The Bays Mountain Astronomy Club Newsletter

June 2024

Kingsport, TN

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Cosmic Reflections

Greg Penner - BMAC Interim Chair

reetings BMACer's!

What an exciting spring we have had in 2024! First we had the long-awaited solar eclipse on April 8th, and then as a surprise bonus we had the Aurora Borealis visible from right here in East Tennessee as well as all across the country! I know many of you got some great images of the aurorae just as I did, so I'm hoping you will be sending those images to Adam to include in the newsletter. Other great events we've had so far this spring were our May meeting, in which local students presented their science projects to us in the planetarium, and the May 18th Astronomy Day in conjunction with Kids at Bays Day.

The science projects presented by the students at our last meeting were excellent, and it was encouraging to see their enthusiasm and skill in presenting their work. The teachers who are guiding these students in their studies should be proud of them, and I'm glad our club can have a role in their education. They will surely continue to excel as they progress in their chosen disciplines.

Astronomy Day was a great success! Having our event coincide with Kids at Bays Day resulted in many more kids visiting our displays than in previous years. We had a great turnout of club members who helped make Astronomy Day successful. The activities and displays were very relatable for people of all ages, including immersive Moon phase demonstration, making paper helicopters, "Reflectors and Mirrors" (how telescopes work), JWST display, Mars Ingenuity helicopter model, gravity demonstration, "How far can you jump on the moon?", images from club members on a TV, views of the Sun/sunspots through a telescope, and more! I want to thank all of the club members who came out to help; you made it possible for these families to gain a better understanding of what astronomy is all about in a fun, participatory way. A good time was had by all!

The next event to look forward to is our June 7th club meeting. Our program will be for club members to share their solar eclipse experiences. The solar eclipse was such a big event across the country that we want to use this meeting to re-live the experience of viewing the eclipse from our club members'

perspectives. What kind of planning went into your experience? Did you travel to get into the path of totality? How did you handle making decisions about weather and where best to view the eclipse? What was eclipse day like? Did you view it with a large group of people or in a more intimate setting? What kind of equipment did you use to view or take pictures? If you were able to see totality, what was that like vs. seeing a partial eclipse? Our club members should be sending images to Adam to be shown during the meeting as they share their experiences. In order for the planetarium staff to install and program the images, all images must be submitted by the end of Tuesday, June 4.

I'm looking forward to seeing everyone at the June meeting and hearing the stories, until then...

Clear Skies!

BMAC Notes

Astronomy Day 2024

Another successful Astronomy Day event was held at Bays Mountain Park on May 18. This year, it coincided with Kids at Bays Day. This was an all-day event at the park that provided kid and family-friendly activities and learning stations about the natural world. The greatly increased visitation due to this partnership will make us want to continue for future years! Here are some images from club members.

BMACer Tisha Fuller made this very interactive Moon phase model. Children really enjoyed it! Image by Greg Penner.

BMACer Christa Cartwright shares how reflecting telescopes work. Image by Adam Thanz.

Student Presentations at the May 3 BMAC Meeting

As Greg wrote in his article, we were very impressed with the great research presentations by area students during the May meeting. Here are some photos of that evening. All photos by Adam Thanz.

From North Greene County High School - Noah Deyton & Mary Weems spoke on Generational Trauma in Relation to Mental Health in Southern Appalachia

From North Greene County High School - Michael Fox spoke on Future, Freedom and Farming: Comparing Red, White, and Blue Lighting on Brassica Oleracea, Lactuca Sativa and Raphanus Sativus Microgreens

From Tennessee Tech University - Mackenzie Henley spoke on Analyzing Photos from the Solar Eclipse 2024

From King University - Christian Jones and John Harbaugh gave two presentations: The Three-Dimensional Structure of the Open Cluster IC 2391; Orbital Satellite Tracking: Identifying the Chinese Space Station (CSS) Tiāngōng

BMAC Photos

Here are some nice photos from Jim Williams. He writes: “Got a fairly good view of the eclipse on the 8th from Wapakoneta, Ohio. Had some high-level clouds but still did fairly well.”

Moon's shadow to northeast.

Inner Corona, Baily's Beads, Diamond Ring, Prominences.

Eclipse temperature drop.

Aurora!

BMACer Robin Byrne looks up at the auroral display overhead. Image by Adam Thanz.

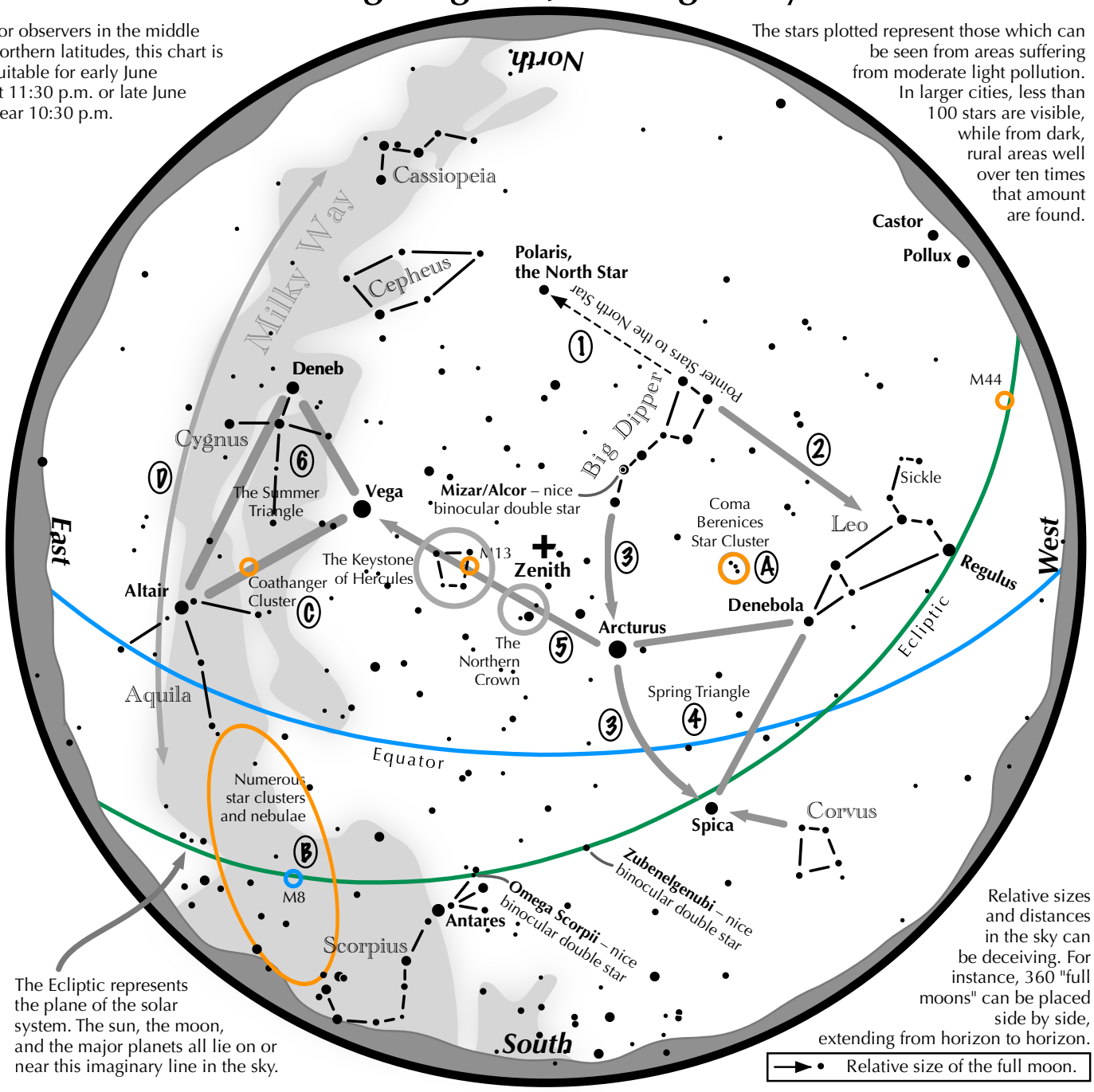
Sky News from the Astronomical League

he Astronomical League has a plethora of educational content to help you learn and enjoy the night sky more. The following inserts are just a tiny bit of what they provide.

Navigating the June Night Sky

For observers in the middle northern latitudes, this chart is suitable for early June at 11:30 p.m. or late June near 10:30 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 June 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. Draw another line in the opposite direction. It strikes the constellation Leo high in the west.
3. Follow the arc of the Dipper's handle. It first intersects Arcturus, the brightest star in the June evening sky, then Spica.
4. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
5. To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
6. High in the east are the three bright stars of the Summer Triangle: Vega, Altair, and Deneb.

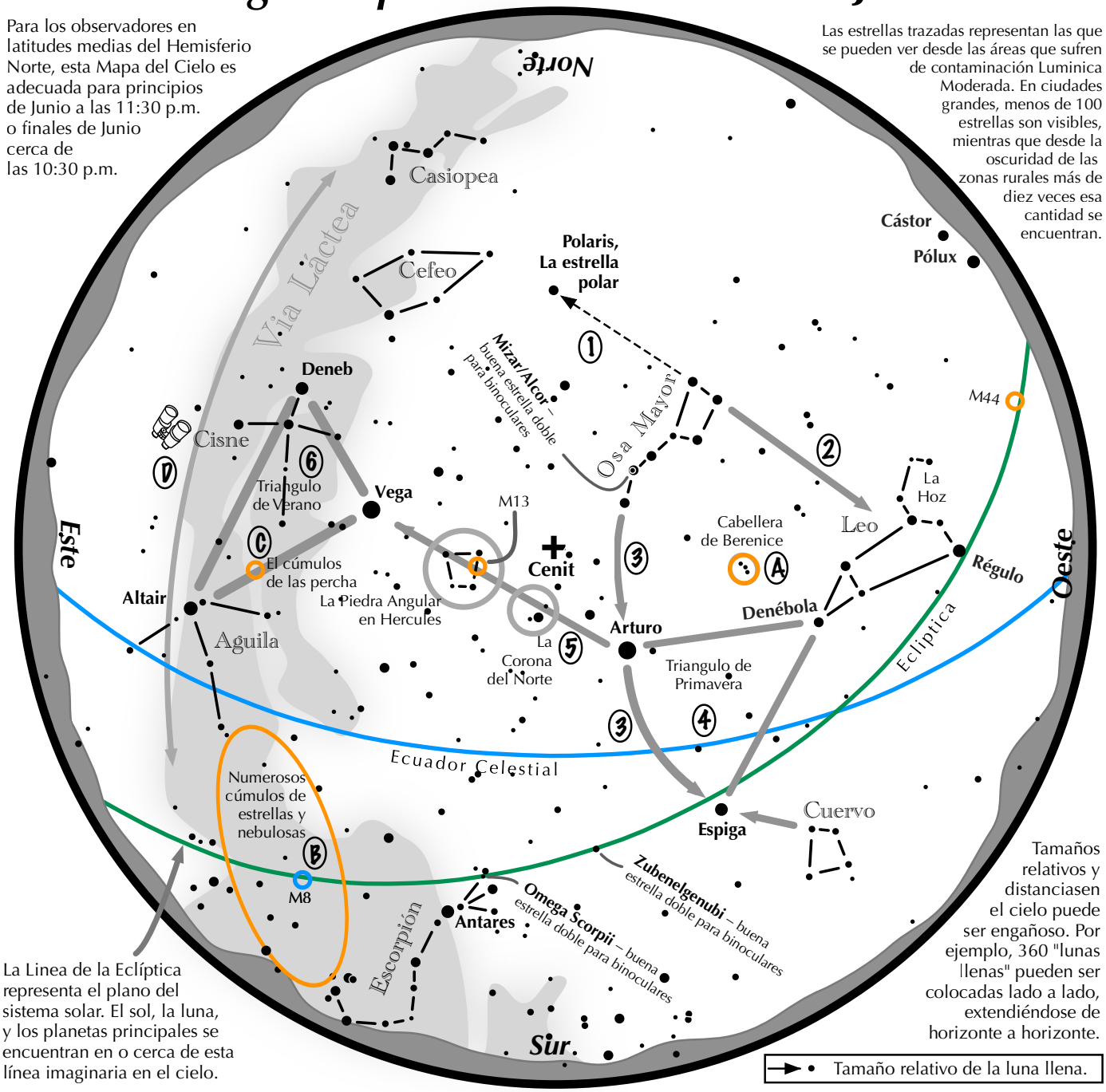
Binocular Highlights

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 of Antares and Altair, hides an area containing many star clusters and nebulae.
C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
D. Sweep along the Milky Way for an astounding number of faint glows and dark bays.

Navegando por el cielo nocturno de Junio

Para los observadores en latitudes medias del Hemisferio Norte, esta Mapa del Cielo es adecuada para principios de Junio a las 11:30 p.m. o finales de Junio cerca de las 10:30 p.m.

Las estrellas trazadas representan las que se pueden ver desde las áreas que sufren de contaminación Luminica Moderada. En ciudades grandes, menos de 100 estrellas son visibles, mientras que desde la oscuridad de las zonas rurales más de diez veces esa cantidad se encuentran.



La Linea de la Eclíptica representa el plano del sistema solar. El sol, la luna, y los planetas principales se encuentran en o cerca de esta línea imaginaria en el cielo.

Tamaños relativos y distanciasen el cielo puede ser engañoso. Por ejemplo, 360 "lunas llenas" pueden ser colocadas lado a lado, extendiéndose de horizonte a horizonte.

Tamaño relativo de la luna llena.

Navegando por el cielo nocturno: simplemente comience con lo que sabe o con lo que puede encontrar fácilmente.

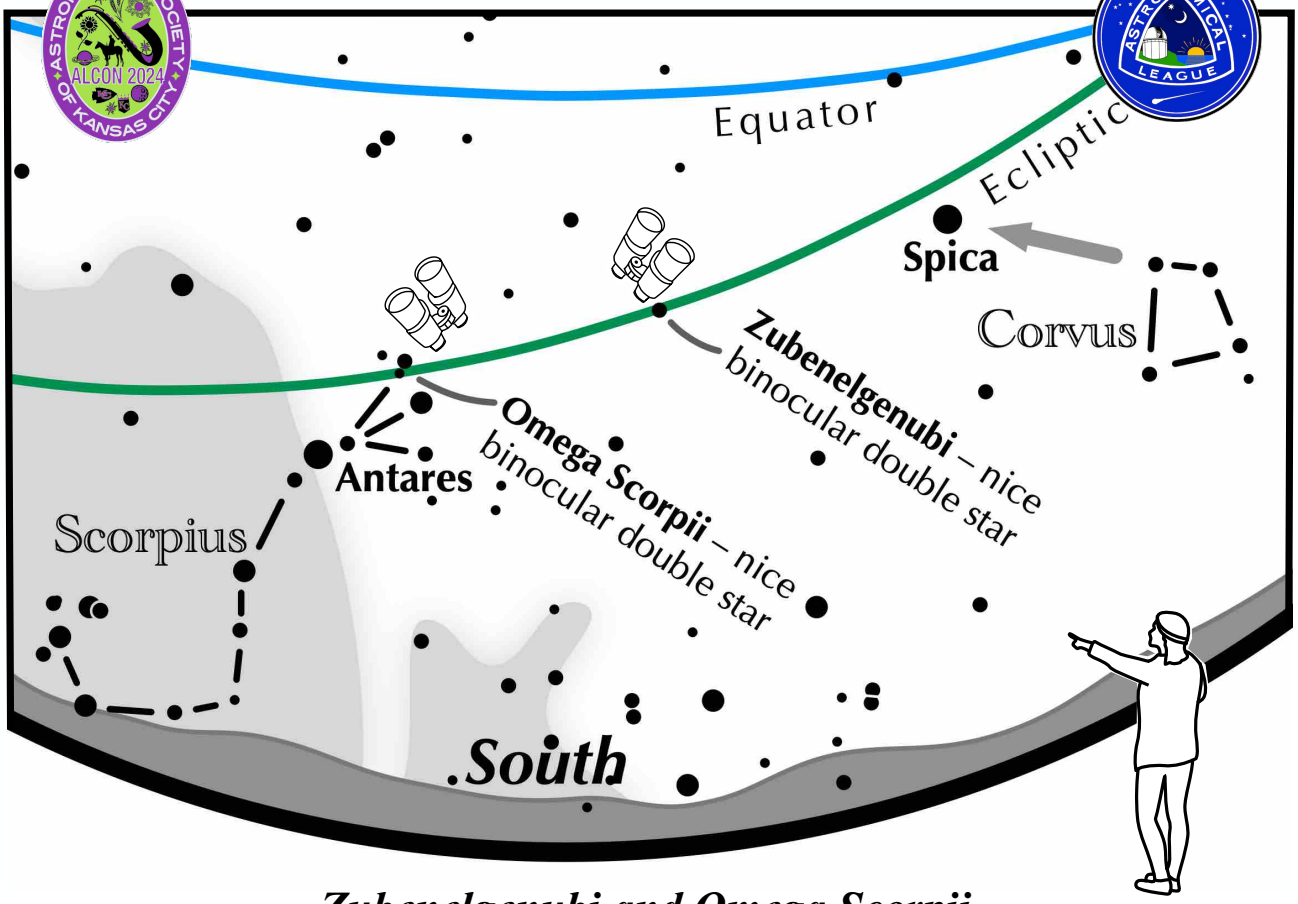
1. Haz una línea hacia el norte desde las dos estrellas en la punta de la Osa Mayor. Pasa por Polaris, la estrella polar.
2. Directamente debajo del tazón de la Osa Mayor se encuentra Leo con su estrella principal, Régulo.
3. Siga el arco del mango del tazón de la Osa Mayor. Primero cruza Arturo, luego continúa hacia Espiga, luego Cuervo.
4. Arturo, Espiga y Denébola forman el triángulo de primavera, un gran triángulo equilátero.
5. Dibuja una línea desde Arturo a Vega. Un tercio del camino se encuentra "La Corona del Norte". Dos tercios de esa distancia llevan a la "piedra angular de Hércules." Se necesita un cielo oscuro para ver estas dos configuraciones estelares tenues.
6. En lo alto del este se encuentran las tres estrellas brillantes del Triángulo de verano: Vega, Altair y Deneb.

Puntos destacados con binoculares

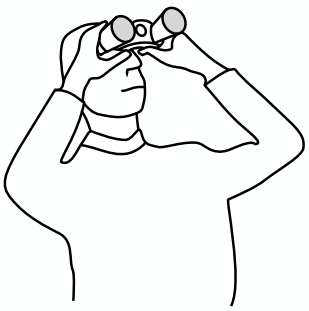
A: Mira alto en el este para ver el cúmulo de estrellas perdidas de Cabellera de Berenice. **B:** Entre las brillantes estrellas de Antares y Altair, se esconde un área que contiene muchos cúmulos de estrellas y nebulosas. **C:** El 40% del camino entre Altair y Vega, centellea el "Colgador", un grupo de estrellas que describe un perchero. **D.** Barrer a lo largo de la Vía Láctea para obtener una cantidad asombrosa de brillos tenues y bahías oscuras.

 Traducción al español por Dr. Salvador Aguirre

If you can see only one celestial event this June, see this one.



Zubenelgenubi and Omega Scorpii, two easy binocular double stars.



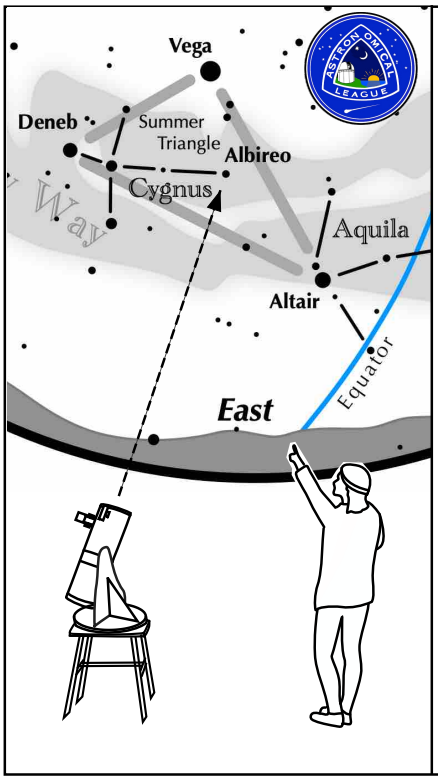
Enhance the scene – use binoculars!

Throughout June ninety minutes after sunset, look low in the south for the bright stars Spica and Antares.

- Almost mid–way between them shines the moderately bright star Alpha Librae, also called Zubenelgenubi.
- Aim binoculars at it and two stars will be seen.
- To Antares' right are the three "claw" stars of Scorpius. Directly below the uppermost claw, Graffias – or Beta Scorpii – is Omega Scorpii.
- Binoculars will easily show two 4th magnitude stars, Omega 1 and 2, separated by nearly a full moon width. The two Omega's are a chance line of sight pair. They are not gravitationally bound to each other.

The keen-eyed skywatcher will discern two stars when gazing at both Zuben and Omega.

www.astroleague.org



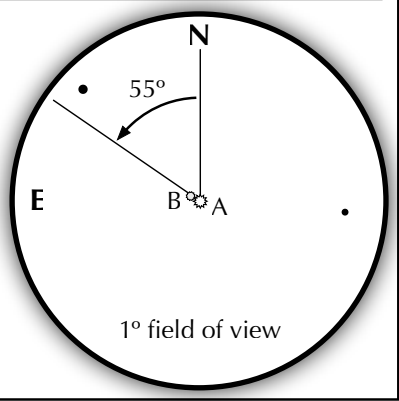
Other Suns: Beta Cygni (Albireo)

How to Beta Cygni on a June evening

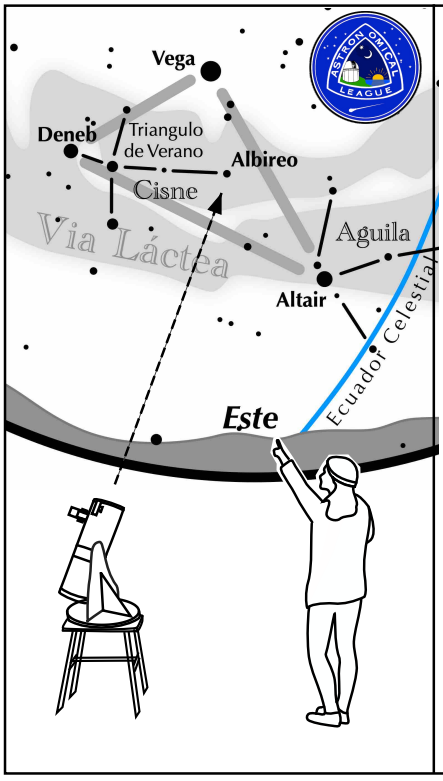
Look in the east for the Milky Way and Cygnus. The Northern Cross shape of Cygnus lies in a horizontal position. The southernmost star of the Cross is Beta, also known as Albireo.

Beta Cygni
A-B separation: 35 sec
A magnitude: 3.4
B magnitude: 4.7
Position Angle: 55º
A & B colors: orange, blue

Suggested magnification: >30x
Suggested aperture: >2 inches



Try 10x50 binoculars to separate Albireo.



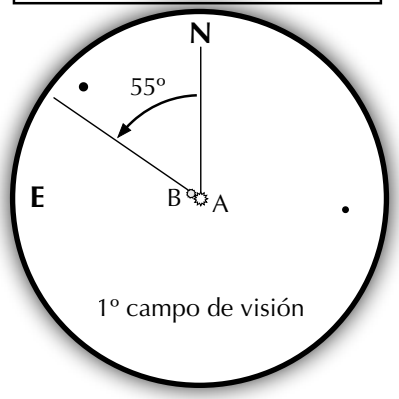
Otros Soles: Beta Cygni (Albireo)

Cómo encontrar a Beta Cygni en una tarde de junio

Mire hacia el este en busca de la Vía Láctea y el Cisne. La forma de Cruz del Norte de Cisne se encuentra en posición horizontal. La estrella más al sur de la Cruz es Beta, también conocida como Albireo.

Beta Cygni
A-B separación: 35 sec
A magnitud: 3.4
B magnitud: 4.7
PA: 55º
A & B color: naranja, azul

Ampliación sugerida: >30x,
Apertura sugerida: >50 mm



Usa 10x50 binoculares para separar Albireo.

Stellar Observations

Greg Penner

Aurora Borealis in East Tennessee!

I never thought it would actually happen here. When the Sun starts getting very active with sunspots, solar flares and coronal mass ejections, we start seeing news reports across all media outlets about the possibility to "see the aurora borealis as far south as Alabama or Texas!" The forecasts always turn out to be overly optimistic or, at best, minimally correct with a barely visible red glow on the horizon that could be the aurora (but you're not sure, maybe it's the glow of city lights a few miles away). This time it was different. This time the forecasts proved correct; overwhelmingly correct! We saw the aurora borealis from right here in the Tri-Cities of East Tennessee (and across much of the world), and there was no doubt about it!

On May 10th, NOAA's Space Weather Prediction Center issued a Severe Geomagnetic Storm Alert (G4 conditions) because they had observed at least seven coronal mass ejections (CMEs) from the Sun with impacts expected to arrive on Earth midday on

May 10th. CMEs are explosions of plasma and magnetic fields from the Sun's corona. They cause geomagnetic storms when they are directed at Earth. These storms can disrupt power and communications infrastructure, but they also bring the possibility of spectacular aurora displays. Earlier in the week on May 6th, I happened to make some observations of the Sun with my filtered telescope and imaged a large area of sunspots that made quite an impression. To me, it looked like a footprint on the Sun. This sunspot group was designated AR3664 and continued to grow throughout the week as seen **HERE**. This sunspot became the source of multiple X-class flares as seen in a time lapse video from NASA's GOES-R spacecraft.

Sunspot group AR3664 on 5/6/24 by Greg Penner

During the day on Friday the 10th, I heard about the geomagnetic storm alert and aurora predictions. I had been disappointed in the past by aurora predictions that failed to materialize at my location, but these predictions seemed to have a real sense of urgency about them. The forecasters were saying that the best chance to see the aurora display was from 2a - 5a EDT Saturday morning, so we set our alarms accordingly. However, my wife started noticing multiple references to aurora sightings on social media Friday evening. Many of the sightings were in Europe, but then we started seeing pictures of aurorae in the U.S., even at lower latitudes similar to our location. These weren't just barely perceptible glows low on the horizon, but rippling ribbons of pink, purple, red and green. Then my wife's sister in Greeneville, TN, sent us a picture at 10:27p showing pinkish-red rays of light, so we bolted outside and finally at 10:31p, I captured my first real image of the aurora borealis almost directly over our house! The Space Weather Prediction Center had increased the alert levels to G5 and Kp9, the most extreme activity on the scale. We spent the next 7 hours

completely mesmerized as we were checking off our biggest bucket list item without even having to leave our house! This was just the first wave of what ended up being three distinct waves of aurorae that were visible to us throughout the night and early morning hours of May 10-11. The first wave was approximately 10:30p - midnight. The second wave was 2a - 3:30a. The third wave was 4:30a - 5:20a as the sky started to brighten before sunrise. The first wave was partially obscured by some clouds, but fortunately the clouds dissipated for the 2nd and 3rd waves, allowing us to capture multiple stunning images. With our naked eyes, we could see the faint pink and red glow and the rippling, moving, sometimes vertical, sometimes slanted pillars of eerie whitish light. The images we captured with our smart phones using multi-second exposures gathered many more photons of light to create much deeper colors and more prominent beams of light. All of the following images are unedited and unfiltered.

First Wave Images 10:30a - Midnight

Aurora from Greeneville, TN by Cathy Wallace

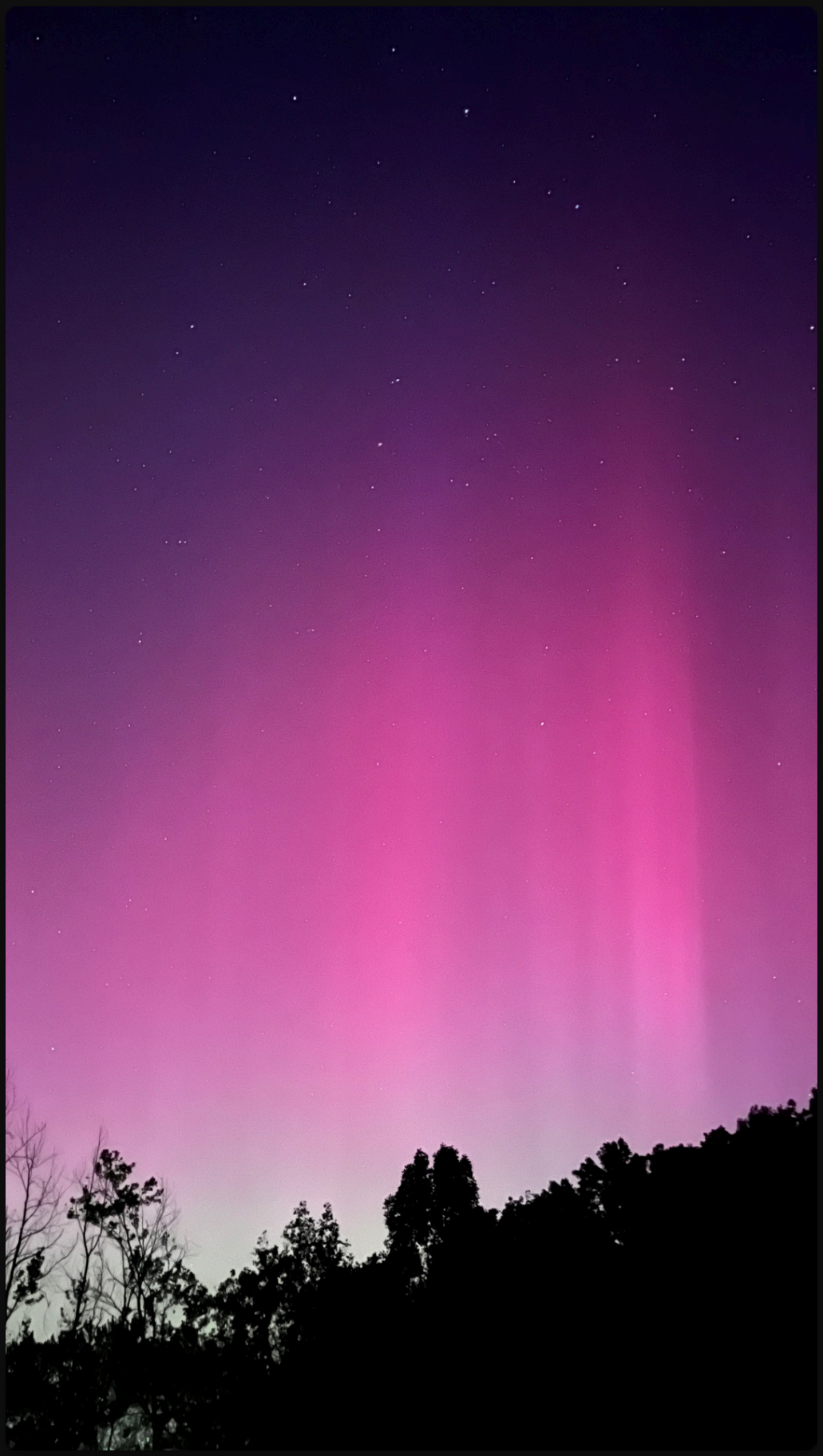
Aurora from Blountville, TN by Greg Penner

Aurora from Blountville, TN by Greg Penner

Second Wave Images 2:00a - 3:30a

Aurora from Blountville, TN by Greg Penner

Aurora from Blountville, TN by Debbie Penner



Aurora from Blountville, TN by Greg Penner

Third Wave Images 4:30a - 5:20a

Aurora from Blountville, TN by Greg Penner

Aurora from Blountville, TN by Greg Penner

2024 has been a spectacular year so far for Sun-related phenomena with the total solar eclipse and magnificent aurora displays. With the Sun still approaching its maximum level of activity, we can be hopeful that we will see more dramatic sunspot activity and aurora displays. The excitement these events have generated across the country is really fun to see. As a group of amateur astronomers, our club members can share our knowledge and enthusiasm for these events with our friends, co-workers and families. Invite people to our club meetings and special events like Astronomy Day, StarWatch and StarFest. Keep looking up and stay tuned into astronomical events so you can be a helpful source to your community!

The Queen Speaks

Robin Byrne

Happy Birthday Ann Druyan

This month we celebrate the life of a woman who isn't as famous as the man she married, but who is impressive in her own right. Ann Druyan was born June 13, 1949 in Queens, New York. Her parents, Harry and Pearl, owned a knitwear company. Despite a later career promoting science, an experience in school originally soured her attitude toward science and math. When learning about the number pi in junior high school, she asked if it applied to every circle in the Universe. Her teacher told her to not ask stupid questions. How appalling!

After graduating high school with honors, Druyan attended New York University, but left after three years without graduating. Instead, she began a journey of self-education that would last the rest of her life.

Ann Druyan. ***Image by Bob Lee August 10, 2008.***

By the late 1970s Druyan began to find her path and hone her skills. In 1976, Druyan was hired by NASA to be the creative director for the message that was carried on the Voyager 1 and 2 spacecrafts. The Voyager Interstellar Message Project was a golden record that included music, spoken words, and images as a message for any lifeforms that might find the spacecrafts as they travel beyond our Solar System. Druyan fought to include one of the songs on the record, Johnny B. Goode by Chuck Berry, explaining that the rock music genre is the music of motion and going someplace new, just like Voyager. It is estimated that the records could last as long as one billion years.

In 1977 Druyan published her first book, A Famous Broken Heart. It is a fantasy novel about a woman who finds herself in a world of fictional characters, who worry about what's happening in the real world.

In 1979, Druyan began what would be a life-changing collaboration with Carl Sagan. After working with her on the

Voyager records, Sagan decided to hire Druyan to help co-write his ground-breaking PBS series, Cosmos. With Sagan as the host, the thirteen episodes covered a range of topics, from the origin of life to the fate of the Universe. With over 500 million viewers, it wasn't until Ken Burns' Civil War series that another PBS show had a wider audience.

The team of Druyan and Sagan took things to another level when they married on June 1, 1981. They would have two children: Alexandra, born in 1982, and Sam, born in 1991. Over the years, they would collaborate on several books, including The Demon Haunted World and Comet.

Druyan's writing career and association with PBS would also continue. In 1987, she wrote and produced an episode of NOVA titled Confessions of a Weaponeer about George Kistiakowsky, who was Dwight D. Eisenhower's Science Advisor.

In addition to her writing career, Druyan has also been an activist for a variety of causes she has felt passionate about. In

the 1980s, Druyan was arrested three times for her participation in nuclear disarmament protests.

In 1988, Druyan was named as Secretary of the Federation of American Scientists, a role she held for ten years. This organization, established after the bombing of Hiroshima, is known as the “conscience of American science” because of its mission to use science and technology to benefit humankind.

In the 1990s, Druyan and Sagan collaborated with then-Senator Al Gore, Jr., as well as a wide range of religious leaders, to draft policy proposals related to protecting the environment. The document, titled Statement by Religious Leaders at the Summit on the Environment, emphasized the importance of protecting the environment as a human rights issue, showing the connection between areas of environmental devastation and the toll it takes on the people living there.

In 1996, Carl Sagan was diagnosed with myelodysplasia (MDS), a form of cancer affecting the blood. Despite a valiant battle,

and Druyan by his side throughout the ordeal, Sagan died on December 20, 1996. During Sagan's battle with MDS, he and Druyan were working as co-creators and co-producers of the film version of Sagan's novel Contact. The film was released in 1997, after Sagan's death.

In the year 2000, Druyan continued to bring astronomy to the public through her writing, this time in the form of a planetarium show. The renovation of the Hayden Planetarium brought with it a new production, written by Druyan and Steve Soter, titled Passport to the Universe, narrated by Tom Hanks. The team of Druyan and Soter wrote a subsequent show for the Hayden Planetarium, titled Search for Life: Are We Alone, narrated by Harrison Ford.

Druyan's association with the Hayden Planetarium led to another project with the planetarium's director, Neil deGrasse Tyson. In 2000, Druyan, working with Joseph Firmage, created a production company, Cosmos Studios, Inc, devoted to producing science-based entertainment. One of their first

productions was the reboot of Sagan's PBS series, now hosted by Tyson, Cosmos: A SpaceTime Odyssey, for which Druyan was also one of the writers. Other productions by their company have covered topics ranging from dinosaurs to the Voyager mission.

In addition to their legacy in print and film, Druyan and Sagan will also live on in the stars. In 1982, an asteroid was named in Sagan's honor, 2709 Sagan. Then in 1988, Eleanor F. Helen discovered another asteroid, which she named 4970 Druyan. As the two asteroids travel around the Sun, the orbit of one of the asteroids crosses in and out of the other's orbit, like two linked rings, so they have been dubbed as sharing a "wedding ring orbit." What a beautiful homage to the life shared by Druyan and Sagan.

While Sagan is no longer with us, Druyan continues to work, writing and producing shows that help popularize science. At their closest to Earth, both asteroids, Sagan and Druyan, are approximately 13th magnitude, which, though faint, is not out

of reach of many amateur telescopes. Perhaps it would be a fitting way to honor both Druyan and Sagan to attempt to observe their intertwined asteroids and think about all that Ann Druyan has contributed to our love of the cosmos.

References:

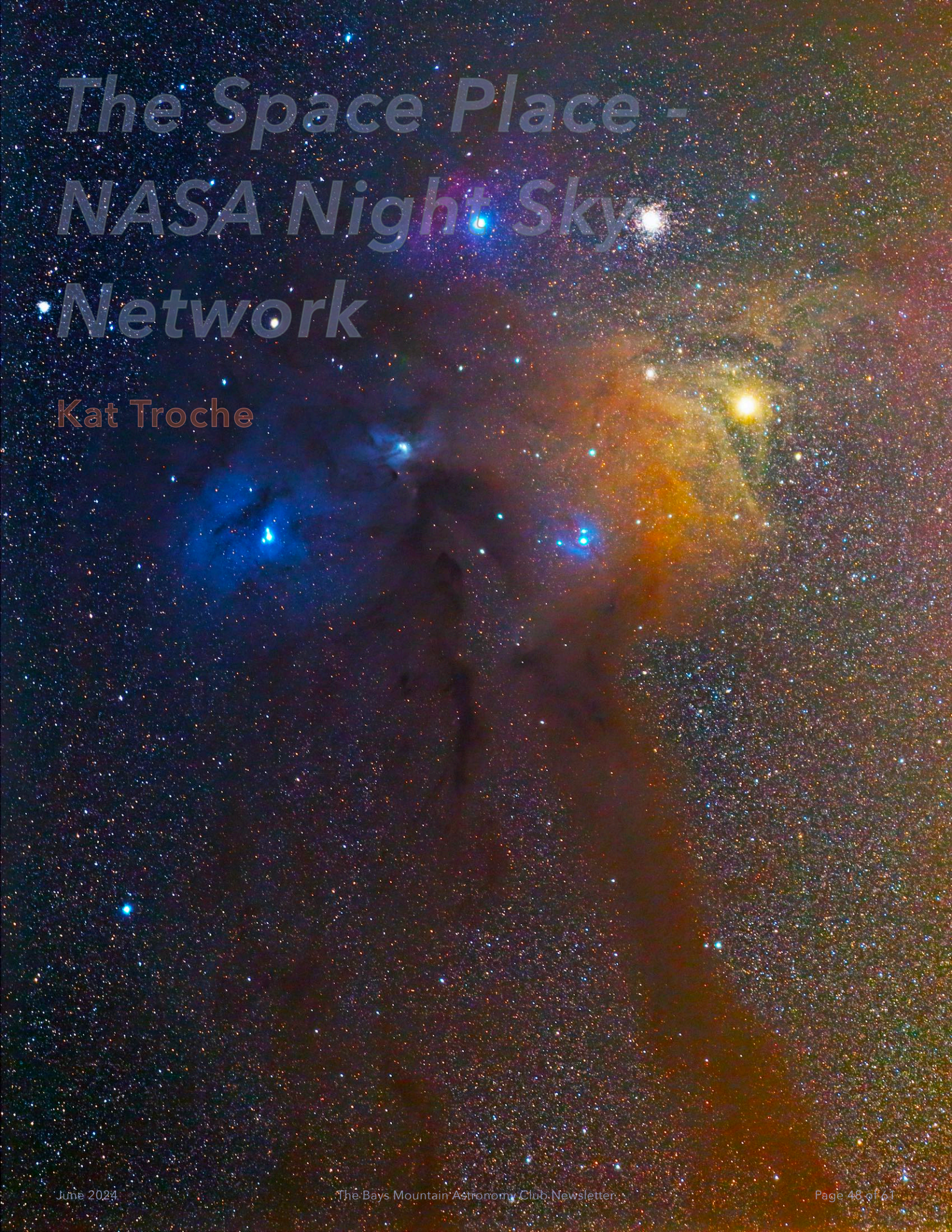
Wikipedia - **Ann Druyan**

Freedom from Religion Foundation - Ann Druyan

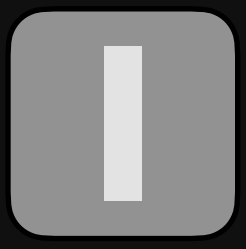
Queenska - Ann Druyan, Conqueror of the Universe by Marta Oleskiv, April 25, 2023

The Space Place - NASA Night Sky Network

Kat Troche

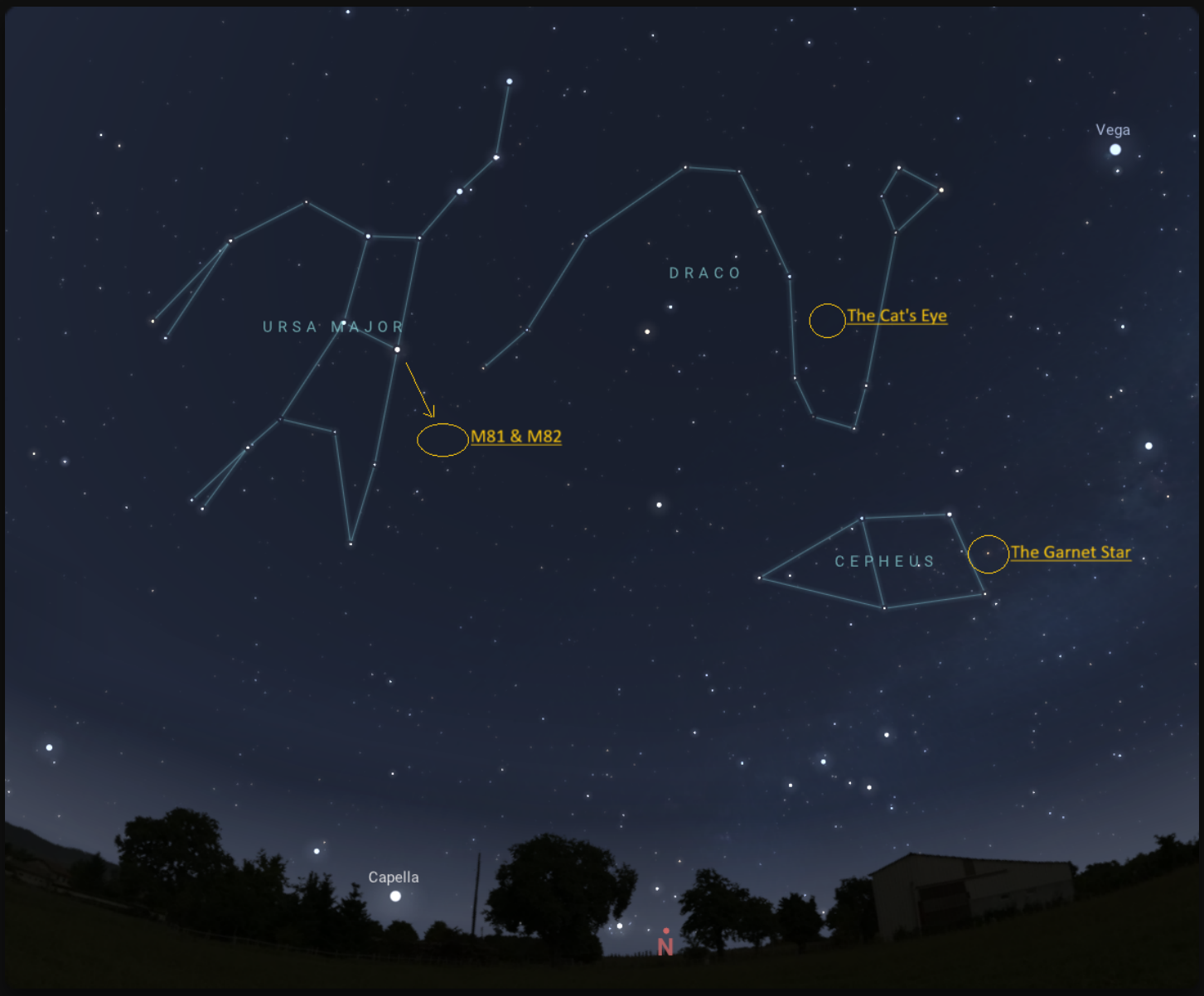


Constant Companions: Circumpolar Constellations, Part III



n our final installment of the stars around the North Star, we look ahead to the summer months, where depending on your latitude, the items in these circumpolar constellations are nice and high. Today, we'll discuss objects in Cepheus, Draco and Ursa Major. These objects can all be spotted with a medium to large-sized telescope under dark skies.

- Herschel's Garnet Star: Mu Cephei is a deep-red hypergiant known as The Garnet Star, or Erakis. While the star is not part of the constellation pattern, it sits within the constellation boundary of Cepheus, and is more than 1,000 times the size of our Sun. Like its neighbor Delta Cephei, this star is variable, but is not a reliable Cepheid variable. Rather, its brightness can vary anywhere between 3.4 to 5.1 in visible magnitude, over the course of 2-12 years.



From left to right: Ursa Major, Draco, and Cepheus. Credit: Stellarium Web.

- The Cat’s Eye Nebula: Labeled a planetary nebula, there are no planets to be found at the center of this object. Observations taken with NASA's Chandra X-ray Observatory and Hubble Space Telescopes give astronomers a better understanding of this complex, potential binary star and how its core ejected enough mass to produce the rings of dust. When searching for this object, look towards the ‘belly’ of Draco with a medium-sized telescope.

This composite of data from NASA's Chandra X-ray Observatory and Hubble Space Telescope gives astronomers a new look for NGC 6543, better known as the Cat's Eye nebula. This planetary nebula represents a phase of stellar evolution that our sun may well experience several billion years from now. Credit: X-ray: NASA/CXC/SAO; Optical: NASA/STScI

- Bode’s Galaxy and the Cigar Galaxy: Using the arrow on the star map, look diagonally from the star Dubhe in Ursa Major. There you will find Bode’s Galaxy (Messier 81) and the Cigar Galaxy (Messier 82). Sometimes referred to as Bode’s Nebula, these two galaxies can be spotted with a small to medium-sized telescope. Bode’s Galaxy is a classic spiral shape, similar to our own Milky Way galaxy and our neighbor, the Andromeda Galaxy. The Cigar Galaxy, however, is known as a starburst galaxy type, known to have a high star formation rate and incredible shapes. This image composite from 2006 combines the power of three great observatories: the Hubble Space Telescope imaged hydrogen in orange and visible light in yellow green; the Chandra X-Ray Observatory portrayed X-ray in blue; the Spitzer Space Telescope captured infrared light in red.

The Cigar Galaxy. Credit: NASA, ESA, CXC, and JPL-Caltech

M81

Up next, we celebrate the solstice with our upcoming mid-month article on the Night Sky Network page through NASA's website!

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** to find local clubs, events, and more!

BMAC Calendar & More

Calendar:

BMAC Meetings:

- Friday, June 7, 2024 - 7p - Eclipse stories from BMACers.
- Friday, August 2, 2024 - 7p - Topic TBA.
- Friday, September 6, 2024 - 7p - Topic TBA.
- Friday, October 3, 2024 - 7p - Topic TBA.
- Friday, December 6, 2024 - 7p - Topic TBA.
- Friday, February 7, 2025 - 7p - Topic TBA.
- Friday, March 7, 2025 - 7p - Topic TBA.
- Friday, April 4, 2025 - 7p - Topic TBA.
- Friday, May 2, 2025 - 7p - Topic TBA.

SunWatch:

- Every clear Saturday & Sunday - 3p-3:30p - March-October - By the Dam
  - View the Sun safely with a white-light view if clear.; Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

StarWatch:

- October 5 & 12, 2024 - 7:30p
- October 19, 26 & November 2, 2024 - 7p
- November 9, 16, 23 & 30, 2024 - 6p
  - View the night sky with large telescopes at the observatories. If poor weather, an alternate live tour of the night sky will be held in the planetarium theater. Free.
  - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.

pecial Events:

- **Annual Club Picnic - July 2024**
  - Date and site location will be sent directly to full BMAC members. BMACers and their families are welcome to enjoy an evening of astronomy-themed games and activities along with a potluck dinner and observing.
- **StarFest 2024 - November 1-3, 2024**
  - Our 39th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 4 keynote speakers, unique T-shirt and more!
  - **Pre-registration by Oct. 2024 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."**
  - Link for all the StarFest info including registration and hotel reservation links.
- **BMAC Dinner - January 2025**
  - This event is for members and their families. Look for an e-mail in January with all the information.

Regular Contributors:

Greg Penner

Robin Byrne

Adam Thanz

Greg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He has enjoyed astronomy since childhood when he received a “department store telescope” and viewed Saturn for the first time. He has been a member since 2018.

Robin Byrne has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

Adam Thanz has been the BMAC Newsletter Editor for all but a small number of issues since 1992. He is the Planetarium Director at Bays Mountain Park and an astronomy adjunct instructor at NSCC since 2000.

Connection:

Bays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 - **Park Site** - **Club Site**
- Newsletter edited by **Adam Thanz**

Dues:

- Dues are highly supplemented by the Bays Mountain Park Association and volunteerism by the club. As such, our dues are kept at an extremely low cost.
- $16 / person / year
- $6 / each additional family member
- Note: if you are a Park Member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. The easiest way is to pay via the CivicRec online portal. If you are a current member, please log in with your e-mail address and reset your password if you have not already done so. You can then update your membership. Here's the direct **link**. If you want to add family members, then add them via the internal link. You can also pay at the gift shop, by mail or over the phone.

Chapter Background Image Credits:

- **Cover image of Southern Milky Way by Adam Thanz.**
  - *Sony A7ii with Zeiss Batis 2.8/18 lens, f/2.8, 8 sec., ISO 6,400, August 9, 2020.*
- **Table of Contents image of Comet NEOWISE (C/2020 F3) by Adam Thanz**
  - *Sony A7ii with Sony FE 2.8/90 Macro G OSS lens, f/2.8, 8 sec., ISO 4,000, July 15, 2020.*
- **Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.**
  - *Image captured July 23, 2016.*
- **BMAC Notes painting of the Moon with moon glow by Christa Cartwright.**
  - *Painting based on a photograph of the Moon Christa captured July 2020.*
- **Stellar Observations image of Crescent Nebula by David Reagan.**
  - *This image was taken with a 140mm refractor in his suburban backyard using an AstroPhysics 900 mount, 8.7 hours of 5 minute Ha and OIII subexposures, combined in AstroPixelProcessor as an HOO image and processed in Lightroom and Photoshop. Image captured in 2022.*
- **The Queen Speaks image of a solar halo by Robin Byrne.**
  - *iPhone 7, June 8, 2020.*
- **The Space Place - NASA Night Sky Network image of the Rho Ophiuchi cloud complex by Brandon Stroupe.**
  - *Canon 6D with Canon 2.8/70-200mm lens, f/2.8 @200mm, 20 x 120 sec. exposures, ISO 1,000, stacked in Deepsky Stacker, processed in Adobe Photoshop CC, Skywatcher Star Adventure mount, September 19, 2015.*
- **BMAC Calendar & More image of the Moon by Greg Penner.**
  - *iPhone shooting through a 9mm eyepiece and 12.5" Truss Tube Dobsonian @212x.*
- **All background images used with permission by their authors.**