Keene Amateur Astronomers

The Newsletter for Keene Amateur Astronomers

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Moonrise at Cerro Pachon, Chile

The Moon rises behind the Gemini South Observatory located on Cerro Pachon in Chile. The Southern Astrophysical Research (SOAR) Observatory is seen on the far left, and the Vera Rubin Observatory is on the right. The observatories are operated by NSF NOIRlab and affiliates. Credit: International Gemini Observatory/NOIRLab/NSF/AURA/R. Rutten

Contents

Editor's Message

There are many exciting things to see in the night sky this month. Be sure to check out the What's Up video and the pages at the end of the newsletter provided by the Astronomical League. You can also find information in this month's newsletter on this to do this month such as take in a show under the dome at the McAuliffe-Shepard Discovery Center. Did you know that they are one of three planetariums in North America that has a 10K projection system? In addition to educational programming and what is in the sky, they are currently running two Under the Dome shows. Personally, I'm interested in their Pink Floyd show.

If you are interested in learning more about telescope making or pick up some new items for your scope, be sure to head to Springfield Vermont later this month to attend Stellafane.

As many of you know, I was in Chile as part of the Astronomy in Chile Educator Ambassador Program. Our days were very busy, with early mornings and late nights. I will be writing about my experience at my blog. I hope to have the first post out later this week. I did have the opportunity to tour the Vera Rubin Observatory and see the control room and the telescope.

I hope you have time to slow down and look up at the stars.

- Susan Rolke

Monthly Business Meeting

Our next meeting will take place in August. Stay tuned for Bob's email for the details.

At our last meeting, the group got a quick introduction to the ZWO Seestar S50. The computerized scope comes with a solar filter. The ability to display the object of interest on multiple screens at a time will be an asset at future star gazing events.

Astronomy Conventions, Retreats & More

Adirondack Astronomy Retreat in Lewis NY. Retreat #1 starts July 20th

Stellafane Convention 2025 in Springfield Vermont from July 24th - 27th

McAuliffe-Shepard Discovery Center in Concord NH. Enjoy the exhibits and/or attend a planetarium show.

University of New Hampshire Observatory in Durham offers twice monthly free public observing from 9 - 11 pm on the 1st and 3rd Saturday of every month in the Spring and Summer. UNH now has two domes.

Explore At Home (on the internet):

NASA Eyes on the News - interested in learning more about NASA's latest missions such as Lucy, the Parker Solar Probe, Europa Clipper or Spherex, this is a great site to explore.

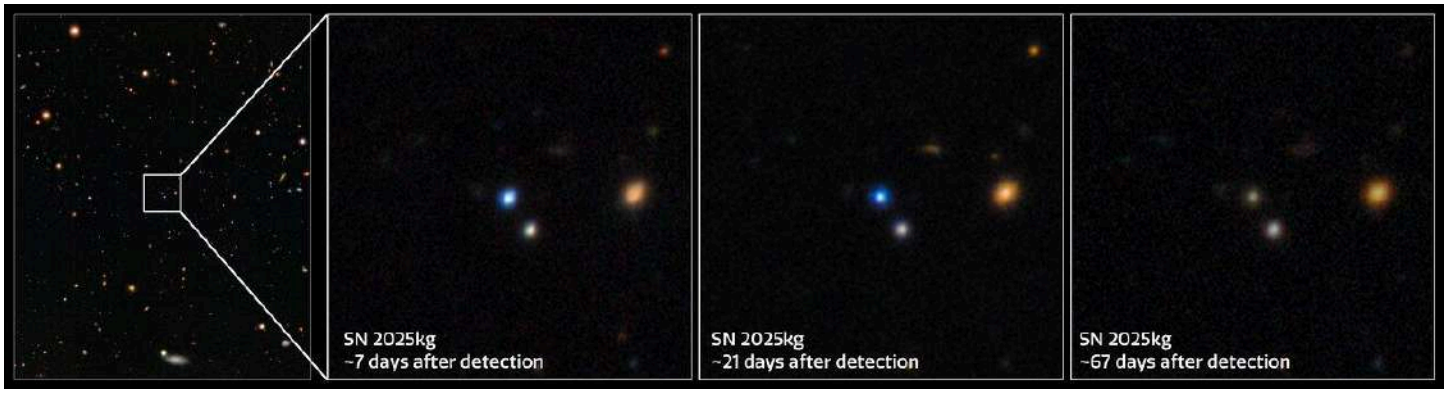
NSF-DOE Vera C Rubin Observatory's 3D Orbitviewer - explore the solar system in this interactive in three dimensions and view the motion of objects. There is more to this interactive than 8 planets. From their website, "Orbitviewer…is designed to showcase the incredible number of Solar System objects revealed by Rubin Observatory. In just one year of operations, Rubin will reveal more objects in our Solar System than humans have discovered in the past 150 years. As Rubin's decade-long Legacy Survey of Space and Time (LSST) gets underway, Orbitviewer will help you explore and contextualize the millions of discoveries from Rubin."

Supernovae and Fast X-ray Transients

By Susan Rolke

The cause of fast x-ray transient (FXT) events in the night sky have eluded researchers since their discovery in the 1970s. FXTs are brief, powerful flashes of X-rays that last from a few minutes to several hours. These events appear without warning and disappear just as quickly. Their unpredictable and short-lived nature has made them notoriously difficult to study. In exciting news released last week, an international team of scientists successfully monitored an FXT for an entire month after its initial detection. By coordinating telescopes on Earth and in space, they gathered detailed data that links these elusive x-ray bursts to the final death throes of massive stars as they go supernovae.

In 2024, the Einstein Probe (EP) was launched. Its mission is to identify transient events that occur in the x-ray wavelength. In just over a year of operation, it has dramatically advanced our ability to observe these fleeting phenomena. So far, the EP has increased the number of known X-ray transients by a factor of ten, detecting multiple events each month. Earlier this year, EP detected an FXT, designated EP 250108a, located about 2.8 billion light-years away. Despite this large distance, in cosmic terms it's considered relatively nearby, making it an ideal target for follow-up observations.



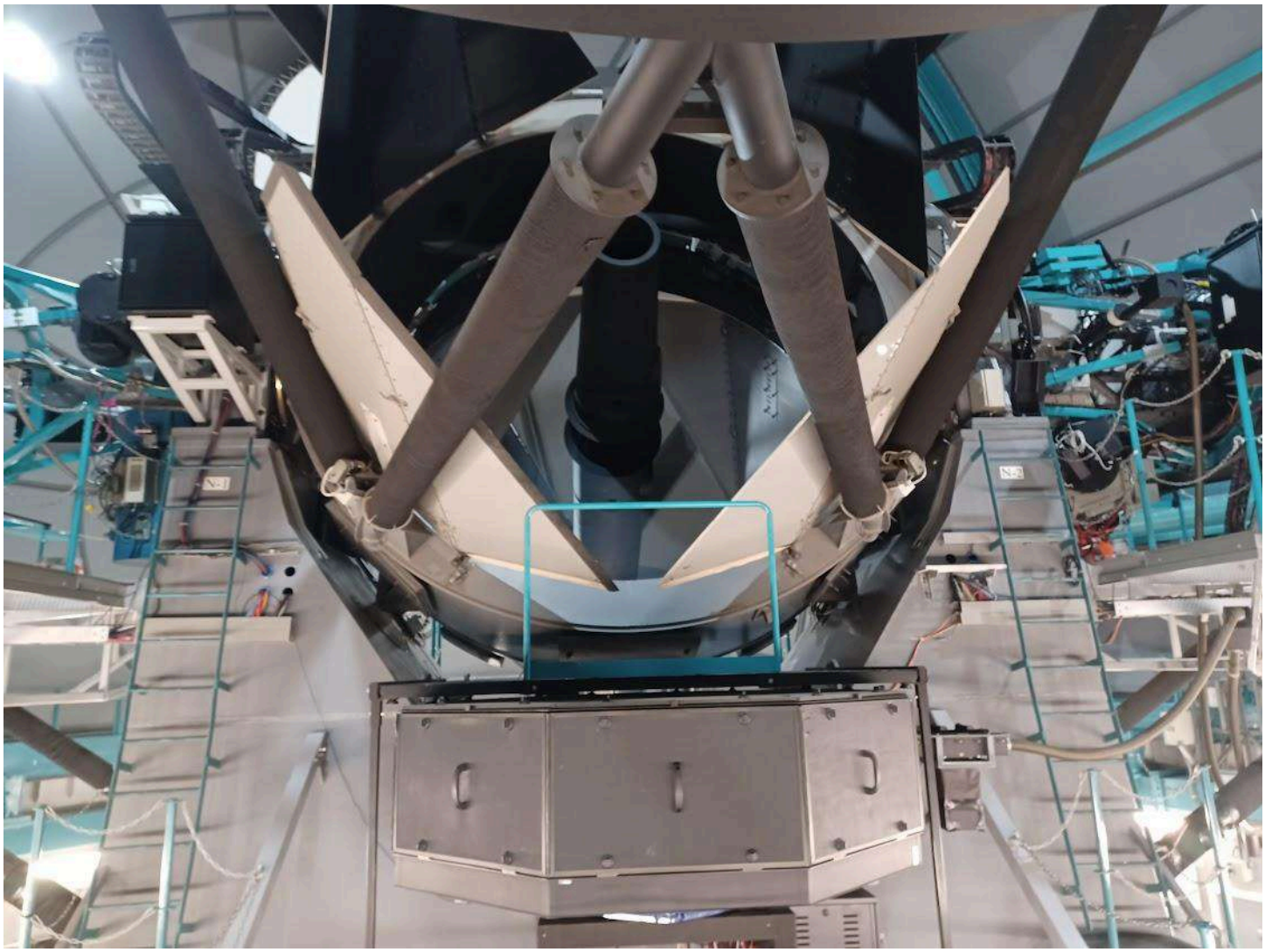
This sequence of images shows the fading light of the supernova SN 2025kg, which followed the fast X-ray transient EP 250108a, a powerful blast of X-rays that was detected by Einstein Probe (EP) in early 2025. Using a combination of telescopes, including the W. M. Keck Observatory, a team of astronomers studied the evolving signal of EP 250108a/SN 2025kg to uncover details about its origin. Their analysis reveals that fast X-ray transients can result from the 'failed' explosive death of a massive star. Credit: International Gemini Observatory/NOIRLab/NSF/AURA.

After the initial detection of EP 250108a, an international team of researchers located at various sites around the world worked together to collect data across multiple wavelengths. The Gemini North telescope on Mauna Kea used its Gemini Multi-Object Spectrograph (GMOS) to capture optical data. Meanwhile, Gemini South in Chile employed its FLAMINGOS-2 instrument to collect near-infrared observations. Additional near-infrared data came from the Southern Astrophysical Research (SOAR) Telescope, also in Chile.

Gemini South Observatory located on Cerro Pachon in Chile and operated by NOIRlab. Credit: Susan Rolke

In Hawaii, the W. M. Keck Observatory contributed with high-resolution optical spectroscopy. Supporting data included infrared imaging from the MMT Observatory in Arizona and highly sensitive near-infrared observations from the James Webb Space Telescope (JWST). Together, this coordinated effort allowed scientists to observe how the FXT evolved over time and gain valuable insight into its origins.

Studying the source of an FXT after its initial detection is essential for understanding what causes these mysterious bursts. When astronomers pointed the Gemini telescopes toward the origin of EP 250108a, they discovered the aftermath of a Type Ic supernova, which has since been nicknamed “the Kangaroo.” Over several days, the telescopes observed the new stellar remnant brighten before gradually fading. This in itself was a rare opportunity to observe the phenomenon unfold in real time shortly after the star had undergone a supernova. Subsequent analysis by SOAR, estimates that the star was 15 to 30 times the mass of our Sun.



SOAR telescope on Cerro Pachon operated by NOIRlab. Credit: Susan Rolke

Data collected led researchers to the conclusion that EP 250180a was a failed gamma ray burst (GRB). When massive stars go supernova, they often release powerful gamma ray bursts which are the brightest and most energetic explosions known in the universe. If the jets do not break through the outer layers of the star, they release much less energy and produce signals that are detected in the form of x-rays.

Video of trapped jets

This research provides the astronomy community with a new understanding of the diversity of stellar death. Additional research will contribute to our evolving knowledge of massive stars and how stellar mass effects a star's final stages.

While trapped jets from supernovae is one possible explanation for FXTs, it may not be the only source of these high energy bursts. With the advent of the Einstein Probe and the Legacy Survey of Space and Time (LSST) from the Vera Rubin Observatory, astronomers will be better provided timely notification of transient events and other exotic cosmic events. These alerts will enable observatories around the world to coordinate

follow-up observations across multiple wavelengths. The recent international effort to study EP 250108a sets an exciting precedent. Hopefully, this is the beginning of many future collaborations that will help us gain a deeper insight into our ever changing universe.

Additional Resources:

Rob A. J. Eyles-Ferris et al, The kangaroo's first hop: the early fast cooling phase of EP250108a/SN 2025kg, *arXiv* (2025). DOI: 10.48550/arxiv.2504.08886

J. C. Rastinejad et al, EP 250108a/SN 2025kg: Observations of the most nearby Broad-Line Type Ic Supernova following an Einstein Probe Fast X-ray Transient, *arXiv* (2025). DOI: 10.48550/arxiv.2504.08889

Night Sky Network Online Webinar

Join NASA Night Sky Network on Tuesday, July 22, at 9:00 PM Eastern along with Alena Gavrilenko to learn about NASA's Lucy mission, an epic 12 year journey to explore 11 asteroids, including those belonging to the group known as Trojans that orbit Jupiter..

Alena Gavrilenko, a planetary science graduate student. Currently, she serves as a Lucy Mission Ambassador and enjoys sharing her passion for the Lucy Mission and space exploration with the community.

Observing

To find out skywatching tips for this month, click on the following link to learn more.

Video: What's Up July 2025 Sky Watching Tips from NASA

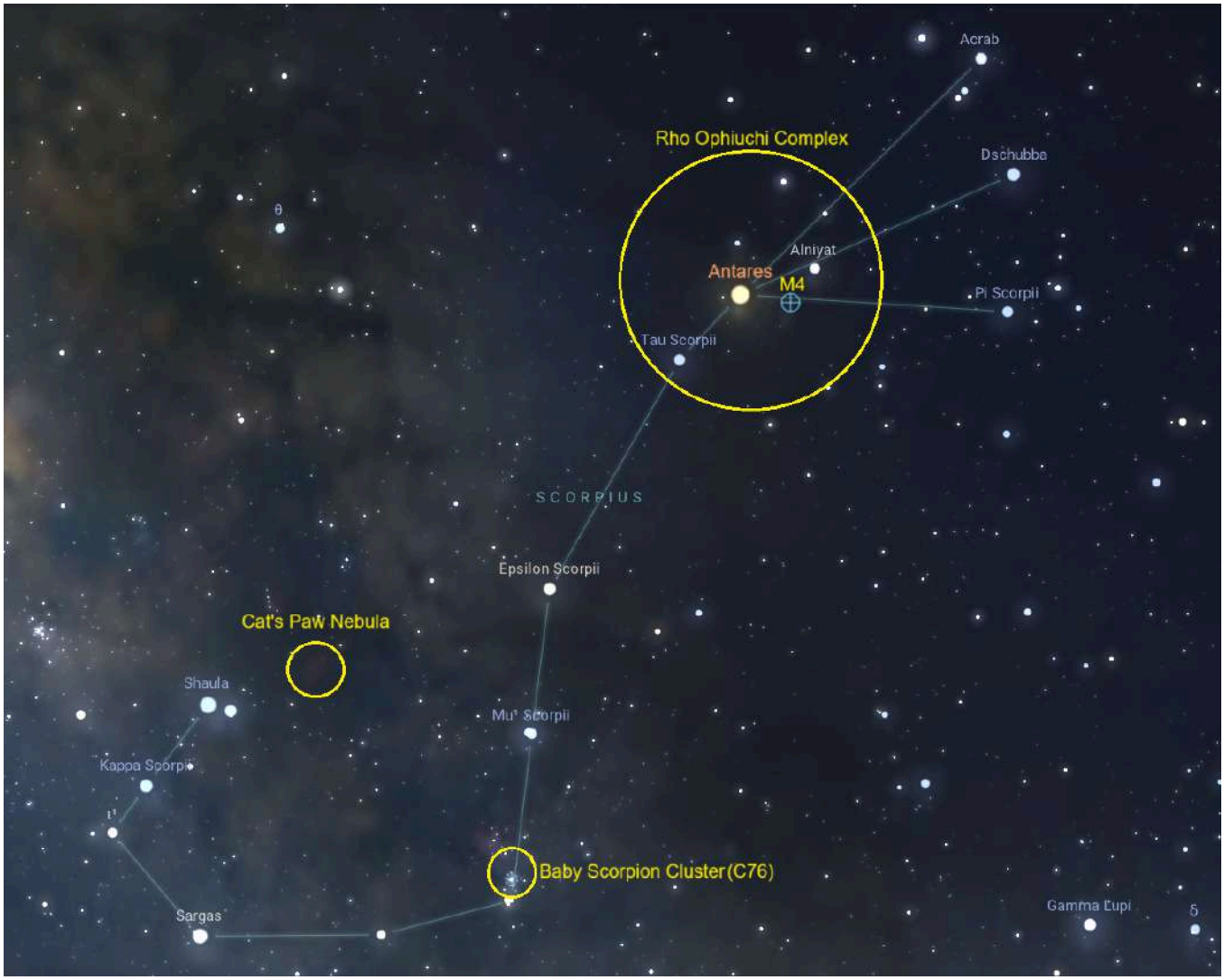
NASA Night Sky Notes, July 2025

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

July's Night Sky Notes: 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 demigod 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

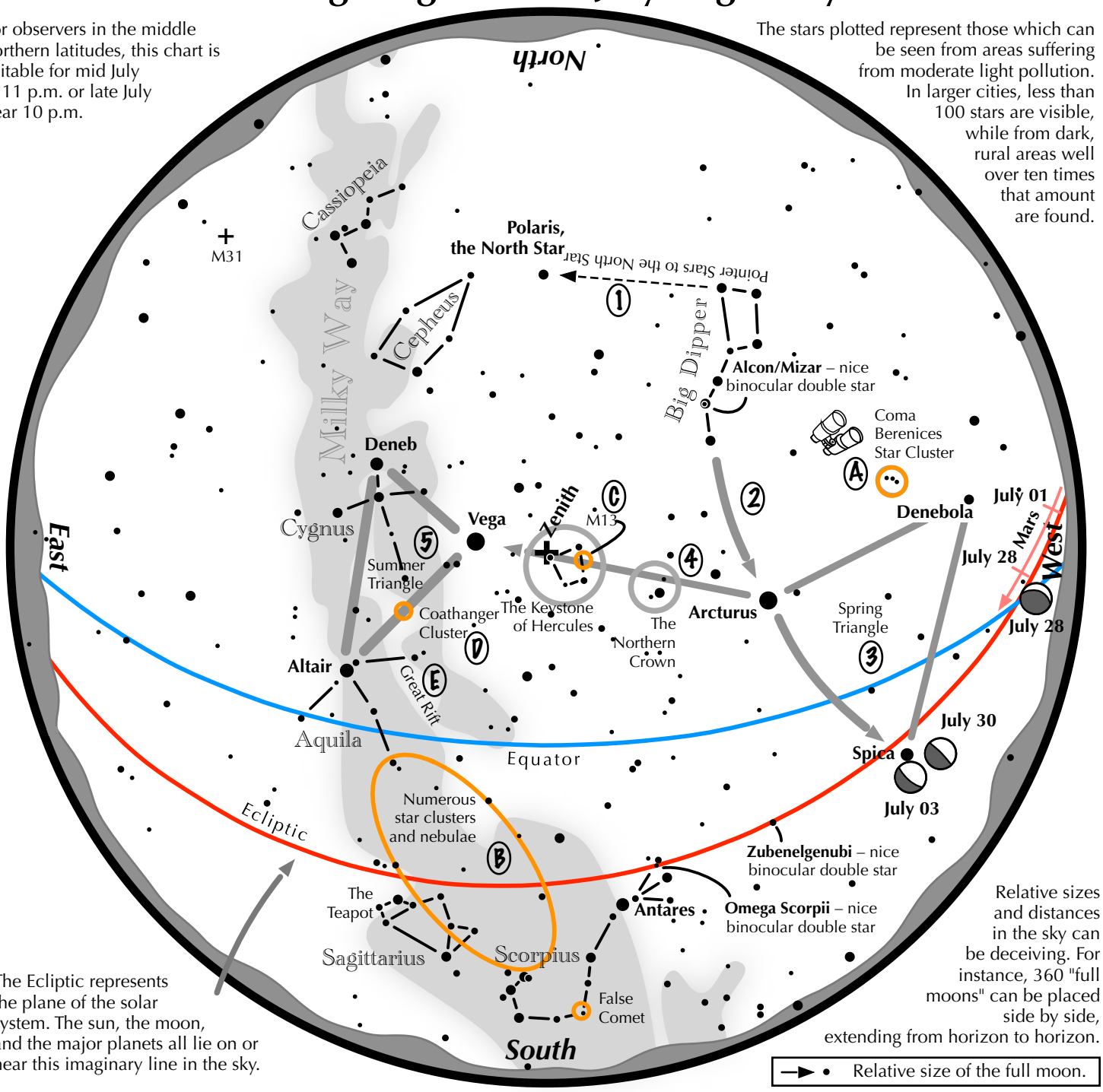
While you can use smartphone apps or dedicated devices like a Sky Quality Meter, Scorpius is a great constellation to measure your sky darkness with! On a clear night, can you trail the curve of the tail? Can you see the scorpion's heart? Use our free printable Dark Sky Wheel, featuring the stars of 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.

You can find past pdfs of the Astronomical League charts **here.** Turn the page to see what is up this month.

Navigating the mid July Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid July at 11 p.m. or late July near 10 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

Relative size of the full moon.

Navigating the mid July night sky: Simply start with what you know or with what you can easily find.

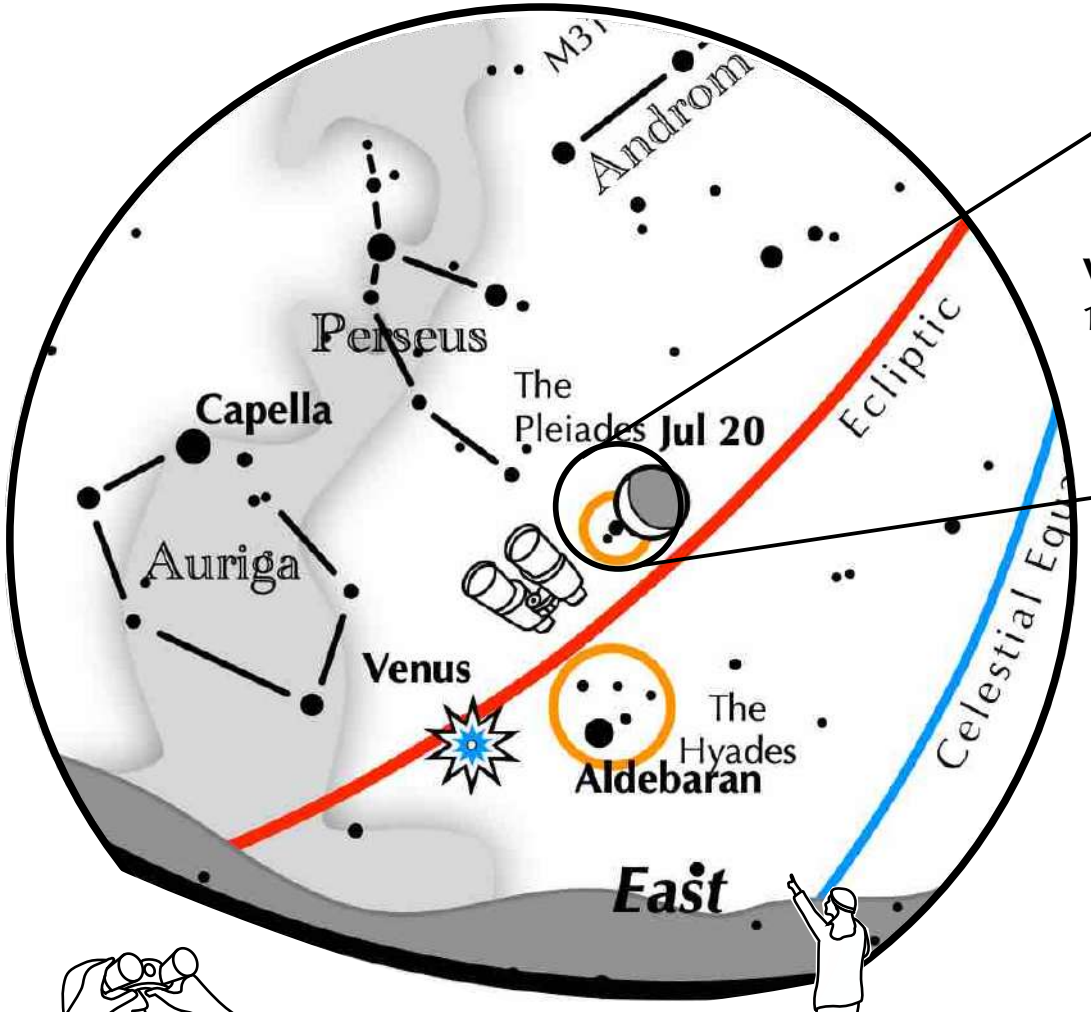
1. Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the July evening sky, then continues to Spica. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
3. To the northeast of Arcturus shines another star of similar brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The
4. Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
5. High in the East lies the Summer Triangle stars of Vega, Altair, and Deneb.

Binocular Highlights

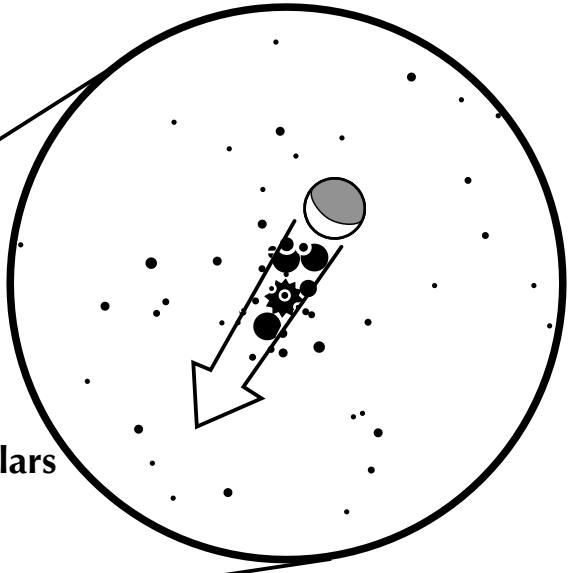
A: Between Denebola and the tip of the Big Dipper's handle, lie the stars of the Coma Berenices Star Cluster.
B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
C: On the western side of the Keystone glows the Great Hercules Cluster, containing nearly 1 million stars.
D: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
E: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.

Astronomical League *www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.*

If you can observe only one morning celestial event this month, consider this one:



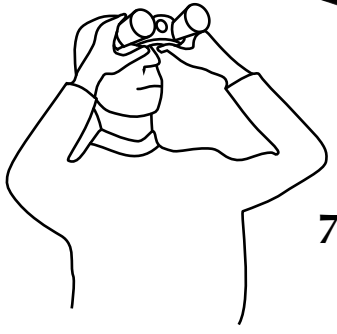
View through 10x50 binoculars



Crescent moon occults the Pleiades

Look to the east-northeast 75 90 minutes before sunrise.

- On July 20 at 4:10 a.m. EDT, look for the crescent moon and the Pleiades low in the east-northeast.
- When the moon rises for West Coast viewers, the event will already be in progress.
- With binoculars, watch Pleiads disappear one-by-one behind the bright leading edge of the moon, and reappear along the moon's dark edge.
- The moon moves eastward about its own diameter every hour.



East-northeast
75 minutes before sunrise
on July 20.

What a great way to start your day!

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.