Highlights of the July Sky...

- - - 2nd - - -

First Quarter Moon @ 3:30 pm EDT

- - - 3rd - - -

PM: A waxing gibbous Moon is about 2½° to the lower left of Spica in Virgo.

- - - 7th - - -

PM: The Moon is about 4½° to the lower left of Antares in Scorpius.

- - - 10th - - -

Full Moon @ 4:37 pm EDT

- - - 12th - - -

AM: Venus is 3½° above Aldebaran in Taurus when they rise in the east-northeast about two hours before dawn.

- - - 16th - - -

AM: A waning gibbous Moon is about 2½° above Saturn whey they rise shortly after midnight.

- - - 17th - - -

Last Quarter Moon @ 8:38 pm EDT

- - - 20th - - -

AM: A waning crescent Moon passes through the Pleiades cluster, with about 1½° separating the Moon from Alcyone, the brightest Pleiad.

- - - 23rd - - -

DAWN: A thin crescent Moon will be 5° left of Jupiter low above the east-northeast horizon.

- - - 24th - - -

New Moon @ 3:11 pm EDT

- - - 26th - - -

DUSK: A thin waxing crescent Moon will be a tad over 1½° to the upper left of Regulus in Leo.

- - - 28th - - -

DUSK: The Moon will be around 4° to the left of Mars.

- - - 29th → 30th - - -

The Southern Delta Aquariid meteor shower peaks at 3am with a zenithal hourly rate of 25 meteors per hour.

- - - 30th - - -

PM: The Moon will be just over 2° to the lower right of Spica in Virgo.

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ July 2025 ★ ★ ★

This Month's KAS Events

Observing Session: Saturday, July 5 @ 9:30 pm

Kalamazoo Nature Center • Visit Observing Page for Details

Observing Session: Saturday, July 19 @ 9:30 pm

Kalamazoo Nature Center • Visit Observing Page for Details

Astrophoto Workshop: Saturday, July 26 @ 8:00 pm

Kalamazoo Nature Center • See Page 5 for Details

Inside the Newsletter. . .

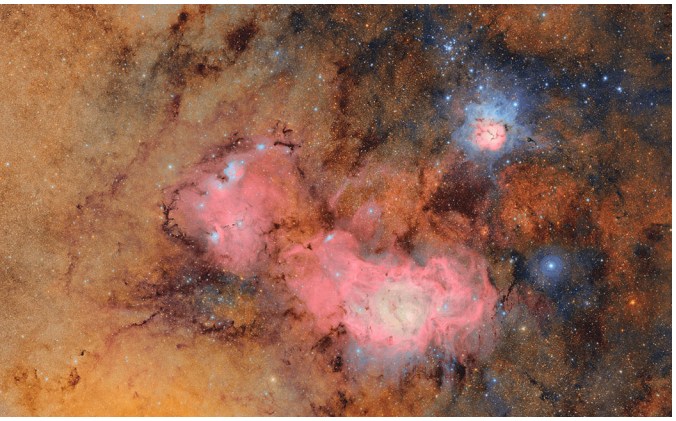
Observations by Richard S. Bell

The Vera C. Rubin Observatory, formerly known as the Large Synoptic Survey Telescope, released its first batch of images on June 23rd, and they are absolutely astounding! The observatory is located on the El Peñón peak of Cerro Pachón, an 8,799-foot-high mountain in the Coquimbo Region, in northern Chile.

The telescope itself is named the Simonyi Survey Telescope, after private donors Charles and Lisa Simonyi. It is an 8.4-meter f/1.234 reflecting telescope employing a three-mirror anastigmat. This system helps to cancel astigmatism by employing three nonspherical mirrors, resulting in sharp images over a wide field of view. However, this tremendous field is at the expense of some light-gathering power due to the large tertiary mirror obscuring part of the optical path.

The Simonyi Survey Telescope is equipped with the largest digital camera ever built. Known as the Legacy Survey of Space and Time (LSST) Camera, it boasts a 3.2-*gigapixel* CCD sensor. The camera is roughly the size of a small car and weighs almost 6,200 pounds. Each image taken by the LSST Camera covers an area of the sky as big as 45 full Moons.

Later this year, the Vera Rubin Observatory will begin its primary mission, the Legacy Survey of Space and Time, in which it will scan the sky nightly for 10 years to precisely capture every visible change. During its ten-year survey, Rubin will cover the entire visible Southern sky every three to four nights and generate approximately 20 terabytes of data each night, along with an additional 15 petabyte catalog database. In 10 years, Rubin data processing will generate around 500 petabytes, and the final dataset will contain billions of objects with trillions of measurements. Naturally, the most technically challenging part of the project will be managing and analyzing the enormous output of the telescope.



Pictured at left is one of the sample images the Rubin team released on June 23rd. It's none other than the Lagoon and Trifid Nebula, my personal favorite region of the entire sky. Over 678 separate images were combined to create this mosaic in just over 7.2 hours of observing time. If your computer can handle it, download the original, full-resolution image. It measures 84,000×51,500 pixels with a file size of 24.14 GB. The detail is off-the-charts awesome!

Another image from the Rubin Observatory reveals the famed Virgo Cluster of Galaxies. It is a combination of 1,185 exposures combined to make the image, which was taken over a period of just 7 nights. It covers ~25 square degrees of the sky and contains an estimated 10 million galaxies. They say that those 10 million galaxies are roughly 0.05% of the approximately 20 billion galaxies that the Rubin Observatory will capture during its 10-year Legacy Survey of Space and Time.

During just about 10 hours of observations, the Rubin Observatory discovered 2,104 never-before-seen asteroids in our solar system, including seven near-Earth asteroids (which pose no danger), 11 Jupiter Trojans, and 9 trans-Neptunian objects. Annually, about 20,000 asteroids are discovered in total by all other ground- and space-based observatories. During this time, Rubin also detected approximately 1,800 additional previously known objects for a total of just under 4,000 detections. The Rubin Observatory will discover millions of new asteroids within the first two years of its Legacy Survey of Space and Time. My guess is, if Planet 9 exists, it'll be the Vera C. Rubin Observatory that discovers it!

June Meeting Minutes

KAS President Richard Bell brought the society's general meeting to order on Friday, June 6, 2025, at 7:15 pm EDT. Approximately 45 members and guests attended via Zoom.

The meeting was scheduled to be held at KAMSC, but we were forced to cancel the in-person gathering due to a graduation ceremony in Chenery Auditorium. During the May 18th board meeting, we reviewed Chenery's schedule and found no mention of the graduation.

We apologize to those who did not receive the last-minute notification in time and traveled to Old Central.

Once he felt enough time was given for everyone to join the meeting on Zoom, Richard delivered his President's Report.

We are seeking volunteers for our annual participation in the Kindleberger Festival in Parchment on Saturday, July 12th, from 9am to 3pm. We plan to offer solar viewing, a hands-on activity, a display or two, and pass out KAS literature and NASA freebies.

We are planning another training session for Owl Observatory on June 14th. Most likely, this will be the year's final training session.

Richard passed on the sad news that "Mr. Eclipse," Fred Espenak, passed away on June 1st. On April 15th, Fred announced that he was diagnosed with idiopathic pulmonary fibrosis five years ago and that his health had rapidly deteriorated earlier in the year.

Fred lived out his retirement with his wife, Patricia, at Arizona Sky Village in Portal and became an honorary KAS member in 2016.

He gave a total of four presentations for us. The first was via Skype on April 1, 2016. Fred gave two presentations during Astronomy Day 2017 on April 29th. One was about photographing total solar eclipses, and the second was a preview of the 2017 eclipse. His final talk for the KAS was given via Zoom on March 1, 2024, and can be viewed on our YouTube channel.

To learn more about the life and work of Mr. Eclipse, please read the *Sky & Telescope* article written by fellow eclipse chaser and friend of the KAS Jay Anderson.

Richard also talked about the passing of KAS member Fred Dutton and his generous donation of a 15-foot domed observatory and PlaneWave CDK20 telescope to the KAS. Richard showed some images of the observatory that Fred sent Richard for his observatory article in the September 2020 issue of *Prime Focus*. Please be sure to see last month's issue to learn more about Fred Dutton's life and his contribution to the KAS.

"Mr. Eclipse" Fred Espenak (1952-2025) speaking during Astronomy Day on April 29, 2017.

The feature presentation of the meeting was *Gadget Night*, a 70+-year KAS tradition dating back to *at least* 1954. This year, 4 members and 1 guest shared their latest doodads or devices they either bought or built. It should be noted that this was the first time *Gadget Night* was held on Zoom.

Our first three presenters joined us from a nearby McDonald's!

Darren Drake, an amateur astronomer from the Chicago area who often visits us during the summer while volunteering at Camp Eberhart near Three Rivers, shared an artificial star that can be inserted into a telescope focuser.

This artificial star can be used not only as a traditional tool for testing telescopes and collimation but also for testing telescopes indoors while still focusing at infinity.

By putting this device, ideally in a Barlow lens to make the tiny 0.1mm hole even smaller, into a telescope with good optics, you create a clear point of light at infinity that can be used for star tests and null tests without any heat disturbances affecting the results.

Darren has invited many friends to test the optics of their telescopes, and with a camera, he can provide quality star tests and single-pass null test pictures that reveal much about each telescope's optical quality.

George Drake (who is not related to Darren) demonstrated a red light LED headlamp, which also includes an adjacent white LED lamp, allowing observers to keep their hands free instead of using a red flashlight. He ordered it online for $21.19 and received 2 units for that price.

Joe Comiskey recently employed his portable music stand at the last observing session. He took the KAS's recently purchased ZWO Seestar S50 to the session, along with the tablet. He needed

something to hold the tablet so onlookers could view the display as the Seestar stacked the photos. The music stand was perfect for this. With this, one could play Renaissance recorder masterpieces by day and comfortably observe with the Seestar by night!

Joe's other gadget also merged music with astronomy. Many years ago, Joe received a portable rechargeable light from one of his daughters, which he clipped onto a piano music holder. Years later, he taped a few layers of red film over it to allow for red-light use when observing.

Tim Kurtz showcased a new portable astrophotography setup that utilized the SkyWatcher Star Adventurer GTi. Tim added a GMKtec Windows-based mini-PC with N.I.N.A. and Stellarium installed. Tim mounted a 6" HDMI display on a Manfrotto heavy-duty camera flexible arm and clamp. A wireless mini keyboard manages the inputs.

Due to the weight restrictions of the GTi, Tim chose to use a William Optics RedCat 51 telescope along with either a ZWO ASI071MC or ASI6200MC camera. Guiding is via the William Optics 30mm telescope and ZWO ASI220 mini. Not shown was a Jackery 240 powering the system.

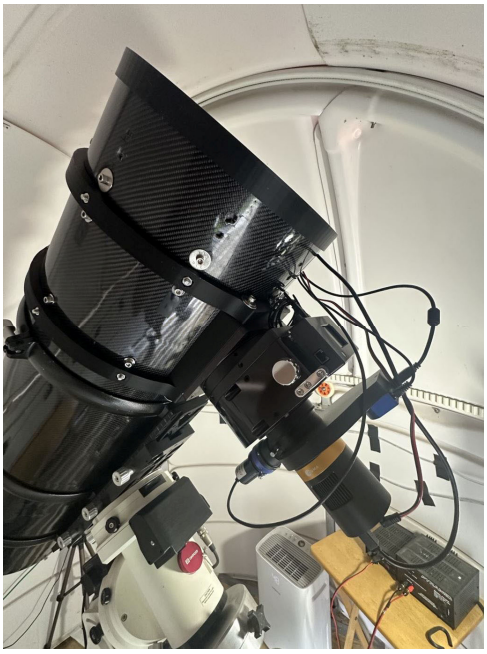
Over the past year, Pete Mumbower has been rebuilding his main imaging telescope, an equatorially mounted 12-inch f/4 Newtonian. The main reason was due to the weight and size of the telescope from the factory; the collimation would shift throughout the sky.

Thus, he began upgrading components to fix this issue. Commercial manufacturers produced some parts, such as the German-made carbon fiber tube and the Moonlite NiteCrawler focuser/rotator. He made most of the components himself at home using a 3D printer or small CNC machine.

These parts included an aluminum focuser mounting block and 3D-printed support rings both inside the tube and outside. One of the more complex parts was a one-piece spider cut from aluminum. Having thicker vanes than usual gave the secondary mirror and holder very high strength and no noticeable deflection. Additionally, the vanes perfectly align with each other, resulting in textbook-perfect diffraction spikes.

Since bare aluminum is shiny, Pete purchased some optical industry ultra-flat black spray paint. This works out very well to keep reflections and glare from causing issues at the focal plane.

Pete also purchased a roll of Protostar Flockboard to line the inside of the carbon tube, which helps avoid reflections and glare. All in all, Pete said he is very happy with how this turned out. Regardless of the telescope's orientation, the collimation remains stable.



With no way to email cookies to all those in attendance, we skipped the snack break and moved onto observing and imaging reports. Apologies to Philip Wareham, who, having brought snacks to KAMSC, discovered the cancellation of the in-person meeting.

Richard was surprised to see the Chinese space station, Tiangong, passing nearly overhead on May 31st when he stepped outside to see how bad the smoke was from the Canadian wildfires.

Pete Mumbower managed to get in some imaging with his upgraded telescope. He shared a nearly 13-hour image of NGC 3718, a barred-spiral galaxy in Leo. Also visible in the same image was the peculiar barred spiral galaxy NGC 3729. Pete also shared an image of yet another barred spiral galaxy, NGC 2903, in Leo. Total integration for this target was nearly 8 hours.

Tim Kurtz shared an image of the Rho Ophiuchi cloud complex with both Antares and the globular cluster M4 in the field of view. Tim captured the image using his Askar 71F refractor and a ZWO ASI 6200MC full-frame CMOS camera on a ZWO AM5N harmonic drive mount. Tim also showed a recent image of the Sadr Region in Cygnus with NGC 6888, the Crescent Nebula, in the field.

Matt Borton recently purchased a Lunt H-alpha solar telescope and shared an image of the Sun he acquired a few weeks ago. A ZWO ASI120MM camera, primarily used for autoguiding, captured the image.

In astronomical news, the Milky Way Galaxy may not collide with the Andromeda Galaxy in about 4.5 billion years after all. The latest observational data from the Hubble Space Telescope and the ESA's Gaia Space Telescope indicates a 50-50 probability of the two galaxies colliding within the next 10 billion years.

The presence of the Large Magellanic Cloud can affect the trajectory of the Milky Way and make the collision less likely.

The private Japanese spacecraft "Resilience" has seemingly been destroyed in a "hard landing" on the Moon on June 5th. The lander was carrying what would have been the first European-built rover to explore the Moon.

Scientists from the U.S. National Science Foundation National Solar Observatory and New Jersey Institute of Technology produced the finest images of the Sun's corona to date.

To make these high-resolution images and movies, the team developed a new 'coronal adaptive optics' system that removes blur from images caused by Earth's atmosphere.

Their groundbreaking results were recently published in *Nature Astronomy* and pave the way for deeper insight into coronal heating, solar eruptions, and space weather, and open an opportunity for new discoveries in the Sun's atmosphere.

After reviewing upcoming events, including the 31st annual Perseid Potluck Picnic on August 2nd, the meeting concluded at 8:40 pm.

This meeting can be viewed in its entirety on our YouTube Channel.

ASTROPHOTOGRAPHY *Workshop*

Do you want to learn how to take images of the night sky? Well, now is your chance! The KAS will hold another astrophotography workshop at the Nature Center on July 26th beginning at 8:00 pm. We encourage members to bring their equipment for demonstration and knowledge-sharing purposes or if they require assistance.

We will also take full advantage of the Leonard James Ashby Telescope in the Owl Observatory, primarily using the Tele Vue NP101is refractor, but possibly also utilizing the Meade 16-inch SCT.

We will focus on deep-sky objects as our subject. We'll choose one specific target to image and gather at least a couple of hours of subframes using the ZWO ASI071MC Pro Cooled Color CMOS Camera in the observatory. We will demonstrate to the members how to set everything up for a night of imaging. The session will also cover the basic operation of Sequence Generator Pro and PHD2 Guiding.

We encourage all members interested in astrophotography to participate in the workshop, but please ensure you register in advance. You can register using the contact form on the KAS website. Please ensure that you indicate you are registering for the workshop. We will inform registrants of any cancellations, whether they are due to the weather or a lack of interest. Here's hoping for some clear, transparent, and steady skies on July 26th!

Saturday, July 26th @ 8:00 pm EDT

Kalamazoo Nature Center • 7000 N. Westnedge Ave.

— ***Registration is Required*** —

When the Universe Gives You Lemons Make Lup-enade

by Gregory T. Shanos

T-Coronae Borealis, abbreviated TCrB, also known as the "Blaze Star," is a recurrent nova that last brightened in 1946. Professional astronomers predicted it would brighten again by September 2024. As of mid-2025, TCrB has not yet gone nova, but when it does happen, its apparent brightness is predicted to be visible to the naked eye at magnitude +2.

T-Coronae Borealis is a classical nova involving a white dwarf accreting hydrogen-rich material from a companion star, usually a red giant. The accreted hydrogen builds up and leads to a thermonuclear explosion that results in the sudden brightness of the star. The process does not destroy the white dwarf.

While waiting for the Blaze Star to brighten, another nova occurred that took astronomers by surprise. Astronomers detected the new nova in the constellation Lupus the Wolf. Therefore, when the universe gives you lemons, make Lup-enade.

Nova Lupi 2025, officially designated V462 Lupi, was first discovered on June 12, 2025, by the All-Sky Automated Survey for Supernovae, a network of 20 worldwide robotic telescopes. When Nova Lupi 2025 was first detected to outburst, it was +8.7 magnitude and has since rapidly brightened to +5.7 magnitude, which is on the verge of naked-eye visibility. This star is normally at magnitude +22.3 and therefore brightened by 3.3 million times! Since this is its first recorded eruption, it is unknown how long V462 Lupi will be visible to the naked eye. It could take from a few days to a few months to dim from its previous level. V462 Lupi was determined to be a classical nova just like TCrB.

Observers from a latitude around 40 degrees North will find Nova Lupi 2025 low in the sky at approximately 10 degrees above the southern horizon at around 10:30 p.m. local time. The further south you are, the nova will appear higher in the sky. From the Florida Keys, V462 Lupi will be 25 degrees above the southern horizon. Therefore, the best way to view the nova is during a clear night when you have an unobstructed view down to the horizon. The coordinates for V462 Lupi are RA 15h 08m 03.27" and DEC -40º 08' 35.1". Simply input these coordinates into your GO TO telescope, and the nova will be centered in the field of view.

This sighting was my first observation of a nova. I was surprised how bright the star appeared in my Seestar S50 smart telescope. I will be monitoring and imaging this star throughout the coming months as it begins to fade. I encourage all amateur astronomers to attempt an observation/image of this once-in-a-lifetime event. Consider submitting your observations to the Association of Lunar and Planetary Observers (AAVSO).

This image of V462 Lupi was taken on June 24, 2025, at 3:08 UT (11:08 pm EDT). The skies were moonless, clear, and hazy right down to the horizon at Bortle 6. The nova was 22° above the horizon at this time. The bright star at the bottom center of the image is HR Lupi, which is at magnitude +5.8. Note that the Nova Lupus is approximately the same magnitude. The image, straight out of the Seestar S50 with no post-processing, is the result of 10-second exposures totaling 5 minutes in equatorial mode. It was taken by the author from Longboat Key (Sarasota), Florida.

Reflections Under the Starry Sky

by Kevin Jung

As the cool summer evening descended, and in need of a quiet, peaceful place for some contemplation, I took refuge by traveling far from the worst of civilization and the ugliness of light pollution. There's something really humbling and amazing about just looking up at the night sky with your own eyes. Even though we have all this fancy telescope and imaging gear now, just using your eyes gives you a raw, unfiltered connection to the universe that's been captivating people for thousands of years.

As I sit outside in the dimming twilight, watching the fires of heaven come out with the envelopment of the deepening velvety blackness, a peaceful wave of awe and contentment is unleashed as my gaze travels the length and breadth of the celestial sphere. One of the best things about stargazing without a telescope is how easy it is. You don't need any special gear—just a clear night, an open sky, and a bit of curiosity. Whether you're in your backyard, on a beach, or up a mountain, the universe is right there, ready to explore. This simplicity breaks down the barriers often linked to astronomy, letting anyone, no matter their skills or resources, join in the wonder of looking at the stars.

Sagittarius is in the southern sky, and I can see Jupiter peeking its mighty head above the trees to the southeast. As darkness gathers, the brilliant soft band of the galaxy arcs over my head, its glowing river of starlight bathing the night in its ghostly luminescence. The star clouds of the Milky Way are easily discernible as I travel from Cygnus, through Scutum, and finally farther to the south. The night sky is like a living canvas, full of constellations that tell stories spanning millennia. Spotting these constellations connects us to ancient cultures that used the stars to navigate, create myths, and keep track of time. Recognizing figures like Orion or using the Big Dipper to find Polaris gives you a sense of being part of something bigger, like those who looked up long before us.

Despite the annoying glow from the lights of man, I can easily acquire stars dimmer than 5th magnitude (+5.4 in Cygnus), so I know it is one of the better nights here in the region of the world. The crickets and other sounds of nature waft around me as I change places every once in a while, moving from the steps to the observation deck to resting on the ground to take in the majesty of the night sky. One of the most incredible experiences is seeing natural events like meteor showers, which you can enjoy just by looking up. The Perseids, Geminids, and Leonids, among others, light up the sky with amazing streaks, making for a memory you won't forget. Seeing the Milky Way, especially from dark, rural spots, shows a dense river of stars that really makes you think about where we fit in the galaxy.

As I watch, there are countless stars dying, and others are being born. Galaxies are traveling to places unimaginable by man, taking their stellar families with them on their grand voyage. Many of these cosmic events I can just wonder about, as their distances preclude me from observing them in real time. Stargazing also helps you be more mindful. Lying under the stars, away from screens and distractions, encourages you to think and connect deeply with nature. The vastness of the universe has a calming effect, putting your daily worries into perspective and bringing peace and introspection.

There are no intrusions or distractions on the hill to disturb my reflections of my inner self, as well as my visual journey of the grand countenance of the cosmos spread before me. I forsake the use of instruments, preferring to gaze upon the star fields with unaided eyes. No other people are here—I am The Man Alone. Unfortunately, I am disturbed in my journey by the technology of man—aircraft fly above me, and sirens sound in the distance. Occasionally I observe a satellite orbiting the earth, but of this intrusion of technology I am not troubled, as these mechanisms have become part of the heavens, much as meteor showers, auro-

rae, keeping track of the Moon's phases, and the movements of brighter planets have. The changes in the sky with the seasons boost your awareness of natural cycles. Such observations can give your life a rhythm, in tune with the cosmic dance happening above.

It is not only a time of reflection but a time of wonder as well. As I look inward, contemplating my life and the path I have chosen and the unknown paths in the journey ahead, I also look outward to the stars, striving for a harmonic balance with the wonders of nature. To explore—that is what drives us. To journey into the unknown; to discover things about our universe and ourselves. What wonders lie in wait for us out in the uncharted depths of interstellar space? What wonders can we find searching our soul? Both are a voyage of a lifetime.

experience that connects cultures, generations, and even eras, inviting us all to look up, dream, and marvel at the endless beauty of the universe.

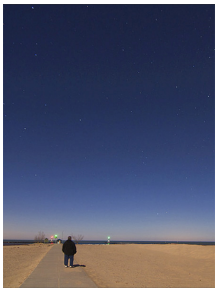
What will our children see in the skies in the future? As we now give our own "cute, personal" names to the objects above us, will they do the same? Is it imprinted in our nature? What wonders will they see in the years to come? Will they be sitting out under the stars of a now unknown planet light-years away, making the same journeys of the mind that I do now, one of the inner soul and the heavens above, and wondering what and how we thought? Possibly. This might be a great, wondrous circle of human intelligence, as generations of human beings look inward and outward over the vast span of time.

There are no answers for me in my travels this night.

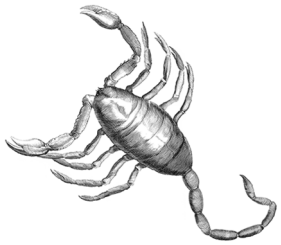
I wander somewhat aimlessly through the star fields spread out above me. Gazing upward, one almost gets a sense of a strange, three-dimensional perspective, as it feels that you can fall right into the stars. I think about our ancestors and how they viewed the constellations, naming the various star fields for things they envisioned in the heavens. From these people and their various mythologies, we now have references in the sky, as well as an insight into the minds of our forefathers. What were their thoughts as they gazed upward? Did their imagination take them as far as ours does, billions of light-years away, to the boundaries of the known universe?

In the end, the joy of stargazing without a telescope is in its ability to inspire wonder, curiosity, and a feeling of being part of something bigger. It's a timeless, universal

Only more questions. Questions about my life. Questions about the future. Questions about the past. But there is one thing I am sure of. I will be out under the stars again, seeking the answers to my questions as I try to become one with the cosmos.



Kevin has been a KAS member since 2010 and is a former Grand Rapids Amateur Astronomical Association president, newsletter editor, and webmaster. He also enjoys photography, geology, and meteorology when not working in insurance. When not viewing or photographing the sky on a clear night, Kevin chases storms across Michigan.



Spy the Scorpion

by **Kat Troche**

As summer deepens in the Northern Hemisphere, a familiar constellation rises with the galactic core of the Milky Way each evening: Scorpius the Scorpion. One of the twelve zodiacal constellations, Scorpius contains many notable objects, making it an observer's delight during the warmer months. Here are some items to spy in July:

The star map of the Scorpius constellation highlights the star Antares and several notable deep-sky objects like the Rho Ophiuchi Complex, Messier 4, the Cat's Paw Nebula, and Caldwell 76, the Baby Scorpion Cluster. Credit: Stellarium Web

Antares: referred to as "the heart of the scorpion," this supergiant has a distinct reddish hue and is visible to the naked eye. If you have good skies, try to split this binary star with a medium-sized telescope. Antares is a double star with a white main-sequence companion that comes in at a 5.4 magnitude.

Messier 4: one of the easiest globular clusters to find, M4 is the closest of these star clusters to Earth at 5,500 light-years. With a magnitude of about 5.6, you can spot this with a small or medium-sized telescope in average skies. Darker skies will reveal the bright core. Use Antares as a guide star for this short trip across the sky.

Caldwell 76: If you prefer open star clusters, locate C76, also known as the Baby Scorpion Cluster, right where the 'stinger' of Scorpius starts to curve. At a magnitude of 2.6, it is slightly brighter than M4, albeit smaller, and can be spotted with binoculars and the naked eye under good sky conditions.

A digital map of the Rho Ophiuchi Complex. Credit: Stellarium Web

Lastly, if you have an astrophotography set up, capture the Cat's Paw Nebula near the stinger of Scorpius. You can also capture the Rho Ophiuchi cloud complex in the nearby constellation Ophiuchus. Brilliant Antares can be found at the center of this wondrous structure.

Manaiakalani

While many cultures tell tales of a 'scorpion' in the sky, several Polynesian cultures see the same stars as the demi-god Māui's fishhook, Manaiakalani. It is said that Māui didn't just use his hook for giant fish in the sea, but to pull new islands from the bottom of the ocean. There are many references to the Milky Way representing a fish. As Manaiakalani rises from the southeast, it appears to pull the great celestial fish across a glittering sea of stars.

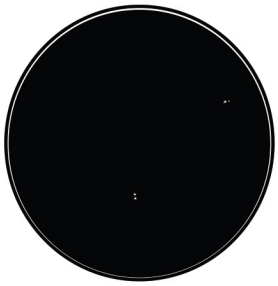
Measure Your Darkness

While you can use smartphone apps or dedicated devices like a Sky Quality Meter, Scorpius is a great constellation to measure your sky darkness with! On a clear night, can you trail the curve of the tail? Can you see the scorpion's heart? Use our free printable Dark Sky Wheel, featuring the stars of Scorpius on one side and Orion on the other for measurements during cooler months. You can find this resource and more in the Big Astronomy Toolkit.

10 Best Things To See In The Summer Night Sky

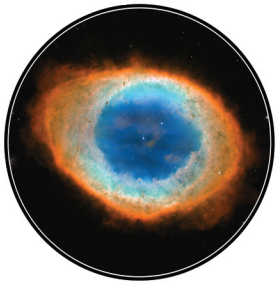
Keystone Cluster

This cluster lies approximately 26,000 light-years away and appears on the edge of naked eye visibility. While you can glimpse it with binoculars, this cluster comes alive through a telescope.



Epsilon Lyrae

Through binoculars you can spot two bright components of this multiple star system. Both appear white and of equal brightness, but a telescope will reveal a secret. What do you see?



Ring Nebula

Some think this nebula resembles a slightly flattened donut, but to many others, its gray color clearly gives it the appearance of a smoke ring in space.

Messier 4

If you look carefully, you can spot M4 with binoculars. Turn a small telescope toward this beautiful cluster and you might see something unusual.

Messier 6 & Messier 7

A low power of only 30x is all that's needed to identify the butterfly pattern of M6 and M7 and enjoy the cluster in its entirety.

Milky Way Galaxy

The brightest stars of Sagittarius form a teapot-shaped asterism. Look above the spout of the teapot to find steam escaping the pot. This faint, gray misty patch marks the very heart of our own Milky Way Galaxy.

Lagoon Nebula

Both binoculars and small telescopes show stars in both hemispheres, with the eastern half appearing brighter and more densely populated.

Albireo

You'll most likely need a telescope to split this star, but a modest magnification of about 35x is all that's needed to see one of the most beautiful sights in the sky.

Coathanger

This is one object that's best observed with binoculars. A low powered telescope will still fit the stars within the field of view, but with very little room to spare.

Dumbbell Nebula

It may appear rectangular, but after a few moments the two lobes can clearly be seen. This nebula allows your imagination to run wild. Is it a dumbbell? Or something else?

HIGH POINT SCIENTIFIC

The Astronomical League
OC
Open Cluster Program

M6 & M7

When these two big, bright, and beautiful open star clusters appear in the early evening in mid June, summer is not far behind.

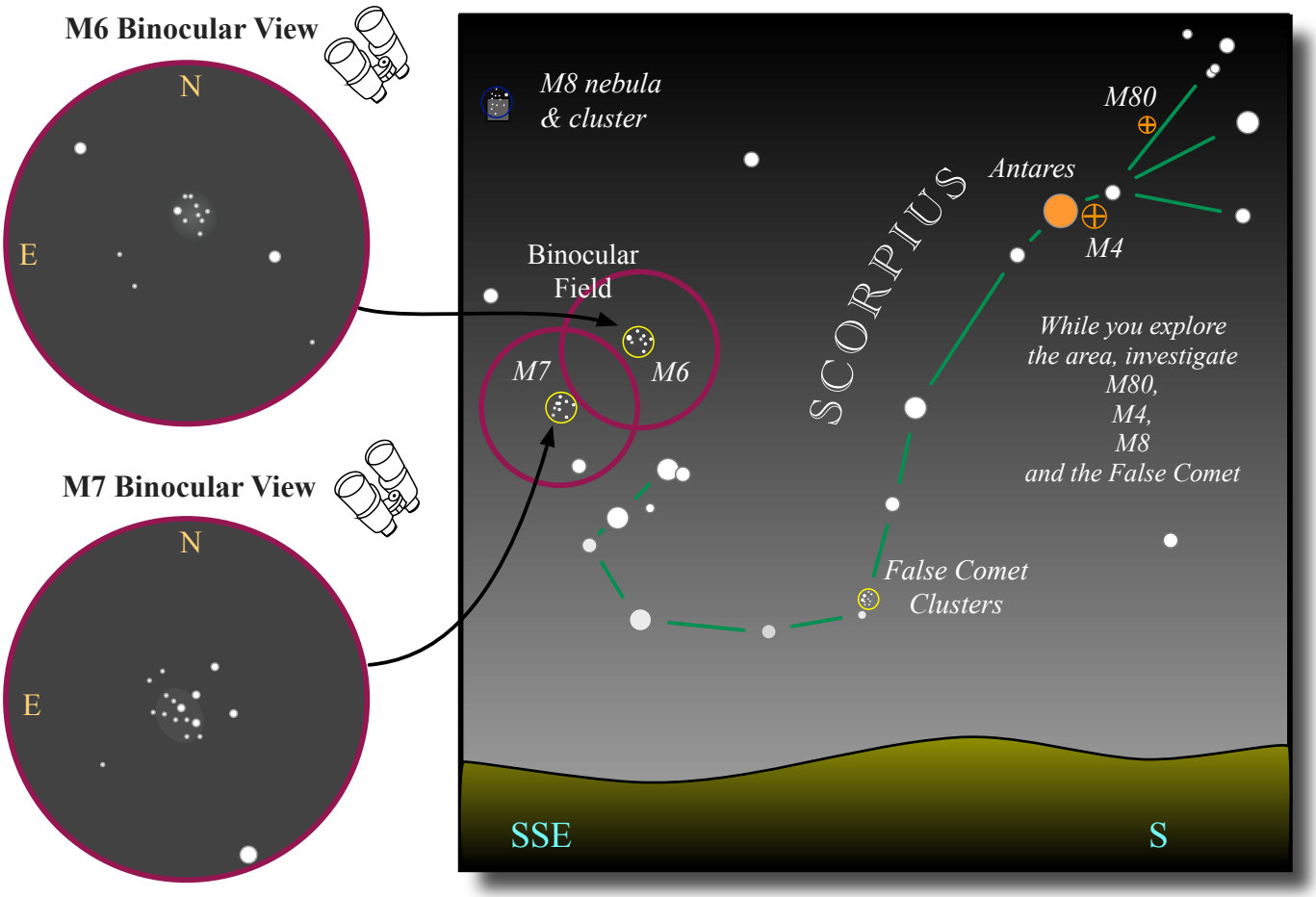
If you have recently begun your journey under the stars, why not whet your appetite by exploring southeastern Scorpius and its two wonderful open star clusters, M6 & M7. You will return to them year after year!

While they are visible to the unaided eye from a dark location, binoculars help greatly.

1. Identify Scorpius standing low in the south-southeast on a late spring or early summer evening. As summer proceeds, it is found low in the south, then low in the southwest in the early fall.
2. From red Antares, direct your gaze southward down the scorpion's back, then turn eastward.
3. When its tail hooks northward, continue the length of that hook.
4. M6 and M7 should be plainly visible in the binocular field.

M6:
A faint hazy glow is seen by the unaided eye from a dark, clear site. Two dozen stellar lights can be discerned with 10x50 binoculars.

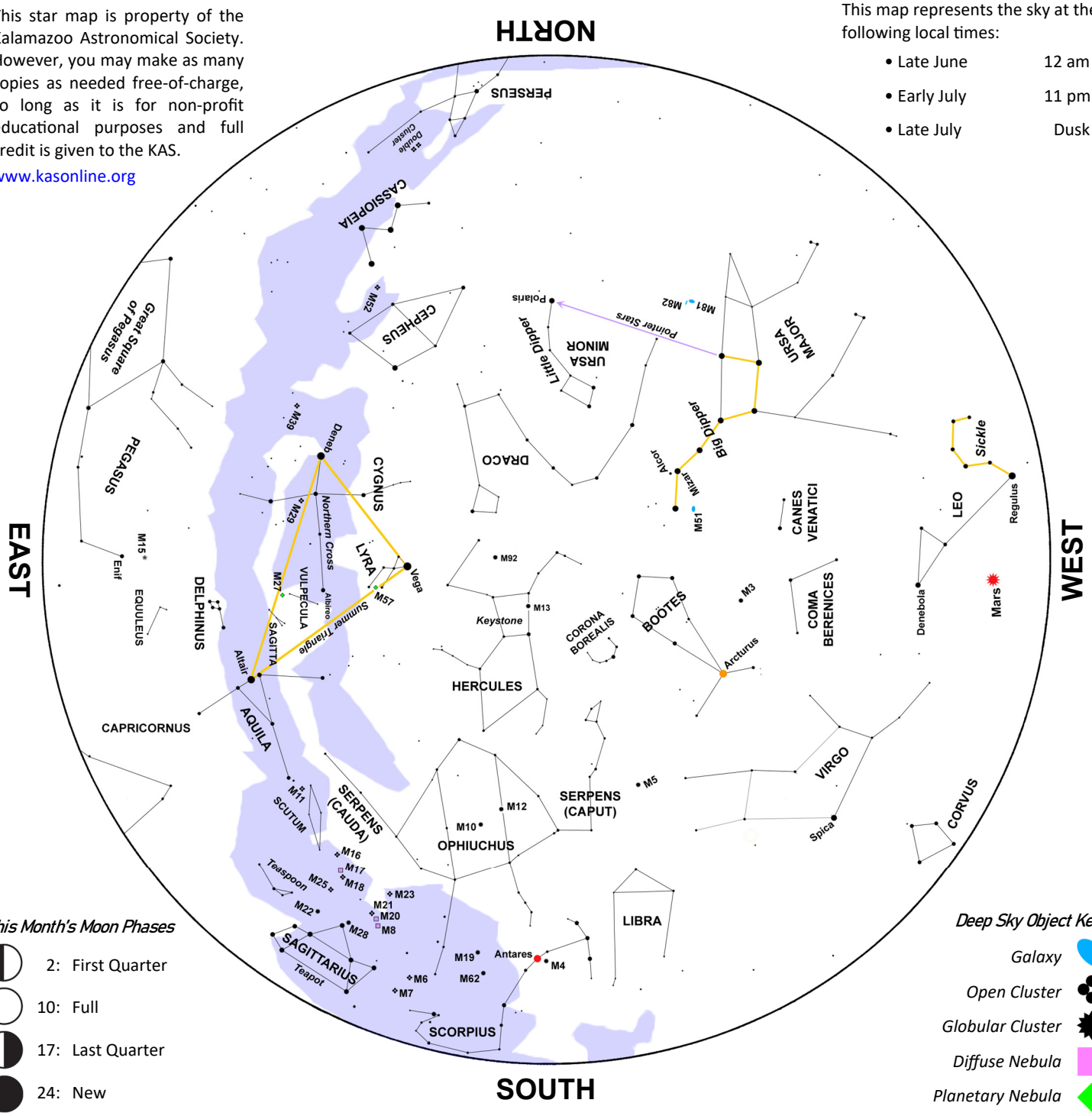
M7:
A glittery glow is easily spotted off the scorpion's tail by the unaided eye. Binoculars reveal many faint stars.



July Night Sky

This map represents the sky at the following local times:

- Late June 12 am
- Early July 11 pm
- Late July Dusk



This Month's Moon Phases

- 2: First Quarter
- 10: Full
- 17: Last Quarter
- 24: New

Deep Sky Object Key

- *Galaxy*
- *Open Cluster*
- *Globular Cluster*
- *Diffuse Nebula*
- *Planetary Nebula*

Face southwest on the evening of July 3rd to see the Moon, one day past first quarter, about 2½° to the lower left of Spica, the brightest star in Spica.

On the evening of July 7th, a waxing gibbous Moon appears 4½° to the lower left of Antares, the red-orange heart of Scorpius.

Venus rises in tandem with Aldebaran 3½° below during the early morning hours of July 12th. Look low in the east-northeast.

A 24%-illuminated waning crescent Moon will occult (block) stars of the Pleiades cluster shortly before and during dawn on July 20th. Stars to temporarily be blotted out include Electra (4:34am), Celaeno (4:49am), Maia (5:13am), Merope (5:17am), and Alcyone (5:44am). All times are eastern and specifically for the Kalamazoo, Michigan, area. You can best enjoy this event with a telescope or tripod-mounted binoculars.

Early risers on July 23rd can enjoy a thin crescent Moon about 5° to the left of Jupiter low above the east-northeastern horizon.

A waxing crescent Moon appears about 4° left of Mars at dusk on July 28th.

Public Observing Sessions

at the Kalamazoo Nature Center

Observe the Night Sky

Members, like you, will set up telescopes near Owl Observatory. The observatory, which features our 16-inch Leonard James Ashby Telescope, will also be open for use.

Telescope Clinic

Do you need help with your telescope? Members will be on hand at the start of each session to give you a one on one tutorial. We can even help you learn how to find objects in the sky!

Constellation Tours

One of our members will take visitors on a tour of bright stars, constellations, and asterisms using a green laser pointer. It's just like being in a planetarium - only under the *real* night sky!

July 5th & July 19th

Gates will open by 9:30 pm, provided that the skies are clear.