

ASTRONOMY CLUB

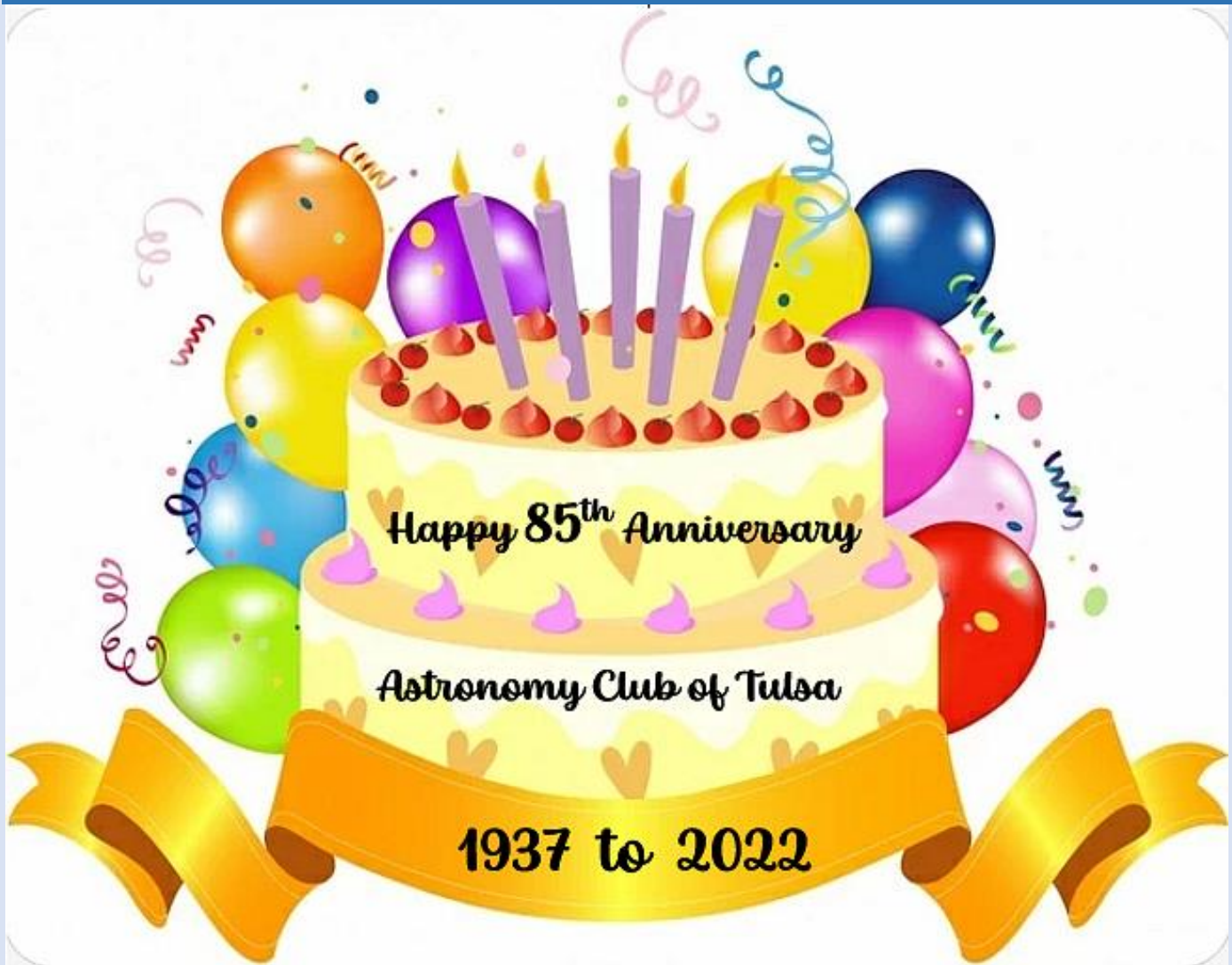


OF TULSA

OBSERVER

July 2022

Bringing Stars to the eyes of Tulsa
since 1937 Editor - John Land



Our Astronomy Club began in the Summer of 1937

See - "*Memories Shared Under the Stars*" - Pages 6 - 11

Image modified from All-Free-Download.com

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Astronomy Club Events

Check our website AstroTulsa.com events section for updates
Observatory ONLY OPEN for SCHEDULED EVENTS. [Click for Observatory Map](#)

Please use insect repellants at home or away from telescopes.

Now that Sunset is later **OBSERVING NIGHTS** will be scheduled on
Friday with Saturday as a backup night for weather cancellations.

Friday July 22 8:00 PM **Guest and** Members Night - Guest requested to RSVP

Friday July 29 8:15 PM **Members Only** night
Open to members and their immediate family

Saturday July 30 6:30 PM **Annual Club Picnic** –
We need volunteers to make this a fun evening

NOTE: Please check our website for Weather Cancellations before heading out.

Friday Aug 19 7:30 PM **Guest and** Members Night - Guest requested to RSVP

Friday Aug 26 7:30 PM **Members Only** night
Open to members and their immediate family



Registration is now OPEN !

for the 39th Annual [Okie-Tex Star Party](#)

Sept 23 – Oct 1 Amateur astronomers from all over the country and beyond come to enjoy a week long “Star Fest” under some the darkest sky on the planet.

OBSERVING NIGHT GUIDELINES

With the Summer Travel Session well under way the number of Covid cases is on the rise again. We want to keep our guests and members safe. We ask you to please be thoughtful of the health safety of others around you. If you or a person in your household is showing signs of illness, please postpone your visit for another date.

Personal Hygiene, Social Distancing and Mask wearing are effective means of preventing spread.

Come stroll through the Solar System. The 1 to 10 billionth scale walkway has just been installed in Broken Arrow on E 61st St about a mile east of Bass Pro in front of Creekwood Elementary. Each planet is displayed on an attractive aluminum stanchion with information on a display disc. Bring your walking shoes, the distance from the Sun to Pluto is 2000 feet! A group of retired and current educators began work in February 2021 to bring this amazing Exhibition to Broken Arrow. Much tireless planning, getting installation permits and raising the \$ 50,000 from community businesses and private donors was needed to bring this about.



President's Message John Land



Greetings to all our Astronomy Club of Tulsa Members and Guests.

Summer is here and the heat is on! But there is hope. By the end of the month the nights will be 41 mins longer. The Summer Milky Way will come up two hours earlier. Saturn rise before 10:00 PM and Jupiter before Midnight. People often visit area lakes or parks and get a chance to finally get away from the urban skyglow and enjoy darker skies at night. Our Observatory Guest nights are often busy as families come out to enjoy seeing the stars. Members volunteers are needed to help on our guest nights.

I had the privilege of attending the MidStates Regional astronomical convention in St Louis in early June. 77 Members were present from several astronomy clubs scattered around our five state region. We got to hear a number of interesting presentations and visit the St Louis club's observatory about 40 miles south of town. Our Banquet keynote speaker was Scott VanBomme, Dept. of Earth and Planetary Sciences at WA University. His presentation titled *"The Pale Red Dot"* was a fascinating look forward to how the Perseverance Mars Rover is collecting and caching core samples to be eventually collected and returned to Earth. Our Club planned to help host the 2020 convention. I'm hoping enough members will be volunteer to help us plan and host the MidStates Convention in 2023

Congratulations to Peggy Walker of the BA Sidewalk Astronomers for being selected for the 2022 MidStates Amateur Astronomy award. Peggy is an enthusiastic promoter of astronomy for youth and writes an article for the National League Reflector newsletter.

Our area clubs were also invited to register to participate in the 2022 Online Convention of the Royal Astronomical Society of Canada. I got to listen to a few of their speakers and also a tour of a neutrino detection instrument buried deep underground in an old salt mine.

The American National Astronomical League convention will be held in Albuquerque, NM July 28 – 30 <https://alcon2022.org/>

I hope to see many of you at our Summer observing sessions.

Let us continue our 85 years of

"Bringing Stars to the Eyes of Tulsa since 1937"

John Land - President



Click on these images to links on the Internet



See our [website observing page](#) for a collection of [Interactive Sky Watching Tools](#) Moon phases - Sun rise & Set - [Make your own custom interactive sky chart](#) and more

July Skies. - Moon Phases -- 1st Q July 6 -- Full July 13 -- 3rd Q July 20 -- New July 28
Closest Super Moon of 2022 - Full Moon 13:38 CDT - Perigee 04:09 CDT - distance 357,263 km
[Download a July Evening Star Map](#)

Morning Planet Parade – Four planets are still visible before dawn. (5:00 AM) Bright **Jupiter** is easily identified in the SE. **Mars** lies 27 degrees to it left **Venus** is rising a bit north of East. **Saturn** is sinking lower in the SW Mercury is too close to the Sun this month. The moon plays tag with Saturn July 15 & 16, Jupiter the 19th, Mars the 21st and a thin crescent moon next to Venus on the 26th

The **Delta Aquariid meteor shower** is active near the end of July. It reaches its peak the night of our club picnic July 30 with couple dozen meteors per hour in darked skies.

Comet C/2017 K2 makes its closest approach to Earth on July 14. At around 7th magnitude it has been accessible to moderate sized telescopes since late May. You may have seen some Hyped Up articles online claiming “*Giant Comet Headed for Earth!*” However, Do Not Be Alarmed - at its closest approach 1.8 AU it is still beyond Mars orbit. At its discovery in Sept 2017 by the PANSTARRS survey it was 1.5 billion km away. The Hubble images place its size at about 18 KM (59,000 ft) diameter. over twice the height of Mt Everest. Data and Finder Charts <http://astro.vanbuitenen.nl/comet/2017K2>



The Summer [GLOBULAR CLUSTER Observing Challenge](#) Began July 1 and must be completed by Sept 30, 2022. Click the link above for details for to earn the award. Here is a PDF of the [38 Globular Clusters](#) You will also want to review . . details about [Rating Seeing and Transparency](#)

Learn more about other [Astronomical League Observing Certificates](#) available



Tired of Cloudy nights? Enjoy the Stars Indoors by taking in a show at the spacious Jenks High School Planetarium. Most shows are on Tuesday evenings. Check the schedule of shows and make your reservation at <https://www.jenkscommunityed.com/jenks-planetarium>

July Show Times

9	Sat	Spacepark: Infinity*11am
9	Sat	The Summer Sky***8:30pm
11	Mon	My House Has Stars6:30pm
13	Wed	Apollo 116:30pm

Memories Shared Under the Stars- Members share their memories of our club. If you would like to share your stories for our August issues
Email them to Tulsaastrobiz@gmail.com

Bob Lieser - attended with his parents since the late 70's and still comes regularly to meetings and observing nights

As a child, my parents took me to Art Sweeney's studio for meetings of the Astronomy Club of Tulsa. That was a long time ago, but here are a few random memories.

The 1976 film "Universe," a documentary about planets and stars narrated by William Shatner, was shown during one of the meetings. I was excited to recognize Shatner's voice from Star Trek! I've seen it several times since then, but I saw it at the Astronomy Club for the first time. Twice in the video, there's a sound effect a lot like the "THX" sound that used to play in theatres before movies, and I think this film is where it originated.

I remember Reggie Kikugawa at the meetings, and that he had a loud, hearty laugh. When I was at Carver Middle School, there was a "career day," when students could list the career they were interested in and get a meeting with a Tulsan in that field. A friend of mine and I Don Sipes, listed "astronomer" as our career, and when we went to our site visit, there was Reggie Kikigawa from the Astronomy Club!

In 1982, someone was selling a used Meade 2080 8 inch Schmidt Cassegrain telescope after a meeting, and my parents bought it. It was our first big telescope. We used it for many years afterwards, including on a couple of trips to see the skies of the Southwest desert.

During one of the club meetings in the early 1980s, there was a discussion about how the Soviet Union seemed to be pulling ahead of the United States in the space race. While the U.S. was working on low earth orbit missions, the Soviets could be on the way to landing a man on Mars. Someone suggested that John Glenn could be the best 1984 Presidential candidate in terms of space policy. I'd never been interested in politics before,

But an astronaut running for President sounded cool. Somebody also mentioned a great book on the Soviet space program called "Red Star in Orbit" by James Oberg. I checked this book out from the library and read it, and this may have been what sparked my interest in Russian language and culture. Reading about the Apollo-Soyuz docking and how the astronauts and cosmonauts trained for it probably also helped me see how important exchange programs could be.

Tamara Green – Joined in 2004 along with her husband Owen. She has served on ACT Board, Secretary and also as President

There are way too many precious memories for me to pick just one. This club has given me so much joy over the years, and I have made many wonderful friends. I think my most favorite times are the times I had at the Adams Ranch, the Messier Marathons at TUVa, and of course Okie-Tex.

Dan Horwitz - joined in 2003

I have learned much from being a member of the Tulsa Astronomy Club. Members freely share their experiences, knowledge, and equipment alternatives with other members and the general public. Learning what works and what doesn't, can also be a money saver. Associating with other members who share this common interest is reinforcing and motivating to continue to learn and enjoy astronomy.

Robbin Jones – joined in 2011 –

A few special memories for me were involved various club members while at the OkieTex Star Party.

I remember the first time I saw the Horsehead nebula through an eyepiece using Steve Chapman's Dobsonian. On the same night Steve showed me the Flame nebula. He told me to "jiggle" the scope a little to help me see the objects. It was thrilling to see these for the first time after hearing about them.

I remember another night at OkieTex when John Land showed me Barnard's "E" using binoculars. I heard about it, but had never seen it till then. John very patiently showed me lots of objects in the sky that night, but above all I remember Barnard's "E".

I remember another time at OkieTex when for a day or so I was fighting to properly polar align my scope. Skip Whitehurst very kindly and patiently helped me figure out the problem to get a good alignment which worked super for the rest of the star party.

I remember seeing M31 through Tony White's big 6" TMB refractor at OkieTex - all I could say was "wow".

Lots of other things I could say - people sharing scopes, eyepieces, equipment, refreshments, food, etc. The night sky is certainly beautiful, but I would not be able to enjoy it near as much were not for many club members showing me how to enjoy it.

Stan Davis – Joined in 2007 - has severed on our ACT board

Congratulations to the Astronomy Club of Tulsa on its 85th anniversary. It is an accomplishment that should certainly be celebrated. It took a lot of dedicated members to keep the club operational for so many years. I would like to give a special thank you to John Land for all of his hard work that he has done for the Astronomy Club of Tulsa. I know that over the years he has held multiple club office positions and been a long-standing board member. His dedication over the years is a real tribute that should be noted.

I joined ACT like most of you wanting to learn and get assistance in operating my newly purchased telescope. John has always been there to teach and assist at the members nights and all events. He has been very active in prompting the clubs outreach programs. That in itself takes a lot of personal time.

I remember when I was new member, and I went to High Frontier Rocketry out reach in Pawhuska. I took my two grandsons to show them all of the cool rockets. The Astronomy Club was also involved and had telescopes setup for an evening of viewing. I don't remember if I brought mine or not. I do remember John was there and had a portable planetarium. My grandsons and I attended one his presentations. It was really nice. He

was showing what the evenings sky would look like and objects to observe that evening. One of his explanations was how to find the Big Dipper, following the handle, arc to Arcturus and then spike to Spica. I was just learning my constellations and my way around the night sky, and I hadn't heard that before. It is a very useful aid in finding two more constellations. Also, I have heard my grandson's showing someone the evening sky and they will say just follow the arc to Arcturus and then spike to Spica.

I am very glad to be a member of ACT and so very thankful for all of the members that have taken an active roll in keeping the club moving forward. They too certainly deserve a pat on the back for their hard work.

I just wanted to make a special thank you to John for all of his many years of dedication to the Astronomy Club of Tulsa.

KC Lobrecht - joined in 1979 - was first woman to earn her Master's Observing Certificate. Club president and board member and a great artist

A few of us have been in the Club for half that time. (*the club's 85 years*) Richie Shroff. John Land and James Liley still active Astronomers. I believe shared observing is the best of the Club.

John asked me to write some stories of the Club's, between the 80s and 90s. Sorry if they are shaggy dog ones.

I had moved out to the rural Mounds in '78. So, I was observing behind my barn with the horses blowing steam, just before I joined the Club in the late Fall of 1978. Good thing, as I was trying to find the Horsehead Nebula with a 4" refractor; (when you need a 20"). Caveat: "nothing can deter a dedicated observer, except clouds". Perseus' Double Double Open Cluster hooked me.

About that time made two Club meetings. Joined what appeared to be staid gentlemen. (The only other female Judy Lieser). The men sat behind the long desk, as you came into Art Sweeney's studio, off Skelly Drive, just east of Lewis. I was 29. John Land was President, as he is now, presiding over the Meetings, to a packed house. The second meeting the Guest Speaker was a retired Blue Book Project Researcher. He did come off Detective type. All I remember, him saying, "the mother ship in "Close Encounters" was about right in size".

In the 90s, I saw a weather balloon shatter miles above the Observatory early one evening with a group. That was pretty spectacular, tinkling down for a very long time. Another sighting: Craig Davis and Tim Davis were dead serious about some type of air balloon size craft towards Kellyville above the horizon, hours past sunset. They observed for 45 minutes. Of all the thousands that have come up to the Observatory... 2 sightings? James Liley waylaid UFOs believers when asked. He said to me, "he probably shouldn't be as stern of distances involved of space ~ impossibilities". I said, "like telling, Christ was just a man and there are no ghosts".

I'm waiting for a 100k per hr. meteor storm and proof of a very large hominid. Supernova in our Galaxy might be asking for it. Glad we have two Solar Eclipses before we die.

I got involved in the Spring of 1992 Kevin Manning called for volunteers working on the new Mounds Observatory being almost completed, due west of me by 5 miles as the crow flies. I told him I was a painting fool, so got the job... painting all doors and dome ceiling. Think it's still current. Dedication of the New Observatory in that Fall. First light of our Dome's Telescope was that Winter, was a huge big deal. We all on baited breathe, bigger than Hubble's 'cuz it was personal. James blew me away with the Swan Nebula, up the 20 foot tall oak ladder. (I loved that ladder, painting. They took the scaffolding away last 4 foot up).

I became Secretary in '92 and scheduling Director for Groups. (Club Pres. '95/96). Nick Pottorf and I did several solar observing groups, those were stunning to watch Nick. Not so much the sunspots. He had a lovely gentle grace. I scheduled as many as eight groups a month by night. Later Chris Brown TCC Astronomy Physics Professor assigned me his Field Assistant, (I asked him to be my VP in '95). By '93 I had attained the Messier Certificate. During our thirteen years together I became the first woman to attain the Herschel I and II Certificates 2002 and first woman to get The Master Observer's Certificate with the Astronomical League.

Gerry Andries longtime Observatory Manager made that possible as he ran interference during the many public groups coming up. I did observing log work during assisting Chris's Field Students. They saw hundreds of fuzz ball globulars.

My closest observing buddies got their Master's Certificate too. Tim Davis, Rod Gallagher, Gary Bushmaster and Brad Young.

Our Club's serious observers make Okie-Tex at Kenton. My first two, in the late 90s, were at Lake Murray. Dallas Astronomy Club invited us to their Atoka dark site before Okie-Tex. That was my indoctrination to Star Parties and camping. No turning back. Kenton has many of our hearts. (Felt like our real life). Messier Marathons with Ron and Maura Woods on the farm near Checotah for decades were fondly looked forward to as well.

All the best of living in the moment, in the night with deep sky observing. Clearly remember a few kids saying across the observing field, "Oh Wow!!" usually to Saturn for the first time. Chris and I would smile at each other across the observing pads.

I can still hear singing coyotes, a lone wolf's forelorn howl, owl hoots almost coos of love, and especially katydids on warm summer nights their song of "errsin-errsin" to us. Driving to and from the Observatory, seeing deer almost get creamed, huge beavers, snakes, tarantulas, porcupine, opossums, bobcats and families of raccoons and an owl lurking overhead and lots of bats over the field. Many Hawks, Owls, Turkeys Vultures... training and aligning our telescopes on them at high power on the AT&T tower.

A story of a coyote ran through our observing field in the early days and knocking someone off his observing chair. Many stories of snakes, barn swallows and hordes of ladybugs in the Observatory. The red Sunsets in the heat of Summer and Moonrise shared many years of experiences. Cold Winter nights the best shared.

Hope this warms your heart how much the Club is loved from this Observer. Thanks for being there. The Innuits believe the stars are past beloved souls. Do feel the Universe watches over me since I looked so deeply.

Brad Young – Attended with his parents as a child then joined in 2002. Brad probably has completed more Astronomical Observing Certificates than any person in the entire Astronomical League ! Currently working on observing ALL the **7,840** objects in the NGC catalogue!

There are three things I remember distinctly from my childhood:

- Garanimals clothing, which was my entire fashion palette.
- Leon Russell constantly on the turntable in our living room (and singing along)
- Getting dragged Custom Recordings Studio on Friday nights to the Astronomy Club.



NOTE: 1) NOT the author 2) actual Leon 3) artist rendition of Art Sweeny's Studio

I didn't like the inside part at all. The recording studio was cool with its acoustic walls and ceilings, but the adults just showed a bunch of slide photographs and talked a lot. But then we got to go outside in the parking lot and look through telescopes at the moon and planets and stuff. That part I liked a lot.

I was one of the few children, but the adults seem to put up with me if I didn't smudge the eyepiece. We were at Skelly Drive and Lewis, and it was as dark as it needed to be to observe anything we wanted. Imagine trying to observe anything at that spot today!

When Green Stamps were discontinued, my great grandma split her stash with me, and we rode the bus to the store. I got the most stamp costing thing I could with mine (think Skee-Ball) – a cheap refractor. I guess dragging me to the Friday night meetings stuck.



Years later after I moved back to Tulsa, I found the club still going strong and had a new dark site out at our present observatory. After the comet craze of the late 90s when I was still working in Houston and only back in Tulsa on the weekends, I rejoined the Astronomy Club and made it when I could. Besides a short stint in the Fort Bend Club in Houston, the Astronomy Club of Tulsa has been a lifelong resource for information, camaraderie, and above all, fun.

John Land – Joined 1977 – has served in numerous capacities

I first joined the Tulsa Astronomy club in the spring of 1977. I had enjoyed that stars as a kid and renewed my interest while teaching science at Okemah, OK. My mother-in-law discovered there was a club in Tulsa and we would plan our trips to Tulsa on the weekends when there was a club meeting.

We meet in an eclectic sound recording studio on Columbia street just north of I 44 – Skelly Drive. It was owned by Art Sweeny – He was a man of all trades – in addition to his studio he had a vacuum chamber for coating telescope mirrors and other types of optical equipment. The club had some great people to mentor us novice astronomers. Nick Pottorf was a gentle super intelligent man always encouraging us. He served as club treasurer until nearly the age of 90. Back in those days people often made their own instruments. He had a metal working and optical workshop in his basement and made instruments that would rival commercial products of today. I had the joy of riding along with him, Gil Gotschalk and Louis Desjardin to an astronomy convention in Omaha in the early 80's Was amazing to listen to them talk. One former member of the club, James Westphal, came to speak to us about a future space telescope (the Hubble) He was the designer of its wide-field camera!

After the meetings or on Saturday we would gather at a dark site away from town. In June '77 we were out near Keystone. I had a little 60mm refractor the math teacher had loaned me. About 2:00 AM I was scanning along the Milky Way and landed on a small star cluster. Some high school students were observing nearby and informed me that it was M 11 (*the Wild Duck cluster in Aquila*) ELEVEN ? Where were the other TEN ? I soon learned there were 110 M objects! When I got home, I ordered a 6" F8 Newtonian from Edmond Scientific! I was officially hooked on the stars!

We began observing on the parking lot next to our present observatory in the late 1980's. Several visionary members of the club began plans to build a permanent observatory. Construction began in 1992. Many of our members participate in building it.

Some bright comets brought a lot of public interest in astronomy. Halley's Comet was visible for several months in fall of 85 into 86. The astounding Hale-Bopp comet was easily visible to the naked eye for many weeks in 1997. In August 2003 Mars made its closest approach to Earth in 60,000 years. (*really just a few 100 km closer*) We held a public telescope viewing at large field near the Zoo. Had over 5000 people show up over two nights ! Among our guests was a young couple with a small telescope
(*Tamara & Owen Green*)

I have been privileged to share my love of the marvelous wonders of God's vast universe with many wonderful people over my 45 years in the club. The key to our club's continued success lays with passing on our passion for the night sky to future generations who will continue in leadership roles for years to come.

John Land

The Objects That Changed Astronomy

By Brad Young

(And How to Observe Them)

Part Four: Sputnik to James Webb Space Telescope

“Listen now for the sound that forevermore separates the old from the new.” NBC radio announcer on the night of 4 Oct 1957, introducing the transmissions from Sputnik 1

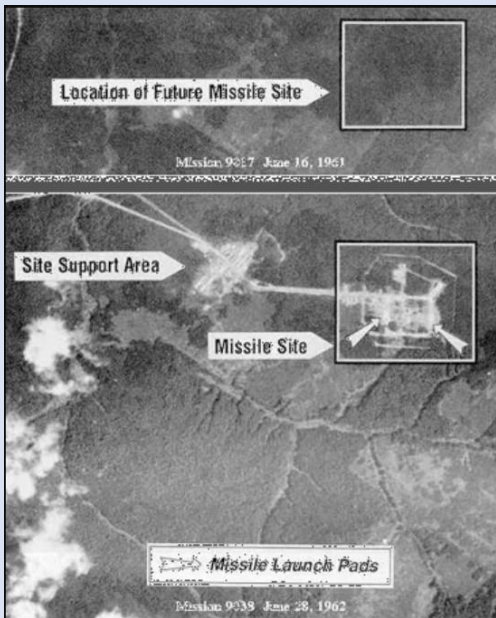
Mankind’s giant leap into space began with a beeping ball less than two feet in diameter that spooked Americans and started one of my favorite parts of this hobby, tracking satellites. But the explosion in space exploration that followed also led to space-based astronomy, and even planetary exploration.

More New Thinking

While astronomy in the visual and radio bands of the electromagnetic spectrum can be done from Earth, the other parts of the spectrum were not available, due to the atmosphere. Even visual observing was hampered by the constant changes in air movement and heat convection. Significant progress has been made in reducing these effects by locating observatories on mountains, and the invention of adaptive optics, but the ultimate solution was to get above the roiling air and into space.



As often happens, military advances due to the Cold War bred civilian advances, beginning with the need to get to space to compete with the other side. Reconnaissance missions to image foreign assets led to better photographic, and later, electronic imaging technology along with working out data transmission and linking to ground stations and “passing” data from different orbits. All these advances transferred easily to planetary probes, imaging satellites, and communications links across vast distances. So, as the space program advanced, so did the science that could be done, using the new vistas opened to us.



“Two U.S. Corona reconnaissance satellite images made a year apart—in mid-1961 (top) and mid-1962 (bottom)—revealing the construction of a new Soviet SS-7 Saddler (R-16) intercontinental ballistic missile site. Located at Yur’ya, Russia, the site was the first Soviet ICBM complex to be identified in Corona images.”

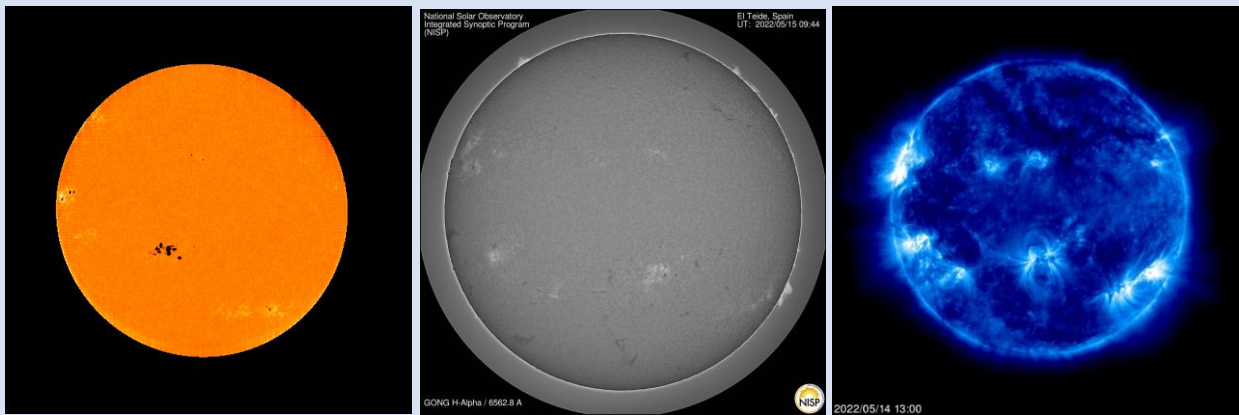
Before Men on the Moon

“Flyin’ mother nature’s silver seed to a new home”
Neil Young

Several important missions started before the manned missions culminated (so far) on the Moon. The Explorer missions, at first a cover for early U.S. spy satellites to check rival U.S.S.R., began in 1958 and Explorer 1 was the first successful U.S. launch. Missions later investigated radiation, the magnetosphere, the sun, and observed the sky in

wavelengths of light blocked by our atmosphere, such as X-rays, gamma rays, UV, and IR. Explorer missions continue; the recently launched Ionospheric Connection Explorer (ICON) is a satellite designed to investigate changes in the ionosphere of Earth, the dynamic region high in our atmosphere where terrestrial weather from below meets space weather from above.

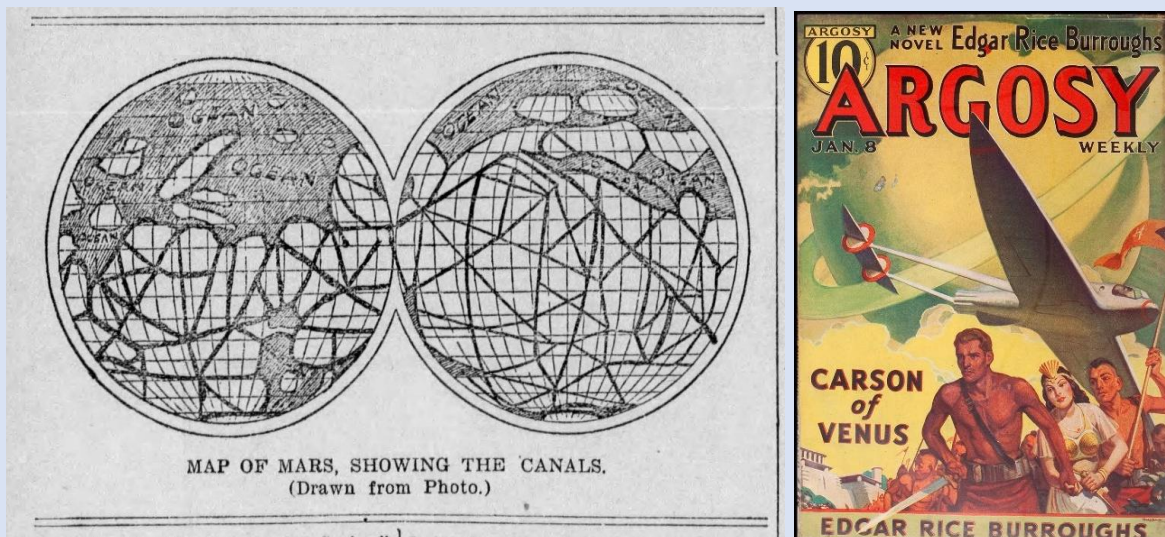
The Orbiting Astronomical Observatory (OAO) missions also began early, in 1966. 3 of the 4 launches were successful and are also still on orbit. Their focus again was on parts of the spectrum we can’t see well from Earth, so it would be difficult to recreate the discoveries they made. But understanding better how the sun works, how space weather works, and what radiation threatens space travel and resources has led to planetary exploration and our modern space infrastructure. Consider this the next time you use GPS, satellite data services, or observe the sun. When you see solar activity in white light (left), or, as some amateurs and ground-based observatories do, in H-alpha (center, from GONG project), SOHO and other missions can add to the picture by observing in other wavelengths (right, extreme UV).



Planetary Exploration

"That's one small step for a man, one giant leap for mankind." Neil Armstrong (the transmission squelched, and most did not hear "a man").

However, the epoch defining advance for humans was setting foot on the Moon. This and unmanned missions to the planets, other moons, asteroids, comets, and beyond the solar system is what defines the Space Age. Now, when you explore the Moon, you can see where man's footsteps first fell there by observing [where the Apollo Missions landed](#). When you observe any solar system object, you are enriched by knowledge gained from missions that [flew by a planet \(Mariner 2 was first, at Venus\)](#), [crashed \(Deep Impact into Comet Tempel 1\)](#), or are a Mars helicopter ([Ingenuity](#)).



One of the fundamental driving forces of exploring other worlds is the search for other life. Man has wondered about this since at least the Greek philosopher Epicurus. The story of Lowell's "canals" on Mars is well known. And consider that in 1918, Svante Arrhenius, a Nobel chemistry laureate, concluded "We must therefore conclude that everything on Venus is dripping wet" from spectroscopic studies, and therefore "only low forms of life are therefore represented, mostly no doubt belonging to the vegetable kingdom." JPL (Jet Propulsion Lab) researchers stated as late as 1963 "if Venus were covered by water, it was suggested that it might be inhabited by Venusian equivalents of Earth's Cambrian period of 500 million years ago, and the same steamy atmosphere could be a possibility." Many people held hope before Venus and Mars probes were launched that life would exist on either of these close planets [\(and still do\)](#).

Whether you believe life ever existed, or could be supported, by other planets or moons (such as Titan), solar system observation at any level, from eclipses, meteor showers, comets, storms, and rings is always a fascinating sight. Although we still see the planets through our fickle atmosphere, we can observe them knowing more thanks to missions like Pioneer, Voyager, Cassini and New Horizons.

Now, instead of fearing comets, we study them up close, even collecting samples from comets and asteroids, such as the Osiris-REX mission to the asteroid 101955 Bennu. *Note: I have this patch for helping (just a little) to use images returned by the spacecraft to map the landing site for the sampler.*

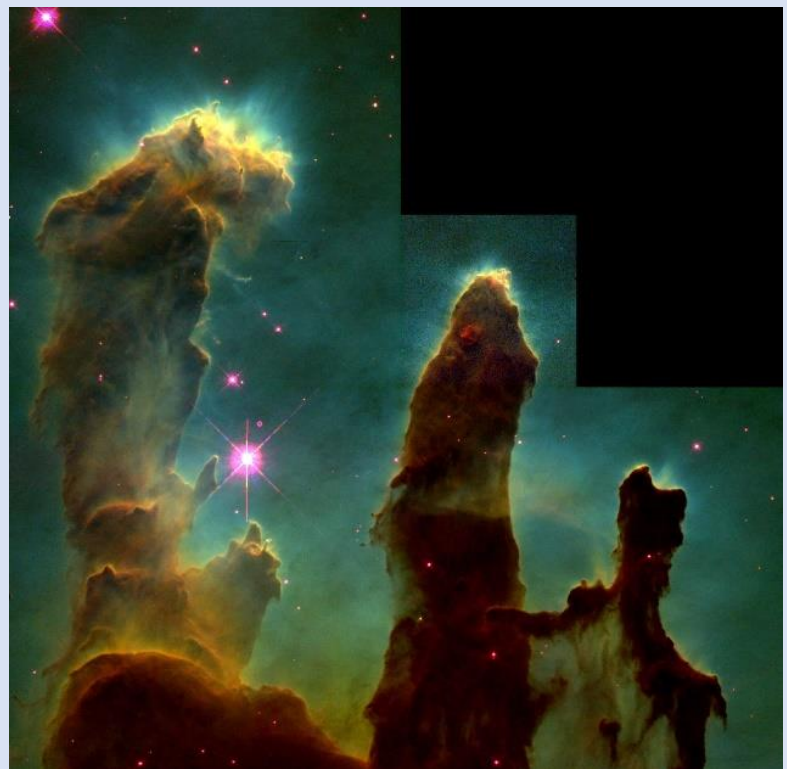


Modern Space Based Observatories

“Can you take me higher, to a place where blind men see?” “Higher” by Mark Tremonti / Scott Stapp

The use of spacecraft for lofting instruments above the atmosphere has led to the greatest discoveries yet in astronomy. It would be difficult to select the best, but a few are easy to include. The Hubble Space Telescope (HST) set the bar, at least with the public, for modern SBO's. It's first “hit”, arguably the most famous astrophoto ever, is 1995's “Pillars of Creation”:

This is a very magnified view of part of Messier 16, the Eagle Nebula. The top of the dark columns are incubators of new stars. This object can be seen in a moderate sized telescope or imaged easily, and, although you probably won't get *this* view, it is still a stunning object, well worth a look.



Another early hit (pun intended) for HST was its capture of the effects of Comet Shoemaker-Levy 9's impact on Jupiter in July 1994. Although the impact was visible from Earth with a telescope, HST images helped us understand and track the effect.



I have fond memories of stopping people on the sidewalk where I lived across the street from Chapman Stadium in Tulsa and showing them this sight. We can't always predict comets (or impacts), but we can follow on the latest discoveries with scope or CCD when possible. The [COBS](#) (Comet Observation database) is a great place to report visual or imaging sightings of comets and see what current comets are up to with brightness, size, tail, etc.

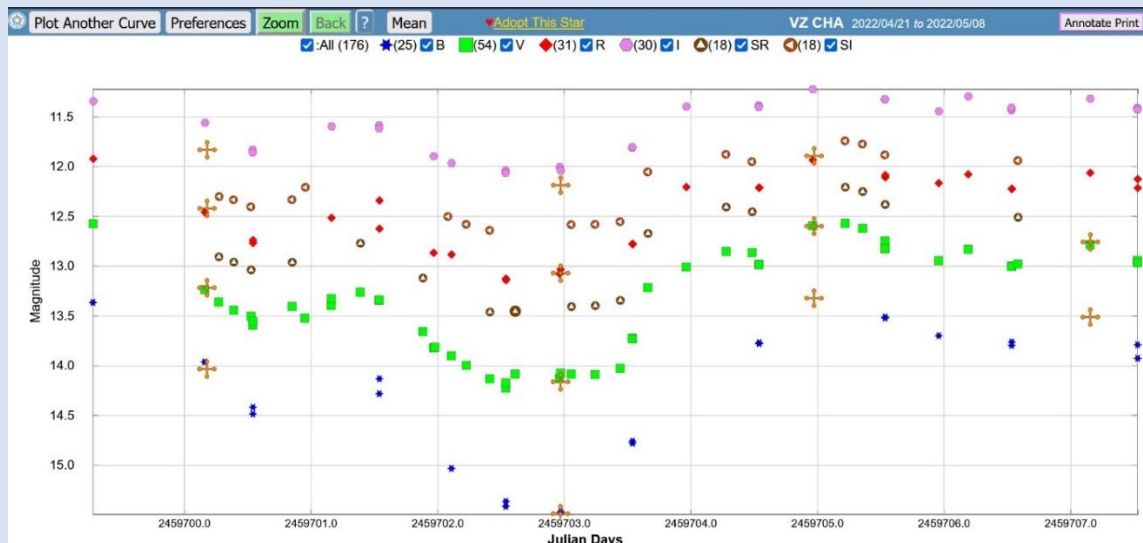
Symbiosis

"As our circle of knowledge expands, so does the circumference of darkness surrounding it." A. Einstein

The idea of following on discoveries is the true value of SBO's and manned missions – building on what we can see here and returning material and data back to Earth for research. Moon rocks, meteorites, samples, pictures, and instrument data are what have driven the last 60 years of unparalleled growth in our understanding of astronomy, and its popularity. But, as Einstein noted, the more you know, the bigger the circle is of what you don't know. This is why we keep searching, and why astronomy will always be a fulfilling hobby: we still have so much to learn.

But we can help the process by involving ourselves in outreach, education, and citizen science. Symbiotic projects abound for those who have the time to devote to working with the data collected by SBO's. One way is to help track the darkness of the sky and supplement space-based studies is with such naked eye activities as [Globe at Night](#). [Zooniverse](#) has many astronomy related programs that support ongoing SBO projects, most of which require no equipment at all. For imagers, [Hubble Legacy Images](#) can be downloaded and processed to check for "hidden treasure". Other projects such as the Osiris-REX mission mentioned above have searchable image sets that can help support probes and landers.

If you do have remote access or equipment of your own, you can assist with such things as HST or Transiting Exoplanet Survey Satellite (TESS) observations of strange variable stars or even exoplanet discoveries. Recently, HST observed a YSO (young stellar object), VZ Chameleontis, and asked amateurs to image it also, in different wavelengths if possible. Using a remote scope, I was able to contribute the magnitude reports shown with crosses below:



This data will be used to help explain how these objects, both protostars and pre-main sequence stars, form and mature, based on their light curves and other data.

Observing Satellites

Image by Author

As mentioned above, a direct result of the launching of satellites and other space vehicles is that we can observe them, also. Many of the oldest spacecraft are still up there. The OAO payloads and their rockets are bright enough to see with your naked eyes, hundreds can be seen with binoculars, and even Vanguard 1, launched in 1958 (and oldest still in orbit), can be seen with a telescope on occasion. Though some people are irritated by their presence (e.g., Starlinks), they can be an interesting part of our hobby and show firsthand the Space Age and its impact on our civilization. Where would astronomy be without Hubble Space Telescope, ISS, and all the science missions on orbit?



Epilogue

Astronomy has evolved as a science during history, with new methods, instruments, and especially, new ways of thinking using scientific, critical methods. There have been many objects discovered or observed in new ways throughout mankind's quest to understand his home that you can observe for yourself. Using your eyes alone, or with instruments and tools, you too can experience the wonder of our universe by revisiting these objects for yourself. Who knows? You might even discover something new or different yourself. So, get out and observe!

Resources:

[https://en.meming.world/wiki/Modern Problems Require Modern Solutions](https://en.meming.world/wiki/Modern_Problems_Require_Modern_Solutions)
<https://kids.britannica.com/students/assembly/view/73048>
<http://www.csun.edu/sfo/dailyim.cgi>
<https://umbra.nascom.nasa.gov/images/>
<https://gong2.nso.edu/products/tableView/table.php?configFile=configs/hAlpha.cfg>
<https://www.space.com/apollo-landing-sites-moon-observer-guide>

Wikipedia

<https://mars.nasa.gov/technology/helicopter/#Quick-Facts>
<https://launiusr.files.wordpress.com/2014/11/venuscarson.jpg>
<https://nwspprs.com/marsim1>
<https://www.sciencenews.org/article/hope-life-venus-survives-centuries-against-all-odds>
<https://launiusr.wordpress.com/2014/11/07/visions-of-venus-at-the-dawn-of-the-space-age/>
<https://www.nytimes.com/2021/02/08/science/venus-life-phosphine.html>
<https://www.nationalgeographic.co.uk/space/2020/10/ancient-asteroid-bennu-contains-ingredients-for-life>

NASA, Jeff Hester, and Paul Scowen (Arizona State University) -

<http://hubblesite.org/newscenter/newsdesk/archive> retrieved May 15, 2022

Hubble Space Telescope Comet Team and NASA -

<https://hubblesite.org/contents/media/images/1994/34/179-Image.html> Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=972901> retrieved May 15, 2022
<https://cobs.si/>
<https://www.globeatnight.org/>
<https://www.zooniverse.org/>
<https://hla.stsci.edu/hlaview.html>

Telescopes for Sale

Meade 8" F/10 LX200R SCT with dual fork - GoTo mount
UHTC (Ultra High Transmission Coatings) Builtin GPS
Smart Mount (PEC) Variable Height Field Tripod
Meade Microfocuser USConverters RS232 WiFi adapter

Also included: Original 2006 Owner's manual and packing box
Asking: \$1450

Contact: jrgrismore@icloud.com



Scopes below are also in June newsletter.

Celestron CGX Mount and Heavy-duty Tripod with 2 extra 11 lb. counterweights
stored indoors, near-mint condition Asking \$ 2,100

Contact Byron Labadie poisonokie@aol.com

Orion XT 10 - 10-inch f 5 \$ 300 Dobsonian Telescope 2 Inch Focuser w 1.25 adapter

Contact John Land Tulsaastrobiz@gmail.com

TREASURER'S and MEMBERSHIP Report

BY JOHN NEWTON



As of June 25, we had 199 members - 23 New member for 2022

We welcome this month our newest members - **Cliffann Ferguson, Moe Daraie, Gary Allcorn, Gary Marlowe and Christopher Stephens** Hello and welcome to ACT!

In addition, we want to recognize our long-term members who continue to renew their memberships with the club even in these restricted times. Finally, we can breathe easy again soon as restrictions continue to lift. Also, we look forward to seeing everyone at our virtual meetings by Zoom, General Meetings and at club events throughout the year when possible.

Accounts as of June 24, 2022

Checking: \$ 4,918.87

Savings: \$ 15,787.35

Investments: \$ 30,017.05 (Value tends to fluctuate with markets).

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 <https://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 the 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. Details - Contact their websites

Membership rates for 2022 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. <https://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. Both magazine now include online access with paid subscription.

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 <https://skyandtelescope.org/>

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

You may renew Sky & Telescope subscriptions directly by calling their number -be sure to ask for the club rate



This article is distributed by NASA's Night Sky Network (NSN). The NSN supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Find Hercules and His Mighty Globular Clusters

Hercules is one of the standout heroes of Greek mythology, but his namesake constellation can be surprisingly hard to find - despite being one of the largest star patterns in our night skies! Once you find the stars of Hercules, look deeper; barely hidden in the space around his massive limbs and “Keystone” asterism are two beautiful globular star clusters: M13 and M92!

Since the constellation itself is relatively dim but bordered by brighter constellations, you can find the stars of Hercules by looking between the bright stars Vega and Arcturus. They are fairly easy to identify, and we have tips on how to do so in previous articles. Vega is the brightest star in the constellation Lyra and one of the three stars that make up the Summer Triangle (*June 2020: Summer Triangle Corner: Vega*). Arcturus is the brightest star in the constellation Boötes, and can be found by “arcing to Arcturus” from the handle of the Big Dipper (*May 2021: Virgo's Galactic Harvest*). You may be able to Hercules's “Keystone” asterism first; this distinct pattern of four stars is traditionally shown as the torso of the great hero, though some illustrators prefer marking the Keystone as the head of Hercules. What pattern do *you* see in the stars of Hercules?

Globular star clusters appear “fluffy,” round, and dense with stars, similar to a dandelion gone to seed, in contrast to the more scattered and decentralized patterns of open clusters. Open clusters are generally made up of young stars that are gradually spreading apart and found inside our Milky Way galaxy, while globular clusters are ancient clusters of stars that are compact, billions of years old, bound to each other and orbit around our galaxy. Due to their considerable distance, globular clusters are usually only visible in telescopes, but one notable exception is M13, also known as the Great Cluster or Hercules Cluster. During very clear dark nights, skilled observers *may* be able to spot M13 without optical aid along the border of the Keystone, in between the stars Zeta and Eta Herculis - and a bit closer to Eta. Readily visible as a fuzzy “star” in binoculars, in telescopes M13 explodes with stars and can fill up an eyepiece view with its sparkling stars, measuring a little over half the diameter of a full Moon in appearance! When viewed through small telescopes, globular clusters can appear orblike and without discernable member stars, similar in appearance to the fuzzy comae of distant comets. That's why comet hunters Edmund Halley and Charles Messier discovered and then catalogued M13, in 1714 and 1764 respectively, marking this faint fuzzy as a “not-comet” so as to avoid future confusion.

While enjoying your view of M13, don't forget to also look for M92! This is another bright and bold globular cluster, and if M13 wasn't so spectacular, M92 would be known as the top celestial sight in Hercules. M92 also lies on the edge of naked-eye visibility, but again, binoculars and especially a telescope are needed to really make it “pop.” Even though M92 and M13 appear fairly close together in the sky, in actuality they are rather far apart: M13's distance is estimated at about 25,000 light years from Earth, and

M92's at approximately 27,000 light years distant. Since M13 and M92 appear so close together in our skies and relatively easy to spot, switching between these two clusters in your scope makes for excellent star-hopping practice. Can you observe any differences between these two ancient clusters of stars?

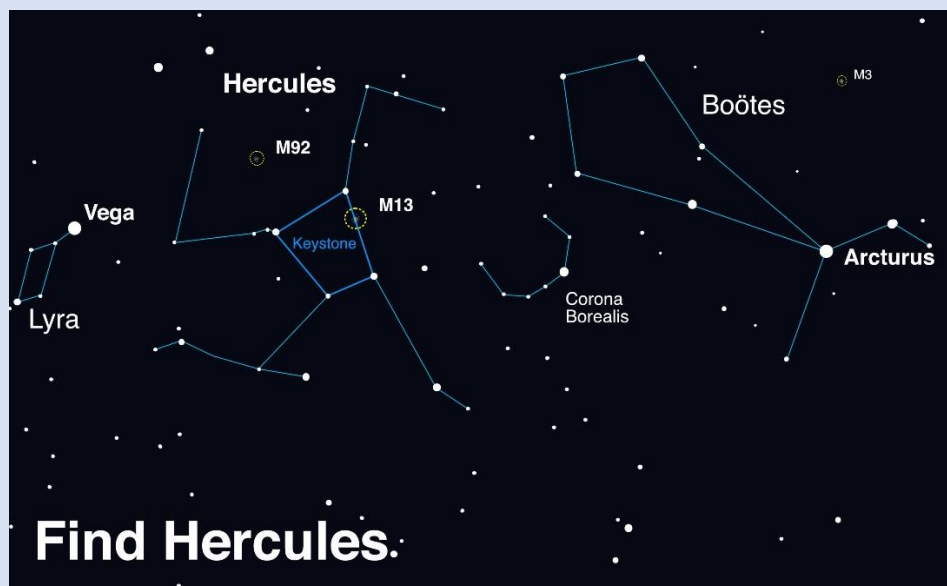
Globular clusters are closely studied by astronomers for hints about the formation of stars and galaxies. The clusters of Hercules have even been studied by NASA's space telescopes to reveal the secrets of their dense cores of hundreds of thousands of stars. Find their latest observations of globular clusters - and the universe - at [nasa.gov](https://www.nasa.gov).



Composite image of the dense starry core of M92 imaged in multiple wavelengths. While your own views of these globular clusters won't be nearly as crisp and detailed, you might be able to count some of its member stars. How far into their dense cores can you count individual stars? Credits: ESA/Hubble & NASA; Acknowledgment: Gilles Chapdelaine. Source:

<https://www.nasa.gov/feature/goddard/2017/messier-92>

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 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



ASTRONOMY CLUB OFFICERS:

PRESIDENT – JOHN

astrotulsa.pres@gmail.com

VICE PRESIDENT – BRYAN KYLE

astrotulsa.vp@gmail.com

SECRETARY – JERRY CASSITY

astrotulsa.secy@gmail.com

TREASURER – JOHN NEWTON

astrotulsa.tres@gmail.com

BOARD MEMBERS-AT-LARGE:

MIKE BLAYLOCK

DON BRADFORD

JIM DANFORTH

TAMARA GREEN

ADAM KOLOFF

JAMES TAGGART

SKIP WHITEHURST

STAFF:

FACILITIES MANAGER –

JAMES TAGGART

astrotulsa.obs@gmail.com

EDITOR - JOHN LAND

tulsaastrobiz@gmail.com

PROGRAM CHAIR - JOHN LAND

tulsaastrobiz@gmail.com

Public FaceBook Page Coordinator

Adam Koloff -

akoloffuso@gmail.com

OBSERVING CHAIR - BRAD YOUNG

allenb_young@yahoo.com

SIDEWALK ASTRONOMY – **Open Position**

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GROUP DIRECTOR – **Open Position**

NIGHT SKY NETWORK – **Open Position**

WEBMASTER JENNIFER JONES

Thanks to Don Sailing for sharing



Do you have ideas for our club In Person or ZOOM Meetings?

Want to share an observing experience or astrophoto.
Know someone willing to be a Guest presenter?

We would also welcome YOU to do a short 5-10 minute section of interest or new equipment you'd like to review.

Create a Cartoon on a Space Theme

Contact our Editor John Land

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