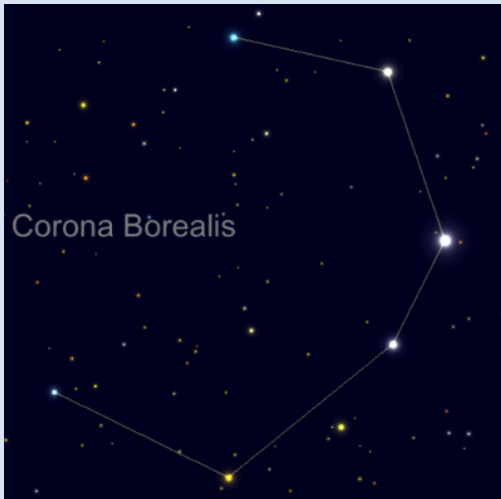
look high overhead for the “C” shaped crown of Corona Borealis. Its main stars are 3<sup>rd</sup> and 4<sup>th</sup> mag.

Most of us are familiar with the star cluster M 13 in Hercules. Corona Borealis lies between Boötes and Hercules. T CrB is one degree from the corner star Epsilon. Remember its 10<sup>th</sup> magnitude now so a wide field eyepiece on a telescope is your best approach to finding it. The two charts below are 1 degree tall – on Left is my Sky Safari app – On Right is my SeeStar S50 telescope image. Match the star patterns to find T CrB. The brighter stars are 9<sup>th</sup> to 10<sup>th</sup> mag as is T CrB near the center.



The Astronomical League is offering an Observing Challenge Award certificate for observing T CrB. See requirements here

<https://www.astroleague.org/al-observing-challenge-special-observing-award/>



Use this to compare magnitudes

Starting with the blue star at the top going clockwise.

The star magnitudes are:

Theta	4.15
Beta	3.66
Alpha	2.22
Gamma	3.81
Delta	4.59 not on the lines
Epsilon	4.13
Iota	4.98

T CrB is a binary star system consisting of a Red Giant star and a White Dwarf. A red giant is an aging star whose outer envelope of atmosphere is greatly expanded and loosely bound. Its red color is a result of the “cooler” temperatures of these extended gases. A few billion years from now our own sun will swell to become a red giant and its outer atmosphere will engulf Mercury and Venus and may even touch Earth. Gases from the red giant spiral down onto the surface of the companion white dwarf star in an accretion disk. As the gases continue to fall in the temperature and pressure on the surface of the white dwarf increases. Once they reach a critical combination of the two and massive nuclear fusion chain reaction with the energy of millions of H-Bombs. The white dwarf itself is not destroyed just the accumulate gases. Such a star is a **Nova** – “New Star” **Recurrent Nova** can repeat this cycle many times over hundreds or 1000s of years.



A white dwarf is a greatly compressed degenerate core of a star no longer able to carry on nuclear fusion. A white dwarf is usually Earth-size but hundreds of thousands of times more massive. A teaspoon of its material would weigh more than a pickup truck. So how did it get this way.

Stars form from giant clouds of gases and dust that are drawn together by gravity. We see numerous examples of these star forming regions in our telescopes. As the gases contract, they temperature and pressure in the core rises higher and higher. Once the central pressure and temperature reaches a temperature of 10 million Kelvin hydrogen fusion begins in its core. ( *The Kelvin temperature scale starts at Absolute Zero – about minus 273 Celsius* ) This sudden burst of energy halts its contraction and eventually the star reaches hydrostatic equilibrium where the temperature and pressure in the core equals the mass of the overlying gasses pressing down. A star like our sun will spend most of its lifetime as a Main Sequence star producing energy by fusing hydrogen into helium and being. But as it ages a helium core begins to form. It gets hotter



and hotter, and the star swells up. Hydrogen fusion takes place rapidly in a shell surrounding the hot dense core. If the star has enough mass, its core may reach 100 million Kelvin at which Helium fusion will begin in the core. But eventually it will run out of gases able to carry on fusion. (*Extremely massive stars can begin Carbon fusion at 600 million K – but that is another story*) Once the star can no longer produce energy in its core there is nothing to hold up the crushing mass of its overlying gases. The star collapses until the atoms themselves degenerate. As you learned in school normal atoms are mostly empty space. They have a tiny nucleus surrounded by orbiting electrons. In degenerate matter the temperature and pressure become so high that it essentially becomes a swirl of electrons pressed together repelling each other. Finally, the electromagnetic repulsion of all the negatively charged electrons crushed together halts its collapse. It has become a white dwarf. A planet sized object with the mass of a star. As it collapses it also became very hot with surface temperatures of 50,000 K or more. The greater the white dwarf's mass the more tightly it is compressed and the smaller it becomes.

The electron repulsive force is 100 times stronger than gravity but there is a limit to how much mass the electron repulsion force can resist. If the mass of the core reaches 1.4 times the mass of the sun, then the entire star will explode as a **Type 1a Supernova**. These types of explosions can even be seen in far distance galaxies. Astronomers can identify them by unique characteristics of their light curves. Since they all originate from the same type of explosion, their energy and light output is very much the same. When astronomers discover Type 1a Supernova they can use them as standard candles to measure how far away they are.

#### **Resources:**

**Excellent Current Article with diagrams June 26, 2024**

<https://spaceweather.com/archive.php?view=1&day=26&month=06&year=2024>

**NASA, Global Astronomers Await Rare Nova Explosion - June 6, 2024**

<https://www.nasa.gov/centers-and-facilities/marshall/nasa-global-astronomers-await-rare-nova-explosion/>

**NASA - View Nova Explosion, 'New' Star in Northern Crown**

[https://blogs.nasa.gov/Watch\\_the\\_Skies/2024/02/27/view-nova-explosion-new-star-in-northern-crown/](https://blogs.nasa.gov/Watch_the_Skies/2024/02/27/view-nova-explosion-new-star-in-northern-crown/)

**Announcing T CrB pre-eruption dip -**

<https://www.aavso.org/news/t-crb-pre-eruption-dip>

<https://www.aavso.org/t-crb>

**IS T CRB ABOUT TO BLOW ITS TOP?**

<https://skyandtelescope.org/observing/whats-up-with-t-crb04202016/>

**Explore the Types of Stars - Illustrations and short descriptions**

<https://science.nasa.gov/universe/stars/types/#white-dwarfs>

**T Coronae Borealis**

[https://en.wikipedia.org/wiki/T\\_Coronae\\_Borealis](https://en.wikipedia.org/wiki/T_Coronae_Borealis)



Click on these images to links on the Internet



\*\*\* The NEW CLEAR OUTSIDE icon above is a link to an extensive site showing cloud cover %,

Seeing, Transparency, Moon Phase, Temp in ° C and many other useful tools

**GOT A NEW TELESCOPE?** Here are some sites to help you get started with you telescope.

Getting Started with Your New Telescope

<https://skyandtelescope.org/astronomy-news/getting-started-with-your-new-telescope-2/>

Astronomy for Beginners | Night Sky Facts, FAQs & Resources

<https://skyandtelescope.org/astronomy-information/>

What to Know Before Buying a Telescope

<https://skyandtelescope.org/astronomy-news/what-to-know-before-buying-a-telescope/>

See [Website Observation Station](#) for a collection of [Interactive Sky Watching Tools](#)

Moon phases - Sun rise & Set - [Make your own custom interactive sky chart](#) and more

Great website for printable Finder Charts of Solar System objects <https://in-the-sky.org/>

July - Moon Phases - -

**New** Fri July 5 - - **1<sup>st</sup> Q** Sat July 13 - - **Full** Sun July 21 - - **3<sup>rd</sup> Q** - - Sat July 27

**JULY PLANETS** – **Venus** and **Mercury** return to the evening sky. Early in the month look for them near the horizon in the evening twilight. Mercury reaches greatest elongation on July 22. Use binoculars or low power telescope to see Mercury in M 44 the Beehive cluster on July 6. Venus will shine brightly as our evening star the rest of the year. It reaches it maximum elongation on Jan. 9, 2025 and continues in the evening sky until March 2025.

**Saturn** rises about midnight in early July and 10:30 PM by late month. Its best viewing will still be in the predawn hours this month. **Mars** and **Jupiter** are best seen an hour or more before dawn. Mars plods along in the morning sky rising about 2:30 AM Jupiter doesn't rise until after 3:00 AM The two planets can easily be seen in the same low power eyepiece on August 14 as they pass only 1/5 degree apart.

**Lunar conjunctions Morning** Mars July 1 & July 30, Jupiter - July 3

**Evening Dusk** Venus - July 6 Mercury - July 7 **Midnight** Saturn July 24 – 25

**Two Comets grace our evening skies.** **Comet 13P/Olbers** is still visible near the NW horizon as it moves below the Big Dipper in the obscure constellation Leo Minor. It will be closest to Earth on July 20 at estimated magnitude of 6.5. **Comet C/2023 A3 (Tsuchinshan-ATLAS)** was already showing a nice tail in June as dives westward through Leo toward it fall rendezvous with the Sun. On October 12 it will pass just 0.47 AU from Earth may reach as bright as 1st mag easily visible to the naked eye. For the latest observations data use <http://astro.vanbuitenen.nl/comets>

**Two Dwarf Planets reach opposition this month.** **CERES** which resides in the asteroid belt between Mars and Jupiter reaches opposition on July 5. It will be a bit of a challenge to identify this 7.3 mag object among the many stars of Sagittarius. Best method is to use a low power eyepiece and make a sketch of the stars you see – then return to that location a day or two later and see which one has moved. **PLUTO** is at opposition July 23<sup>rd</sup> approaching the constellation Capricornus. Those of you with good imaging set ups should be able to locate it. Again take an image a few days apart and examine the dimmest stars to see which 15th mag object has move.

Find More information here <http://astro.vanbuitenen.nl/dwarfplanets>

# ***Polaris and Other Cultures***

By Brad Young - Observing Chair

It occurred to me when I was thinking of a subject for my next article that I have not yet talked about astronomy of other cultures. I wrote and still administer an Astronomical League observing program called [Alternate Constellations](#). The first part of the program involves obsolete constellations in Western civilization. That subject has been fully explored in two books by John Barentine: "[The Lost Constellations: A History of Obsolete, Extinct, or Forgotten Star Lore](#)", and "[Uncharted Constellations: Asterisms, Single-Source and Rebrands](#)" both of which I highly recommend.

The other part involves the study of the constellations of other cultures. This includes recent constellations imagined by people in other parts of the world distinct from Europe and North America and looks back at how the stars were seen in ancient times. So, I decided to write an article that would introduce this subject and hopefully encourage you to do the observing program. I selected Polaris as my subject (see author's note at the end of this article). This worked well because Polaris is quite well known by all Northern observers and cultures but is not part of the observing program. It does however give you some idea of what stories and new meanings you might find by doing the program and seeing the stars through other people's eyes.

## **Before Polaris**

The importance of Polaris is based on its current location near the north celestial pole. At the pole, the stars nearest the location seem not to move through the night. The location of north is not permanent, though. Precession of the equinoxes was discovered by Hipparchus in the 2<sup>nd</sup> Century B.C. The effect of the "wobble" of the Earth in its orbit over a period of ~25,000 years has the effect of several stars in the sky appearing to be the "North Star" over that period. Polaris happens to be the star for our time.

## **...And After**

Precession will cause the north celestial pole to point towards Vega in 12,000 years, right back to where it was at the dawn of agriculture and husbandry of animals. As the cycle continues, it will be near Thuban, a star in Draco (the Dragon), as it was at the beginning of the Egyptian civilization. In transitory eras, the old star grows further away from the pole, while the upcoming one approaches it, in a never-ending cycle.

## **Worldview Importance of the Pole Star**

Many indigenous people and ancient cultures have venerated Polaris (or whichever star was near the pole – see below) for various reasons. This was based on the sight of all stars in the sky seeming to turn around it during the night, but its stability in the sky. Many other cultures, and in fact earlier Western cultures, believed the sky affected or even controlled events on Earth. A stable, unmoving star was certainly worthy of attention.

One air shaft of the Great Pyramid at Cheops points to Thuban, the Pole Star of that time, and the other to Orion. It is believed that these were used to give the soul of the Pharaoh directions for use in the afterlife.

The Anasazi, in New Mexico, the Kogi, living in the foothills of the Colombian Andes, and ancient Indian priests in Asia are all believed to have established the doors of their temples using a gnomon. This is a sophisticated method that also helps delineate the length of the seasons and

year, by casting a shadow that is longest at noon. That would have been close enough to set north to the accuracy we find in structures built by these ancient people. This method would suffice for their needs, especially if like these cultures, they thrived in a time when a pole star was not as convenient as Polaris today.

Omaha Indians represented great sky power with the Sacred Pole that always pointed to the Star That Does Not Walk Around. They treated it with respect, like a human being, that kept their tribe together in times of crises. Cultures in the north and throughout history have held Polaris in special regard; there are many stories, but this one is a great example of the plethora of beautiful anecdotes.



### **Qui-Am-I Wintook**

Or, in English, “Why the North Star Stands Still” represents many North American Indigenous tribal legends and fables on the North Star. This story comes to us from the Pahute Tribe near Zion National Park in Utah. The vivid text describes all the stars in the sky as creatures, great and small. Some migrate like birds, and are not seen for several months a year, while others are always seen (circumpolar). Or they are animals like the buffalo, looking for better grass, and return when the local fields are full again.

One animal, the mountain sheep (na-gah) saw a huge mountain and was compelled to climb it to see what was on top. Higher and higher he climbed but couldn't stand the slippery rocks near the summit. Frustrated, he found a cave to scramble into, and it provided the traction he needed. But soon, the mountain shook violently, causing the rocks behind him to seal the way back down. Now, the mountain goat is stuck in the cave, high in the mountains, so high as to look to be in the sky. He can't turn back, as the way is blocked, so he just keeps climbing, as there is nowhere for him to go. For the Pahute, a tribe living in mountainous areas with many caves, this was a familiar scenario that explained the star's lack of motion.

## Maritime Uses



The name Polaris derives from the Greek Phoinice, which came down as Polaris to the English sailors when Britannia ruled the waves, and the Lodestar (“leading star”) was vital to navigation. The Arabs used it too, using the name Al Kiblah to describe the star vital to determining the location of Mecca. The Muslims also ascribed the power of gazing at the star to cure itching eyelids, a common ailment in the desert.

Using Polaris also has a benefit for high latitude explorers. Because the compass points to the magnetic poles and not the true or geographic poles, it is not well suited for use in high latitudes where the difference between the two can be substantial. Of course, this made no difference until the introduction of the compass into navigation at the end of the Middle Ages.

Another consideration is that the magnetic poles are moving, due to changes in the Earth’s core. The British Geological Survey predicts that its alignment will shift in [just a few years](#). However, if the “pole exchange” phenomenon (where the magnetic poles flip), we will have to flip our compasses, and who knows what else will change. There are indications this has occurred hundreds of times in history and can occur instantaneously in geologic time.

## Southern Lands and Seas

Many texts have pointed out that the North Star is important for sailing, and this is certainly true. However, many Polynesian explorers made do without a bright South Star while in the waters south of the Equator, although their reliance on other stars was crucial. On land, indigenous Australians used a very large constellation known as Tagai, with our Scorpius as its body, Corvus his right hand and the Southern Cross his left. The Southern Cross’ long axis points to the South Celestial Pole.

Many people in the Southern Hemisphere used the Cross to locate south, with various star groups including it. But in equatorial locations, the variation in directional groupings is interesting. For instance, in Brazil, the Bororo people incorporate the stars of Auriga (!) into a massive constellation representing a caiman; its southern stars represent the end of the animal's tail. The eastern portion of Taurus is the rest of the tail, while Orion is its body and Lepus is the head. This constellation arose because of the prominence of Caymans in daily Amazonian life. ( *a cayman is a type of tropical crocodile* )

## Polaris in the Arts



Caesar cries out “But I am constant as the Northern Star!” (moments before he is assassinated). And Shakespeare uses it as a metaphor for the “still point of the turning world” (per T.S. Eliot) again in Othello. Art of all sorts have been dedicated to the star, music, manga, paintings, poems and much more.

### Author's note

Full disclosure: this article was written using a method like AI, and a version of a Large Language Model. It is the original type of information gathering and retelling that involves looking at several books and other sources, quoting some and paraphrasing others. The difference is, and I suppose the lack of intelligence is in the original content which stitches all this together. This used to be known as writing.

Hopefully the results are at least as useful as what you would have gotten if you had typed in polostar to Chat GPT. Because of the method involved, the sources for this article are lengthy, and so are posted for view at my website at <https://hafsnt.com/index.php/2024/06/14/bibliography-for-july-article/> I also posted the bot result there for comparison.

## Treasurer Report Cathy Grounds



As of June 17th, 2024, we have **180 members**, with **16** new members so far this year. Let's welcome our newest members - Nishant Agarwal, Michael Bebeau, Nils Neubauer, Leigh Ann Buckner, Liam Yanulis and Agarwal Nishant

We are pleased to announce that the PayPal glitch has been resolved, many thanks to Jennifer Jones and Seed Technologies for their efforts on this.

Please note that if you are renewing your membership late, you will still be credited a full 12 months going forward from the date you renew.

We are now able to take point-of-sale credit card payments via SquareUp. This will be a huge improvement for us and much more convenient. There is a processing fee of roughly 3% added by SquareUp.

As always if you have any questions or concerns or if your contact information (email, phone, postal address) has changed please send me an email at:

[AstroTulsa.Tres@gmail.com](mailto:AstroTulsa.Tres@gmail.com)

### Accounts as of June 17, 2024

Checking: \$ 4,245.09

Savings: \$ 2,996.27

Investments: \$36,290.94 (Value fluctuates with markets).

You can JOIN or RENEW memberships ONLINE using ANY MAJOR CREDIT CARD or MAILING in your dues with a check. The transactions are processed through PayPal, but you DO NOT need a PayPal account. A modest processing fee is added to online transactions.

Fill out the registration form at <https://www.astrotulsa.com/join>

Membership rates for 2024 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.

### MAGAZINE SUBSCRIPTION RATES 2024 updates

**A monthly astronomy magazine subscription is a great way to learn more about many aspects of our hobby. -**

Scientific articles, sky events, equipment reviews, imaging techniques and more

Use the links below to make your subscription

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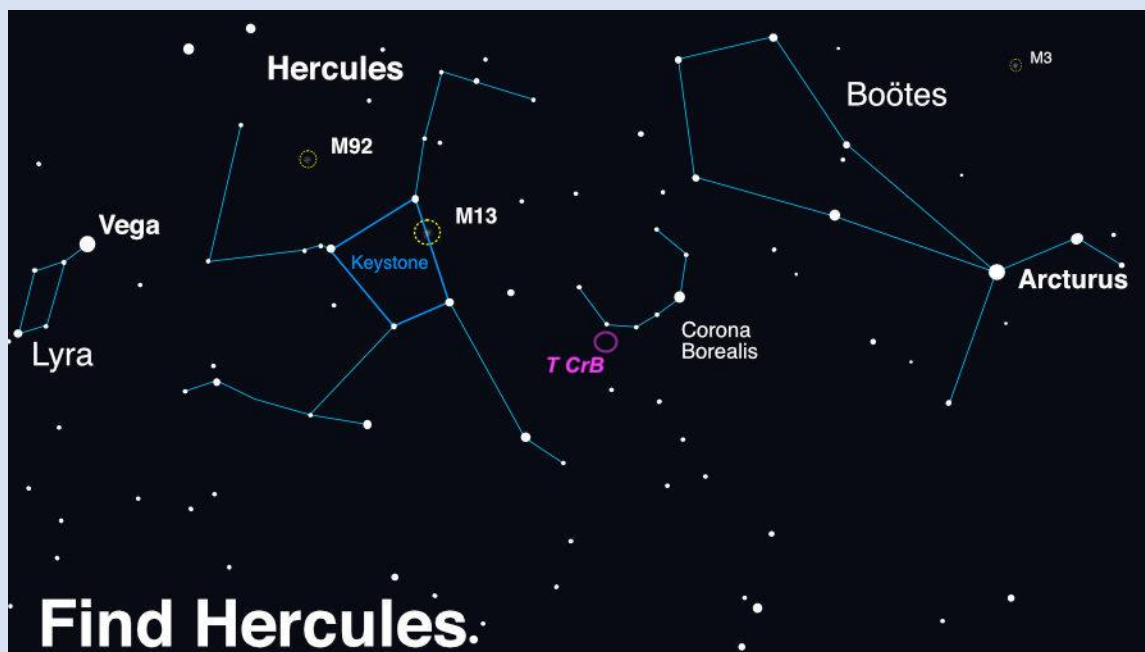
This article is distributed by NASA's Night Sky Network (NSN).

The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more!

## July's Night Sky Notes: A Hero, a Crown, and Possibly a Nova!

By Vivian White

High in the summer sky, the constellation Hercules acts as a centerpiece for late-night stargazers. At the center of Hercules is the "Keystone," a near-perfect square shape between the bright stars Vega and Arcturus that is easy to recognize and can serve as a guidepost for some amazing sights. While not the brightest stars, the shape of the hero's torso, like a smaller Orion, is nearly directly overhead after sunset. Along the edge of this square, you can find a most magnificent jewel - the Great Globular Cluster of Hercules, also known as [Messier 13](#).



Look up after sunset during summer months to find Hercules! Scan between Vega and Arcturus, near the distinct pattern of Corona Borealis. Once you find its stars, use binoculars or a telescope to hunt down the globular clusters M13 (and a smaller globular cluster M92). If you enjoy your views of these globular clusters, you're in luck - look for another great globular, M3, in the nearby constellation of Boötes. Image created with assistance from Stellarium: [stellarium.org](https://stellarium.org)

Globular clusters are a tight ball of very old stars, closer together than stars near us. These clusters orbit the center of our Milky Way like tight swarms of bees. One of the most famous short stories, [Nightfall](#) by Isaac Asimov, imagines a civilization living on a planet within one of these star clusters. They are surrounded by so many stars so near that it is always daytime except for once every millennium, when a special alignment (including a solar eclipse) occurs, plunging their planet into darkness momentarily. The sudden night reveals so many stars that it drives the inhabitants mad.

Back here on our home planet Earth, we are lucky enough to experience [skies full of stars](#), a beautiful [Moon](#), and regular [eclipses](#). On a clear night this summer, take time to look up into the Keystone of Hercules and follow this sky chart to the Great Globular Cluster of Hercules. A pair



of binoculars will show a faint, fuzzy patch, while a small telescope will resolve some of the stars in this globular cluster.



### [See an Image Animation](#)

A red giant star and white dwarf orbit each other in this animation of a nova similar to T Coronae Borealis. The red giant is a large sphere in shades of red, orange, and white, with the side facing the white dwarf the lightest shades. The white dwarf is hidden in a bright glow of white and yellows, which represent an accretion disk around the star. A stream of material, shown as a diffuse cloud of red, flows from the red giant to the white dwarf. When the red giant moves behind the white dwarf, a nova explosion on the white dwarf ignites, creating a ball of ejected nova material shown in pale orange. After the fog of material clears, a small white spot remains, indicating that the white dwarf has survived the explosion. NASA/Goddard Space Flight Center

**Bonus!** Between Hercules and the ice-cream-cone-shaped Boötes constellation, you'll find the small constellation Corona Borealis, shaped like the letter "C." Astronomers around the world are watching T Coronae Borealis, also known as the "Blaze Star" in this constellation closely because it is [predicted to go nova sometime this summer](#). There are only 5 known nova stars in the whole galaxy. It is a rare observable event and you can take part in the fun! The Astronomical League has issued a [Special Observing Challenge](#) that anyone can participate in. Just make a sketch of the constellation now (you won't be able to see the nova) and then make another sketch once it goes nova.

Tune into our mid-month article on the [Night Sky Network](#) page, as we prepare for the Perseids! Keep looking up!

**You are invited to come join us to learn more about Astronomy and view the wonderful sights in the night sky.**  
Check the **EVENTS** section at <https://www.astrotulsa.com/>



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 3<sup>rd</sup> floor.**

[Click for Google Map Link](#)



#### **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.

#### **GUEST OBSERVING NIGHT – RSVP requested**

This event is open to our Guests – both individuals and families as well as our regular members. Several of our club members set up telescopes 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**.

Check the **EVENTS** section at <https://www.astrotulsa.com/>

Follow our map directions **DO NOT USE GPS**

**Two Options for travel to the observatory**

**MOSTLY PAVED ROADS** – Hwy 75 to 201st St S – through Mounds OK

Most **DIRECT ROUTE** – Hwy 75 to 241st St S – some coarse gravel & dirt roads

# Enjoy at Planetarium Show at Jenks High School

## JENKS PLANETARIUM



Jenks High School Campus  
205 East B Street, Jenks

**TICKETS** are \$7

See our 2024 Spring Shows  
Schedule and ticket purchase  
links at

[Shows and Ticket Link](#)

**Shows take place on Tuesday evenings  
or Saturday mornings  
Must purchase tickets online in advance**

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GROUP DIRECTOR – **Open Position**