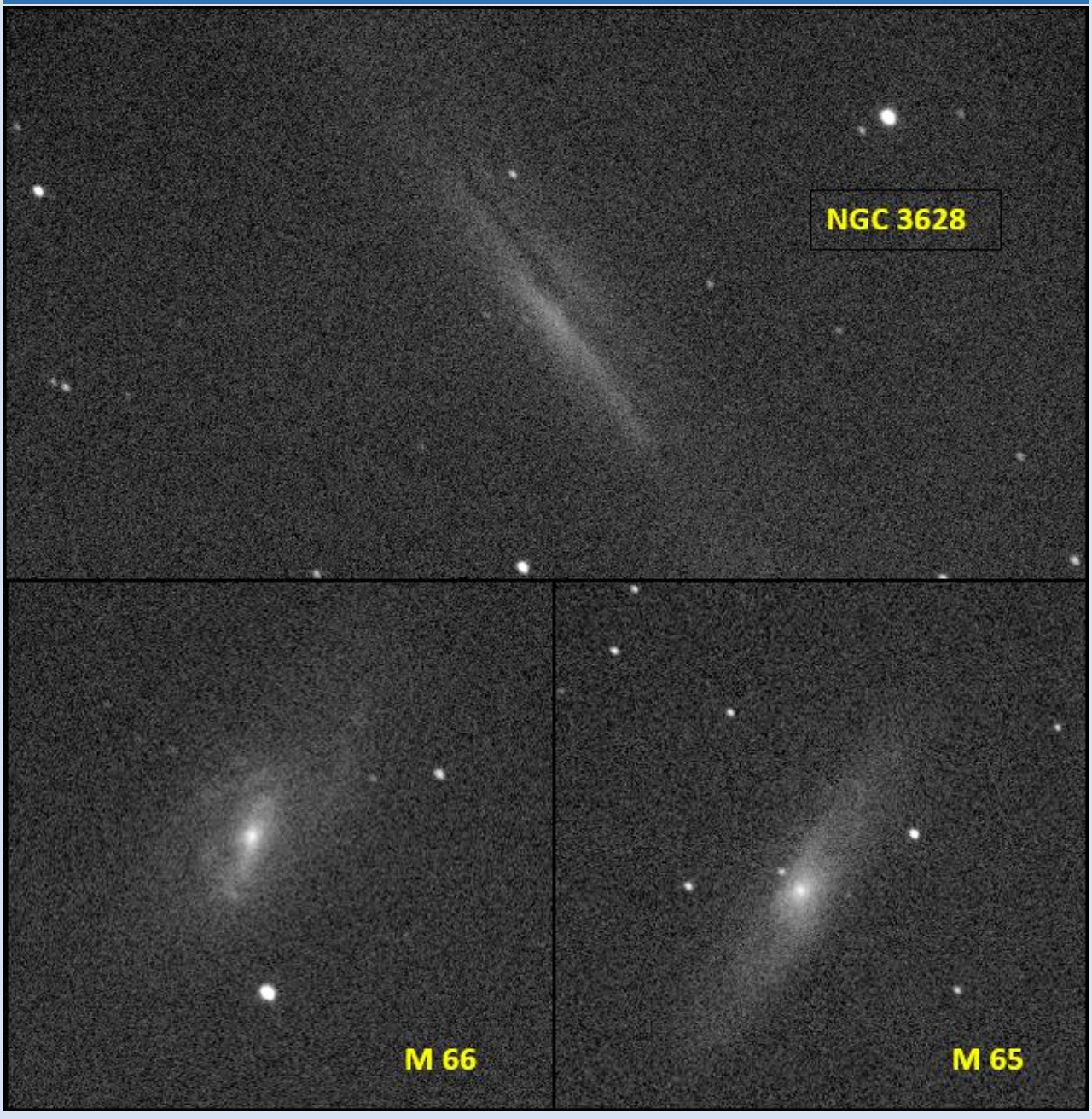
ASTRONOMY CLUB OF TULSA
85 Yrs

OBSERVER

April 2022

Bringing Stars to the eyes of Tulsa

since 1937 Editor – John Land



Don Bradford took these images of the Leo Galaxy Triplet with the Club's 14" Meade Dome scope Camera ZWO ASI294 MM - single 30 sec exposures

Astronomy Club Events

Check our website AstroTulsa.com events section for updates

Observatory ONLY OPEN for SCHEDULED EVENTS. **Click for Observatory Map**

During Winter Months Dress in layers with hat and gloves
Our rural site is cooler than in town - there is a classroom to warm up

Thursday April 8 7:45 PM Public Outreach Night
Star Gazing at Hicks Park - S 34th and Mingo

Astronomy Club Meeting - Friday April 8 - 7:00 PM - IN PERSON club meetings.
At Jenks High School planetarium 105 E B Jenks OK - Guests Welcome

Saturday April 23 7:30 PM Guest and Members Night - Guest requested to RSVP

Friday April 29 7:40 PM Members Only night Weather back up night April 30
Open to members and their immediate family

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

Our April 8 Program "EXOPLANETS, FINDING LIFE IN THE GALAXY"

NASA announced in March that astronomers have now identified 5000 confirmed exoplanets. Our program will feature a video with Dr Robert Zellem, an exoplanet astronomer at NASA's Jet Propulsion Laboratory working on ground- and space-based observations of the atmospheres of exoplanets, planets outside of our Solar System. Rob is a member of the Nancy Grace Roman Space Telescope's Coronograph Instrument (CGI; an instrument that will directly-image exoplanets) He is also the Project Lead of Exoplanet Watch, a citizen science project that will aid in the characterization of exoplanets.

OBSERVING NIGHT GUIDELINES

While Covid cases are down, Schools and Urgent Cares are seeing a spike of Flu cases. 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. Please respect each individual's choices about how they interact with others. Ask permission when approaching a person with a telescope if you want to share a view.

President's Message
John Land

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

March has been a busy month for our Astronomy Club. March 5th a dozen our more members turned out for an observatory workday. They cleared lots of brush. We also cleaned and rearranged the classroom to make it a more welcoming place. March 11th, we had to improvise quickly to hold our meeting on ZOOM following a snow storm on the 10th and Jenks Schools were not in session on Friday. On the 12th the weather had cleared up nicely and we had 80 to 100 people attend our telescope viewing night at Oxley Nature center. Lots of families and kids got to see the moon and stars in a telescope for the first time. Our March 26 Guests Observatory night was well attended. We had 52 guests including a Cub scout pack from Jenks and a small church youth group. Our club had generous donations at both events. See our Events Image Gallery on pages 11 to 13.

John Newton, Adam Koloff and myself met with our webmaster Jennifer Jones from Seed Technologies to create a new more dynamic website for our club. It will be more friendly to mobile devices and also give us more flexibility in managing it. At our guest night March 26 Adam Koloff and Brian Wattenbarger took lots of images we can put on the website. Brian brought his imaging drone and did some amazing video. It was a big hit with the Cub Scouts when he flew it up to slot in the observatory dome while I was explaining our telescope. (See images later in the newsletter) Adam is putting together an amazing video with music. You can see his preliminary version on our members Facebook page.

We now have procured a contract to complete the survey of the 32 acres of land surrounding our observatory that was bequeathed to our club as was approved by a vote the membership earlier this spring.

Let us continue our 85 years of *"Bringing Stars to the Eyes of Tulsa since 1937"*

John Land - President

Observing Chairman
Brad Young

I am pleased to introduce our new Observing Chairman.

Hi, I'm Brad Young. I've been in the club as a teen and then again for about 20 years. I hope to encourage all people, with or without a telescope, to get out in the night sky and observe. I hope to begin by having a presentation at a meeting or out at the observatory, depending on our event schedule. Together, we can explore, enjoy, and educate each other about the universe we all share. If you have any specific questions or ideas, contact me at allenb_young@yahoo.com , or just come up and chat at a meeting or a star party. Also, I have a website https://hafsnt.com/index.php/parks-and-barks/

Click on these images to links on the Internet

Good To Stargaze ™

Tulsa National Weather Service

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

April Skies. -

Moon Phases - - New Apr 1 - - 1st Q Apr 8 - - Full Apr 16 - - 3rd Q Apr 23 - - New Apr 30

Predawn observers can enjoy a couple of close planet conjunctions this month. They can be observed naked eye or with your favorite binoculars or telescope. **Mars and Saturn** dance together within 1/2 degrees of each other on **April 4 and 5.** The celestial pair should both fit nicely in a low power telescope view. Then by the end of April, Jupiter, Venus and tiny Neptune form a short row. On the morning of **April 27, Jupiter, Venus and the Moon** all fit nicely in the same 5-degree binocular view. The same morning telescope users can try challenging tight conjunction of **Venus and Neptune only 23' apart** . **Venus and Jupiter** make a grand finish to the month passing within **1/2 degree on April 30th**. They should fit well in the same eyepiece of your telescope. For accomplished observers with tracking telescopes, they can both be seen in the daytime drawing within 14' before they set in the west.

CAUTION: Your scope will need to be shielded from the Sun lying 40 degrees away.

By mid-month **Mercury** emerges in the west at dusk as our lone evening planet. It reaches is best evening elongation on the 27th near the Pleiades 15 degrees high 30 mins after sunset.

84 minute long Total Lunar Eclipse evening of Sunday May 15 - Start practicing your lunar imaging around Easter this month to be ready for the eclipse. The moon will be low in the SE on eclipse night in the constellation of Libra.

Astronomical League Observing Challenge - Special Awards

The Astronomical League has a set of observing challenge awards featuring types of objects observable each three-month season.

The Springtime Challenge is to observe the **TWENTY BRIGHTEST GALAXIES**
It began March 1 and must be completed by June 30, 2022. Click the link above for details for to earn the award. Here is a PDF of the **LIST of GALAXIES**
You will also want to review details about **Rating Seeing and Transparency**
Learn more about other **Astronomical League Observing Certificates** available

Jenks Public Schools PLANETARIUM

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

The Objects That Changed Astronomy

(And How to Observe Them) by Brad Young

Part One: Homo Erectus to Galileo

In my next four articles, I'd like to look at the objects that changed astronomy, their impact, and how we can observe them today and understand how they have educated us about the universe we live in. Mankind's understanding of the universe has grown enormously in the last few centuries but has been improving since long before written history began. Let's begin with the ancient world, and the historical era up until the invention of the telescope. Consider too that many animals respond to the objects below and changes that occur, because they influence their lives and behavior in myriad ways.

Future articles will consider the astronomical growth from the invention of the telescope to the invention of photography, then on to the beginning of modern space based observatories using the full spectrum of light and instruments of amazing power and scope.

The Sun

The sun also rises, and the sun goes down, and hastens to the place where it arose. Ecclesiastes 1:5

Although this daily cycle seems unremarkable to us today, we should remember that night used to mean terror for our ancient ancestors, especially before the domestication of fire. Having the sun rise was a wonderful thing; it brought heat and light and safety. At some point, people also noticed that it rose in different spots along the horizon, and often this affected the length of the day and night. These fundamental ideas are some of the earliest recorded scientific observations. These observations track the patterns which led to the defining acts of this epoch: the clocking of the seasons to raise crops and livestock. Indeed, the Sun and it's wandering are tied very intimately to mankind's development of civilization.

Famous Ancient Seasonal Observatory and Rock Concert Prop

There are many ways to observe the sun now, including noting is changing position in the sky by charting the shadow it casts throughout the day (sundial) or year (the analemma). Or just watch it rise on a chilly morning or set on a beautiful warm evening. Other ways to observe the sun using instruments (which really expanded our knowledge) will be discussed in later articles.

The Moon

Cold hearted orb that rules the night, removes the colours from our sight.
Red is grey and yellow white, but we decide which is right. And which is an illusion?
"Late Lament" poem by Graeme Edge

The other major light in the sky, the Moon also shows cycles. Its cycles are both shorter and longer in duration than the sun's. The phases of the moon were probably noticed by the earliest humans, as there is evidence that some animals even notice some and may be influenced in their behavior by then. The tides of course are caused by the moon, and although this was not thoroughly explained until 1687 by Isaac newton, a correlation had been suggested before. And the Saros cycle, which determines when eclipses will occur, had been known to ancient civilizations all over the world.

Observing the Moon in historical context is even easier than the sun. We can observe its phases every night, observe the markings on it even with our eyes alone, and observe eclipses of it by the Earth or of the Sun whenever they are available. There are usually two to five eclipses of some kind visible every year somewhere on Earth; in 2022 there are two solar eclipses, neither of which are seen in North America, and two lunar eclipses, both of which are.

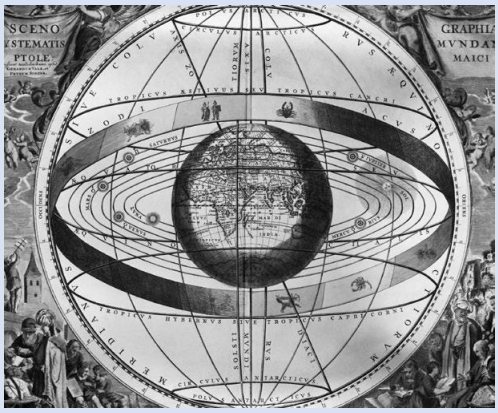
The Stars

May the stars carry your sadness away, May the flowers fill your heart with beauty,
May hope forever wipe away your tears, And, above all, may silence make you strong.
—Chief Dan George, Tsleil-Waututh

The most ancient civilizations recorded star patterns and myths and legends associated with them. Pattern recognition is a highly important skill used by animals in different ways and recognizing patterns of stars is used by migratory beasts from birds to humans. The intersubjective thought exemplified by the mythology of the stars was a social bonding tool that led humans from marginally subsistent apes to the overlords of the animal kingdom. And these myths passed the technology to track the seasons and support domestication of crops and animals via oral tradition, long before writing was available. In other words, the cognitive revolution, in part manifested by ancient astronomy, led to the agricultural revolution.

But besides their importance, it's just fun to go out to a dark sky and watch the stars. Some of the patterns used by the ancients are a little hard to imagine, but others like Orion, Leo and Scorpio almost look like what they're supposed to be. And you can even make up your own patterns, your own stories as you sit around the campfire and enjoy the night sky. Or explore the stories and patterns developed by other cultures that you may not have heard about. It's a free show available to everyone every clear night.

The Planets



The fault, dear Brutus is not in our stars, but in ourselves, that we are underlings.
Cassius, "Julius Caesar" (Act 1, Scene 2, verse 140–142) Shakespeare

Five of the stars were seen to move in the sky. Mercury, Venus, Mars, Jupiter, and Saturn were identified as planets in ancient times, and various wanderings led to other discoveries that helped explain how the universe is constructed. It was noticed that they, along with the sun and moon, traveled in a line of star patterns called the zodiac. Some sort of definition of this line by star patterns exists in nearly every culture. And their retrograde motion exasperated observers for centuries until Copernicus explained it by placing the Sun at the center of the solar system instead of the Earth.

The beginnings of modern astronomy were, in fact, astrology. The blurred lines are evident everywhere in history, from Newton to Lowell. Eventually, scientific method led to a schism that allowed astronomy to flourish in its modern form.

Again, even without a telescope, you can observe the planets whenever they are visible. Watch as Mercury pops up from the Sun three times a year in the evening and three times in the morning sky. Watch as Venus pops in and out in a slower cycle, usually appearing in the dawn or the dusk once a year as the brightest thing in the sky besides the Sun and Moon. Watch the stately wanderings of the outer planets and their retrograde loop as they approach and pass opposition. There are of course a lot more things to

see about the planets as we will find in future chapters. But perhaps before you crank the power up on your mega scope to count the number of whorls in the Great Red Spot, it will interest you to just look at the planets as they move through the patterns of stars and imagine how surprising this must have been to early man and how he began to try to understand and explain why they moved while the thousands of other points in the sky stayed still.

Supernova

Someday you will find me caught beneath the landslide in a champagne supernova in the sky
"Champagne Supernova" Noel Gallagher

Although it wasn't exactly understood why, it was noticed that some of the Stars would grow much brighter than usual or appear from nowhere and become bright. These Nova or new stars would then fade usually to obscurity in a few days or weeks. It was generally understood that they had somehow gone through an extreme change, but it was not understood in detail until later in history.

Unfortunately, it would be a bad bet to tell you that you can see a naked eye supernova anytime soon. The last truly spectacular ones occurred just before the invention of the telescope, and we haven't really had one like those since. There are certainly candidates for ones that might go supernova soon, such as Eta Carinae, but there's really no way to tell until it happens. Similarly, I would be a fool to tell you that you will see a naked eye comet, but you never know.

Comets and Meteors

I'll be with you darling soon; I'll be with you when the stars start falling
"Sunshine of Your Love" Eric Clapton, Jack Bruce, Peter C. Brown, Peter R. Brown

Comets were generally indicators of doom as you may know, but their appearance and motion to the sky made people wonder what they might be. Edmond Halley's brilliant determination that one comet had been seen several times through history was another explanation that came just after the deadline for pre telescopic times, but their importance in the history of astronomy had already been determined. Many attempts were made to explain their motion, sudden appearance, and fuzzy look with ominous tails trailing behind them, but it was mainly a subject of conjecture until Halley.

Meteors were certainly more numerous, but they were also confusing. It seemed as if stars were constantly falling out of the sky, but there never seemed to be fewer of them. On rare occasion, they would even make it to the surface and strike the Earth. But full explanations of both the objects seen in the sky and the objects found on the ground were lacking until more modern times. Meteorites found on Earth were thought to be stones that had been struck by lightning even in Ben Franklin's era. And the discovery of meteors being residue from comets also had to wait until modern times.

Meteors are also a bit unpredictable, but if you look at a dark site, you'll probably see a few any moonless night of the year. And there are several predictable showers that occur such as the Perseids and Geminids that give you a much higher chance of seeing meteors. There's nothing more relaxing than laying back in a lawn chair with a cool drink or a hot cup of cocoa and watching the stars fall.

There are many other astronomy related discoveries that were made before the invention of the telescope, but these may have been the most important ones to inspire wonder and exploration. Hopefully you can take the time to revisit these objects and phenomena and put yourself in their place. With only their eyes and their brains, our ancestors determined our place in the universe, how planets moved why they moved why the moon has phases and how the seasons work. These are the fundamental pillars of astronomy and in some ways of civilization itself.

Next time we will look at the age of discovery between the invention of the telescope and the invention of photography. Quite an amazing time to discuss.

TREASURER'S and MEMBERSHIP Report

BY JOHN NEWTON

As of March 24, we had 198 members - 9 New member for 2022

We welcome this month our newest members - **Warren Grigsby, Dennis Sprague, Don Sailing, Cornelius Johnson, Tim Gilliland and Gary Wayland**

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 March 24, 2022

Checking: $ 4,868.08
Savings: $ 15,787.00
Investments: $ 32,507.88 (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 **2021** 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**

March 2022 Astro Club Activities

Oxley Nature Center - March 12

Aerial Drone View of March 26 Guest Night

Jenks Cub Scout Pack waving at the drone

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.

Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Springtime Catspotting: Lynx and Leo Minor

David Prosper

Many constellations are bright, big, and fairly easy to spot. Others can be surprisingly small and faint, but with practice even these challenging star patterns become easier to discern. A couple of fun fainter constellations can be found in between the brighter stars of Ursa Major, Leo, and Gemini: **Lynx** and **Leo Minor**, two wild cats hunting among the menagerie of animal-themed northern star patterns!

Lynx, named for the species of wild cat, is seen as a faint zigzag pattern found between Ursa Major, Gemini, and Auriga. Grab a telescope and try to spot the remote starry orb of globular cluster NGC 2419. As it is so distant compared to other globular clusters - 300,000 light years from both our solar system and the center of the Milky Way - it was thought that this cluster may be the remnants of a dwarf galaxy consumed by our own. Additional studies have muddied the waters concerning its possible origins, revealing two distinct populations of stars residing in NGC 2419, which is unusual for normally-homogenous globular clusters and marks it as a fascinating object for further research.

Leo Minor is a faint and diminutive set of stars. Its “triangle” is most noticeable, tucked in between Leo and Ursa Major. Leo Minor is the cub of Leo the Lion, similar to Ursa Minor being the cub to the Great Bear of Ursa Major. While home to some interesting galaxies that can be observed from large amateur scopes under dark skies, perhaps the most intriguing object found within Leo Minor’s borders is Hanny’s Voorwerp. This unusual deep-space object is thought to be a possible “light echo” of a quasar in neighboring galaxy IC 2497 that has recently “switched off.” It was found by Hanny van Arkel, a Dutch schoolteacher, via her participation in the Galaxy Zoo citizen science project. Since then a few more intriguing objects similar to Hanny’s discovery have been found, called “Voorwerpjes.”

Lynx and Leo Minor are relatively “new” constellations, as they were both created by the legendarily sharp-eyed European astronomer Johannes Hevelius in the late 1600s. A few other constellations originated by Hevelius are still in official use: Canes Venatici, Lacerta, Scutum, Sextans, and Vulpecula. What if your eyes aren’t quite as sharp as Johannes Hevelius – or if your weather and light pollution make searching for fainter stars more difficult than enjoyable? See if you can spot the next Voorwerp by participating in one of the many citizen science programs offered by NASA at science.nasa.gov/citizenscience! And of course, you can find the latest updates and observations of even more dim and distant objects at nasa.gov

Map of the sky around Lynx and Leo Minor. Notice the prevalence of animal-themed constellations in this area, making it a sort of celestial menagerie. If you are having difficulty locating the fainter stars of Leo Minor and Lynx, don't fret; they are indeed a challenge. Hevelius even named the constellation as reference to the quality of eyesight one needs in order to discern these faint stars, since supposedly one would need eyes as sharp as a Lynx to see it! Darker skies will indeed make your search easier; light pollution, even a relatively bright Moon, will overwhelm the faint stars for both of these celestial wildcats. While you will be able to see NGC 2419 with a backyard telescope, Hanny's Voorwerp is far too faint, but its location is still marked. A few fainter constellation labels and diagrams in this region have been omitted for clarity.
Image created with assistance from Stellarium

Hanny's Voorwerp and the neighboring galaxy IC 2497, as imaged by Hubble. Credits: NASA, ESA, W. Keel (University of Alabama), and the Galaxy Zoo Team Source: hubblesite.org/contents/news-releases/2011/news-2011-01.html

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SIDEWALK ASTRONOMY – Open Position

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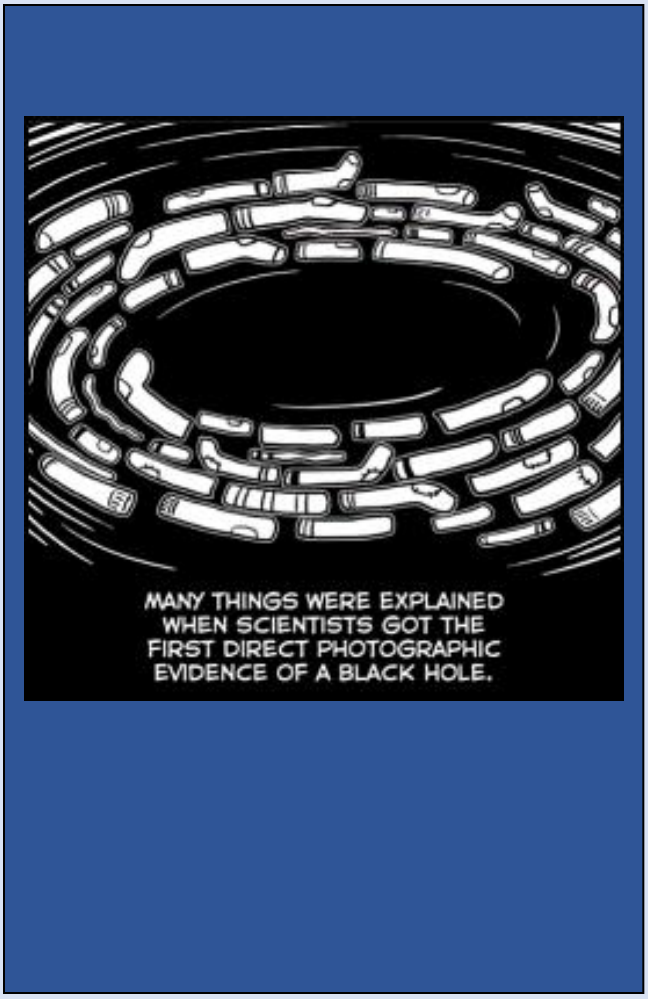

Do you have ideas for our club In Person or ZOOM Meetings?

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