

The Bays Mountain Astronomy Club Newsletter



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Cosmic Reflections

William Troxel - BMAC Chair



reetings fellow BMACer's. Let me thank each of you for connecting in August. I also want to send a big thank you to Kallie, Jason and Adam for allowing us to see and experience the new enhancements to the Planetarium. I have talked about how much I have been waiting to see all the changes and I have to write that I was totally blown away. I have been told that I am a bit over the top when I talk about the shows and astronomy at Bays Mountain Park. I never saw it as over the top, but I guess those of you that thought that were right. So be it!

September's meeting will be back on Zoom. I will send the link out a few days before the meeting. After reviewing the data showing the rapid increase in the number of cases in the area and conversations with Adam and Jason (which I am so thankful to both of you for your willingness to share your advice), we all agree that it is wiser to go back to Zoom meetings until case numbers stay low.

September's meeting will feature our own Christa Cartwright with "Adventures in Space Camp." She'll speak on her recent experience with the Advanced Space Academy at the U.S. Space and Rocket Center in Huntsville, AL! We'll also have Show-n-Tell and "Floating Questions." I am calling it this name because I could not think of a cooler name, it is the quiz questions we have had in the past. If you can think of a fun name, I would love to know and I will change the name. The source for the questions will be from the June 2021 "Reflector" quarterly newsletter from the Astronomical League. Be sure and get the copy out and do a review of the articles!

I have written a lot lately about how very proud I am to be the Chairman and "face" of this club. You have, each and everyone, risen to the challenge that the pandemic has forced our club along with the world to find ways to stay together as we try to figure how to stay connected. Please continue to be strong, practice safety and do not give up hope. We will come out of this as a club stronger, I believe, with all my heart. I have no way of knowing what our future meetings will look like. One thing I do know is that I believe in each one of you because you are Bays Mountain Astronomy Club. Until next time... Clear Skies.

BMAC Notes



BMACer Graduates - Advanced Space Academy

A message from BMACer Greg Cartwright: Christa and her assigned mission team graduated from Advanced Space Academy at the U.S. Space and Rocket Center in Huntsville, AL after a long week of 1/6th gravity training, multi-axis training, neutral buoyancy while scuba diving, engineering challenges, flying jet aircraft simulators, and mission control work! Congratulations!!!!!! They also earned one credit hour of freshman level general science from the University of Alabama in Huntsville!





Celestial Happenings

Jason Dorfman





September brings with it the promise of cooler temperatures ahead as we transition from summer to spring. The autumnal equinox occurs on the 22nd of the month, as the Sun crosses the equator from north to south (Fig.1).

The Sun appears above the eastern horizon at 7:01 a.m. on the 1st and shifts later to 7:24 a.m. by the 30th. A similar shift occurs at sunset, though in the opposite direction, with the time changing from 7:57 p.m. to an earlier time of 7:14 p.m. This, of course, means less daylight and more time for observing the night's wonders. September holds a treasure of planetary delights for the willing observer. The evening hours give us Mercury and Venus getting ready to set in the west-southwest and Jupiter and Saturn rising in the southeast. Neptune also reaches a prime observing position this month.

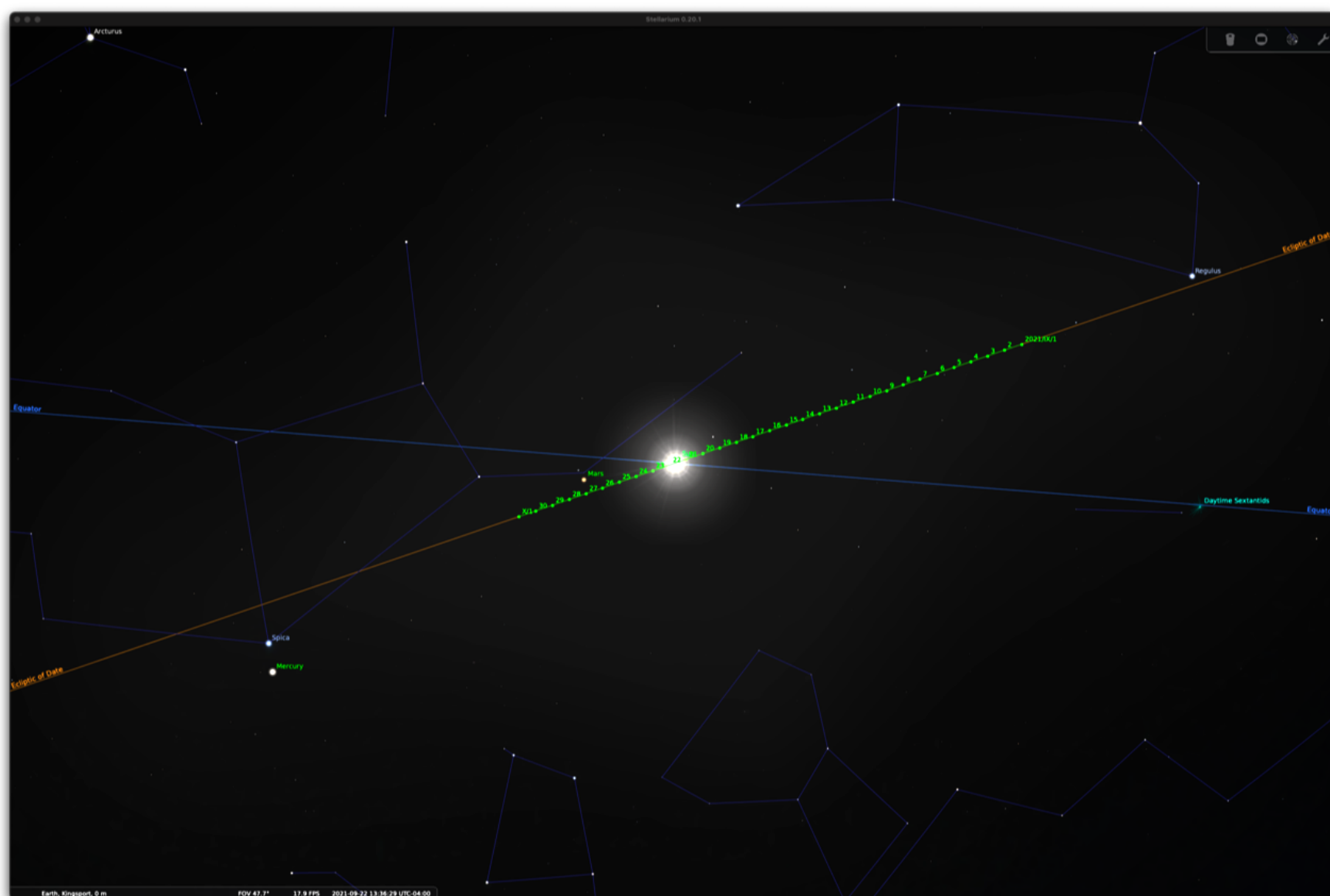


Fig. 1: The Sun's path along the ecliptic for September 2021. The Sun is crossing the equator on the 22nd, the date of the Autumnal Equinox. Image from Stellarium.

Planets

As September begins, turn your gaze to the western horizon as elusive Mercury peeks through the fading twilight. A half hour after the Sun has set, Mercury sits 5° high, just south of due west. Shining brightly at magnitude -0.04 , you should be able to pull it from the twilight with a bit of patience. With the aid of binoculars or a telescope, a small orb spanning $5.9''$ in diameter will be revealed and appear quite gibbous at 73% illumination. Mercury reaches its greatest eastern elongation on the 13th when it will stand 27° east of the Sun. It will still sit quite low in the sky and will have dimmed slightly to $+0.08$ magnitude. The disk of this small rocky world will have grown to $7''$ in diameter and the phase will now be a smaller gibbous at 57.3% lit. After the 3rd week of the month, it will become more difficult to spot this swift-moving planet as it descends into the evening twilight moving back towards our bright star.

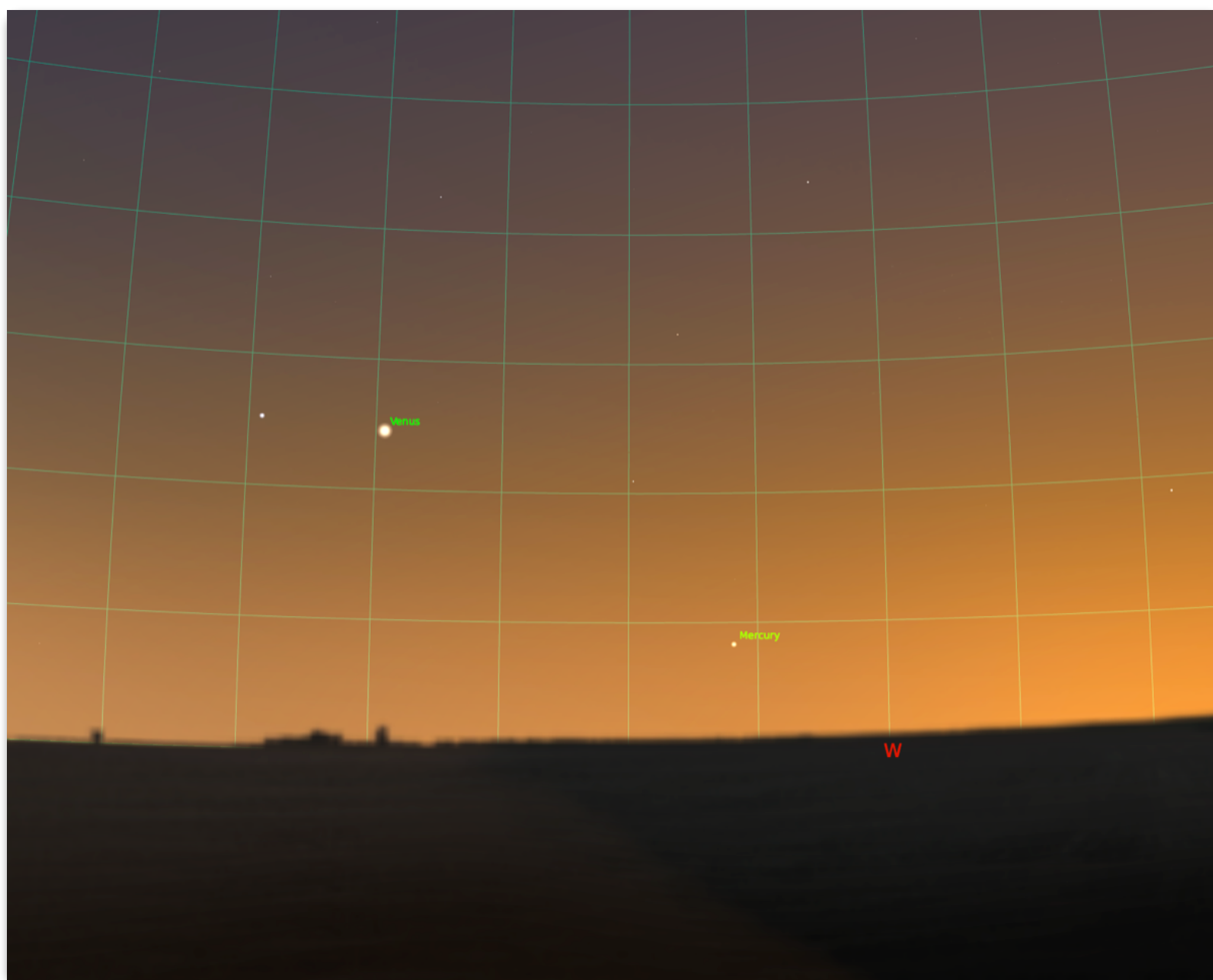


Fig. 2: Mercury and Venus above the western horizon after Sunset at the beginning of September. Image from Stellarium.

If Mercury eludes you, simply turn your gaze a bit higher towards the southwest for super-bright Venus shining brilliantly at magnitude -4. Venus continues to dominate the early evening sky as it continues its eastward trek away from the Sun. On the first, Venus sits about 5° to the right of Spica, the bright star in Virgo. The planet hangs about 13° above the west-southwest horizon a half hour after sunset. Optical aids will reveal the planet's disk spanning $15.2''$ and looking gibbous at 72.6% illumination. By the 5th, Venus and Spica will sit just a degree and half apart with Venus above Spica as you look towards the horizon. With the low angle of the ecliptic, Venus will appear to shift eastward along the horizon from night to night. As we reach the end of the month, our sister world will now sit closer to southwest, but will still be about 13° above the horizon a half hour after sunset. This shift in the sky is due to the planet's motion around the Sun which brings it closer to Earth. This becomes evident when you see that the planet's diameter now spans $18.8''$ on the sky. The phase of Venus on the 30th will still appear slightly gibbous as we see about 62% of the planet illuminated.

As Mercury and Venus set in the west (Fig. 2), turn your attention to the east for Saturn and Jupiter (Fig. 3). Both are moving in retrograde this month in the constellation of Capricornus, having passed through opposition last month. Jupiter follows Saturn across the sky, sitting about 17° to the east and slightly north of the ringed world.

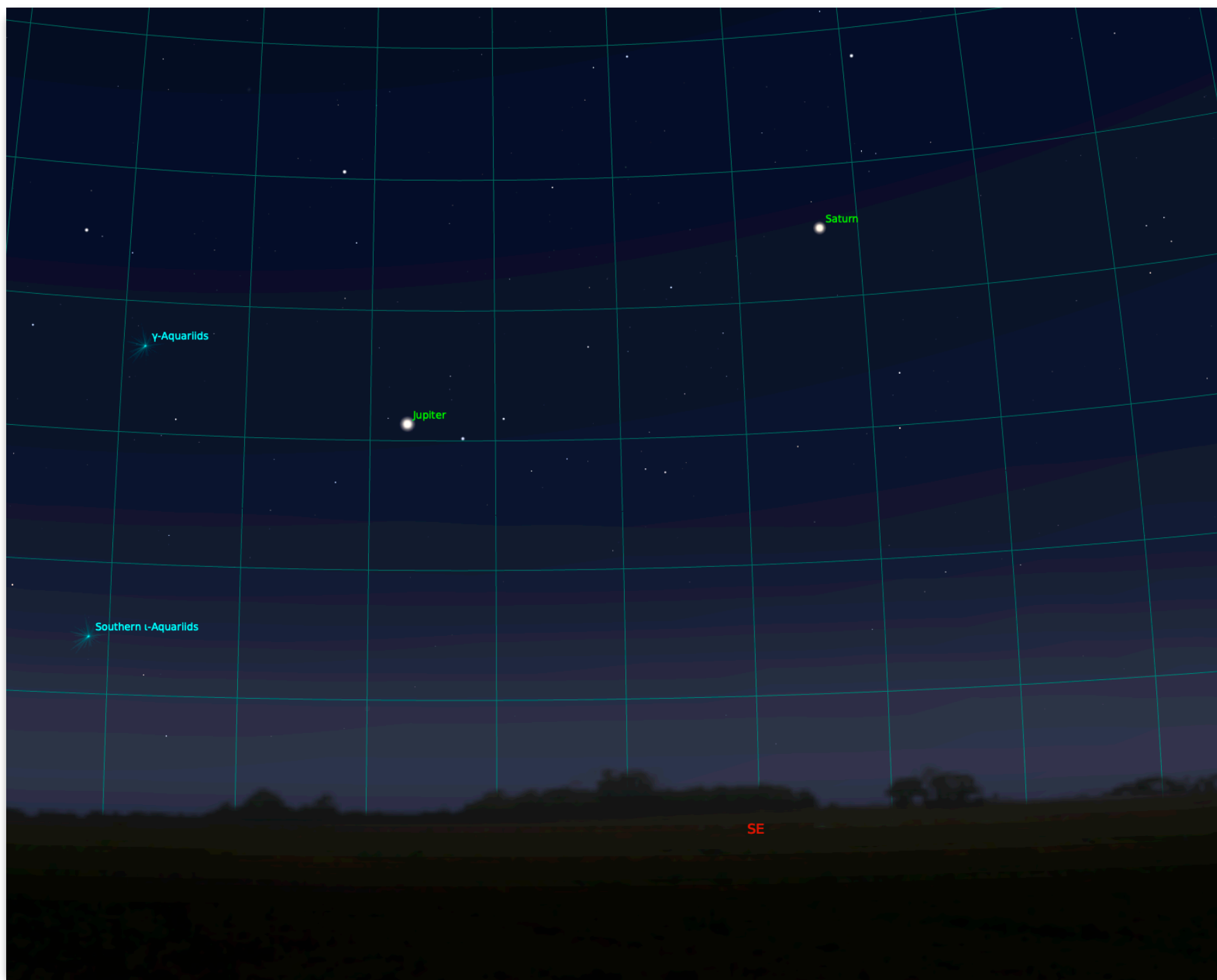


Fig. 3: Saturn and Jupiter rising in the southeast in early September. Image from Stellarium.

An hour after sunset on the 1st, Saturn can be found about 25° high above the southeast horizon. It will climb to almost 35° by 11:30 p.m. when it reaches the meridian. Over the month, Saturn's magnitude will dim from +0.3 to +0.47. Optical aids will show the disk of the planet changing from $18.3''$ to $17.7''$ and the rings going from $42.7''$ to $41.2''$ as the planet increases its distance from Earth over the month.

Next up, is mighty Jupiter, the king of the planets. This gas giant world hangs about 18° above the southeastern horizon an hour after sunset. It will reach the meridian an hour after Saturn as it climbs to an altitude of almost 40° . Jupiter shines brightly at magnitude -2.85 and will dim slightly to -2.7 by month's end. The disk of Jupiter will shrink slightly from $48.8''$ to $46.3''$ over the month as the distance between our two worlds grows.

Whether you're new to the hobby of astronomy or an experienced observer, this month provides a wonderful opportunity for a more challenging planetary observation. The distant, icy world, Neptune, reaches opposition on the 14th. This ice giant sits in the northeast corner of the constellation Aquarius (Fig.4) and, on the night of opposition, can be found about 17° above the east-southeast horizon an hour and a half after sundown. It will reach the meridian and its highest altitude of almost 50° just before 1:30 a.m.. On this night, a barely gibbous Moon sits off to the west and shouldn't provide too much interference. At magnitude +7.8, you'll need the aid of binoculars or a telescope. With a telescope and good seeing conditions, you should be able to spy a small bluish-green orb spanning a mere 2.4".

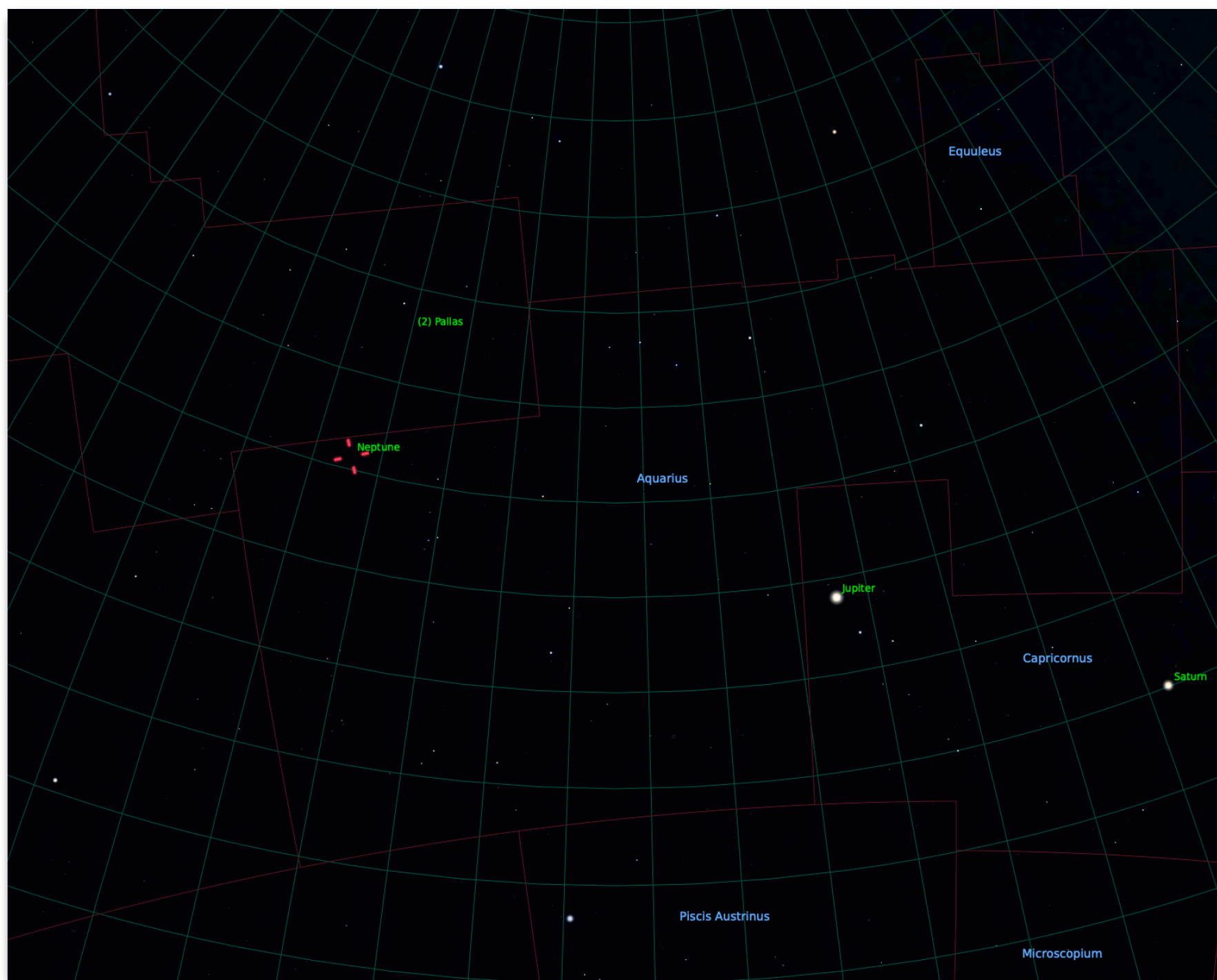


Fig. 4: The position of Neptune within the constellation of Aquarius. Image from Stellarium.

Luna

September begins with a fat crescent Moon best seen in the early morning hours. New Moon occurs on the 6th. During the second week of the month, we'll see the Moon return to the evening skies. On the 8th, a very young crescent can be spied about 5° above and to the right of Mercury and then on the following night about 4° to the upper right of Venus.

On the evening of the 12th, a day before the Moon reaches First Quarter, the Moon can be seen about 3° north of Antares, the bright, reddish star in Scorpius. The waxing gibbous Moon will pass about 4° south of Saturn on the 16th and about 5° south of Jupiter on the 17th. Full Moon occurs on the 20th and the month ends with 3rd Quarter Moon on the 28th.

I hope you're all well and staying safe. Have fun observing!

The Queen Speaks

Robin Byrne



Happy Birthday Keith Glennan



his month we look back to a previously-published article in this newsletter and celebrate the life of a man whose administrative abilities helped America's space program get off the ground. Thomas Keith Glennan was born September 8, 1905 in Enderline, North Dakota. His higher education began at the Eau Claire State Teachers College in Wisconsin, and ended with his receiving a Bachelors degree in Electrical Engineering from Yale in 1927.

After graduation, Glennan had a wide variety of work experiences. His first job was in the motion picture industry, with his electrical skills coming in handy as "talkies" became more popular. He served as operations manager of Paramount Pictures, and as studio manager for Samuel Goldwyn Studios. Then he went to work for a subsidiary of the Western Electric Company, and briefly worked for the Vega Airplane Corporation.

In 1932, Glennan married Ruth Haslup Adams. Over the years, they had four children: a son (Thomas, Jr.) and three daughters (Sally, Catherine and Polly).

In 1942, Glennan helped with the war effort by becoming the Administrator (and later the Director) of the U.S. Navy Underwater Sound Laboratories in New London, Connecticut. After the war, he worked for a few years at the Ansco Corporation in New York before being asked to serve as President of the Case Institute of Technology in Cleveland, Ohio. It was under Glennan's leadership that Case became renown as a top engineering school. Concurrent with his presidency, Glennan also served (at the request of U.S. President Harry S. Truman) on the U.S. Atomic Energy Commission from 1950 to 1952. During this time, the commission was focused on developing a hydrogen bomb, about which Glennan had reservations. Glennan retired from the commission the day before the first U.S. hydrogen bomb test took place in the Pacific.



T. (Thomas) Keith Glennan. Portrait painted by artist Albert Murray of New York. Image from NASA.

Glennan was always willing to do his duty, either locally or nationally. He served on many organizations, including: the Institute for Defense Analysis, the National Science Foundation, and the American Academy of Arts and Sciences.

As a response to the Soviet launch of Sputnik, President Eisenhower established the National Aeronautic and Space Agency (NASA) in 1958. He asked Keith Glennan to be the first head of this new organization. On August 19, 1958, Glennan began working at NASA, while retaining his presidency of Case. Glennan knew that in order to achieve success in space, he would need to bring together, under NASA's mantle, a number of disparate people and laboratories, so that the process would be better coordinated. His first step was to entice Werner von Braun away from building missiles for the Army to help build rockets for space. Von Braun didn't take much persuading to make the move. NASA was built from the original National Advisory Committee for Aeronautics (NACA), which included Langley Aeronautical Laboratory, Ames Aeronautical Laboratory and Lewis Flight Propulsion Laboratory. Glennan added to the NASA family of facilities: Goddard Space Flight Center (which Glennan developed from part of the Naval Research Laboratory), the Jet Propulsion Laboratory and the Army Ballistic Missile Agency, which became the Marshall Space Flight Center. With all of these pieces in place, America was ready to send men into space. However, with a new Kennedy administration occupying the White House in 1961, a new director was chosen, and Glennan returned to Case in January of that year.

Glennan remained as President of the Case Institute of Technology until 1966. It was during this time that Case merged with Western Reserve University to become Case Western Reserve University. After retiring, Glennan remained active. He served as president of Associated Universities, Inc., which lobbied Washington on behalf of higher education. He also served as a U.S. representative to the International Atomic Energy Agency in Vienna.

Glennan lived in Reston, Virginia for many years until moving to Mitchellville, Maryland in the late 1980's. There he died April 11, 1995 due to complications from a stroke. He was 89 years old. Through a life as varied as it was influential, Keith Glennan helped pave the way to space for the United States. Despite being thrust into this role as a reaction to the Soviet's launching the first satellite into Earth orbit, Glennan "...never thought of it as a race. I was always convinced we would overtake the Soviets." The Space Race is over, Russia is now our partner in space, but Keith Glennan's legacy lives on through all of the accomplishments achieved by the U.S. space program.

References:

T. Keith Glennan - Wikipedia

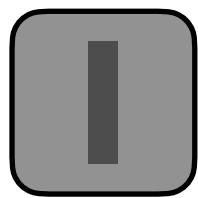
T. Keith Glennan - NASA

T. Keith Glennan, 89, First Chief of Space Agency; New York Times, David Binder

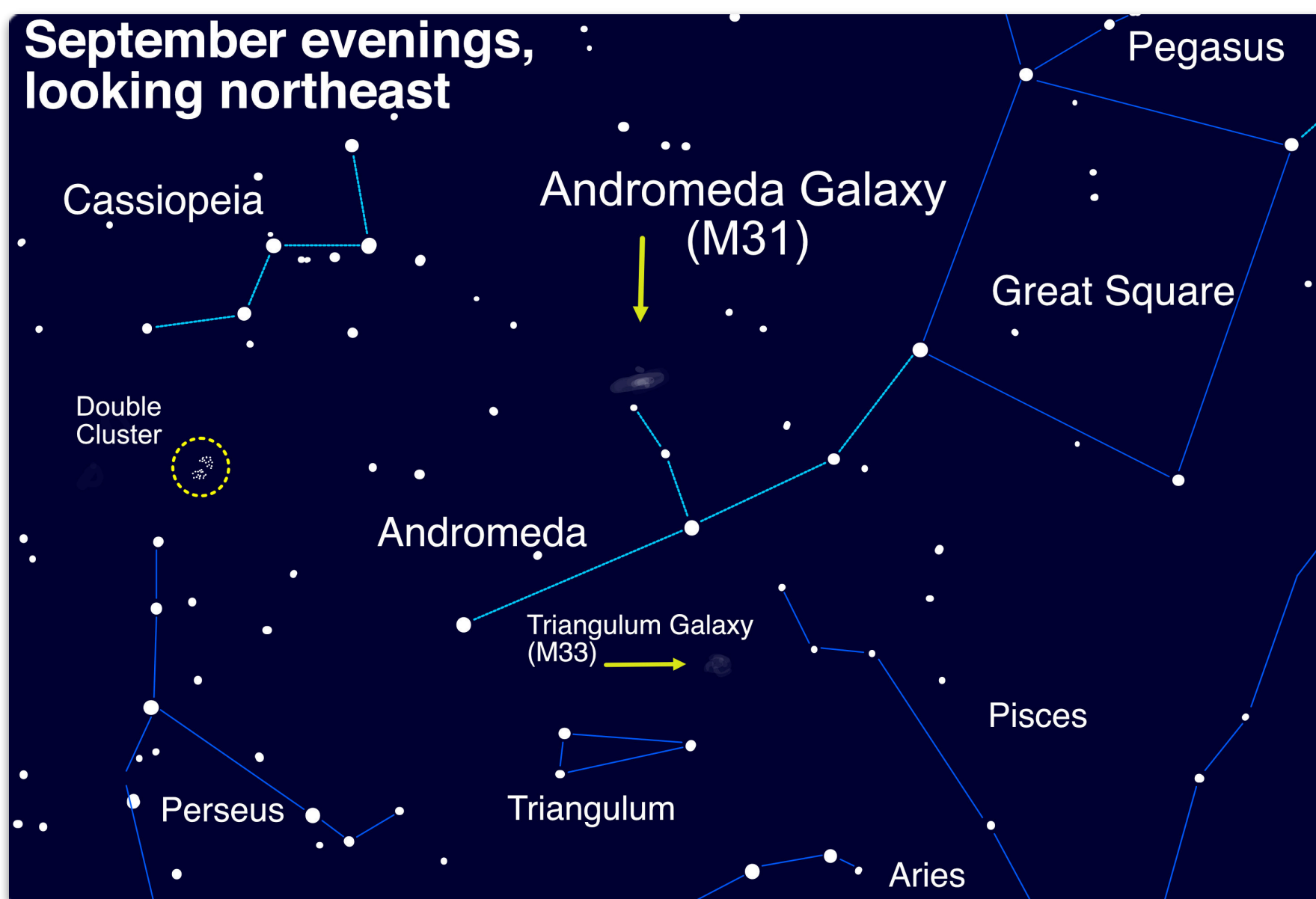
The Space Place - NASA Night Sky Network

David Prosper

Catch Andromeda Rising



If you're thinking of a galaxy, the image in your head is probably the Andromeda Galaxy! Studies of this massive neighboring galaxy, also called M31, have played an incredibly important role in shaping modern astronomy. As a bonus for stargazers, the Andromeda Galaxy is also a beautiful sight.



Spot the Andromeda Galaxy! M31's more common name comes from its parent constellation, which becomes prominent as autumn arrives in the Northern Hemisphere. Surprising amounts of detail can be observed with unaided eyes when seen from dark sky sites. Hints of it can even be made out from light polluted areas. Image created with assistance from Stellarium.

Have you heard that all the stars you see at night are part of our Milky Way galaxy? While that is mostly true, one star-like object located near the border between the constellations of Andromeda and Cassiopeia appears fuzzy to unaided eyes. That's because it's not a star, but the Andromeda Galaxy. Its trillion stars appear to our eyes as a 3.4 magnitude patch of haze. Why so dim? Distance! It's outside our galaxy, around 2.5 million light years distant - so far away that the light you see left M31's stars when our earliest ancestors figured out stone tools. Binoculars show more detail: M31's bright core stands out, along with a bit of its wispy, saucer-shaped disk. Telescopes bring out greater detail but often can't view the entire galaxy at once. Depending on the quality of your skies and your magnification, you may be able to make out individual globular clusters, structure, and at least two of its orbiting dwarf galaxies: M110 and M32. Light pollution and thin clouds, smoke, or haze will severely hamper observing fainter detail, as they will for any "faint fuzzy." Surprisingly, persistent stargazers can still spot M31's core from areas of moderate light pollution as long as skies are otherwise clear.

Modern astronomy was greatly shaped by studies of the Andromeda Galaxy. A hundred years ago, the idea that there were other galaxies beside our own was not widely accepted, and so M31 was called the "Andromeda Nebula." Increasingly detailed observations of M31 caused astronomers to question its place in our Universe - was M31 its own "island universe," and not part of our Milky Way? Harlow Shapley and Heber Curtis engaged in the "Great Debate" of 1920 over its nature. Curtis argued forcefully from his observations of dimmer than expected nova, dust lanes, and other oddities that the "nebula" was in fact an entirely different galaxy from our own. A few years later, Edwin Hubble, building on Henrietta Leavitt's work on Cepheid variable stars as a "standard candle" for distance measurement, concluded that M31 was indeed another galaxy after he observed Cepheids in photos of Andromeda, and estimated M31's distance as far outside our galaxy's boundaries. And so, the Andromeda Nebula became known as the Andromeda Galaxy.

HUBBLE MAPS THE HALO AROUND THE ANDROMEDA GALAXY



While M31's disk appears larger than you might expect (about three Moon-widths wide), its "galactic halo" of scattered stars and gas is much, much larger – as you can see here. In fact, it is suspected that its halo is so huge that it may already mingle with our Milky Way's own halo, which makes sense since our galaxies are expected to merge sometime in the next few billion years! The dots are quasars, objects located behind the halo, which are the very energetic cores of distant galaxies powered by black holes at their center. The Hubble team studied the composition of M31's halo by measuring how the quasars' light was absorbed by the halo's material. Credits: NASA, ESA, and E. Wheatley (STScI)

Source: <https://bit.ly/m31halo>

These discoveries inspire astronomers to this day, who continue to observe M31 and many other galaxies for hints about the nature of our Universe. One of the Hubble Space Telescope's longest-running observing campaigns was a study of M31: the **Panchromatic Hubble Andromeda Treasury (PHAT)**. Dig into NASA's latest discoveries about the Andromeda Galaxy, and the Cosmos at large, at **NASA**.

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:

MAC Meetings:

- Friday, September 3, 2021 - 7p - Via Zoom - Social time 30m before and after meeting. "Adventures in Space Camp." BMAcEr Christa Cartwright will speak on her recent experience with the Advanced Space Academy at the U.S. Space and Rocket Center in Huntsville, AL.
- Friday, October 1, 2021 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA.
- Friday, November 5, 2021 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA.
- Friday, December 3, 2021 - 7p - Via Zoom? - Social time 30m before and after meeting. Topic TBA.

sunWatch:

- **Cancelled until further notice.**
- Every clear Saturday & Sunday - 3p-3:30p - March-October - On the Dam
 - View the Sun safely with a white-light & H α 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:

- **Cancelled until further notice.**

- October 2 & 9, 2021 - 7:30p
- October 16, 23, 30 & November 6, 2021 - 7p
- November 13, 20 & 27 - 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.



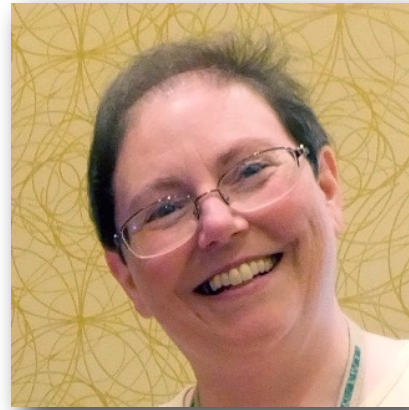
pecial Events:

- **All special events are on continual evaluation to determine availability.**
- **StarFest 2021 - October 29, 30 & 31, 2021**
 - Our 37th 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. 8, 2021 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."**
 - MeadowView Marriott special hotel rate.
 - [StarFest Link](#)
- **Astronomy Day - May 7, 2022 - 1p-4p; 8:30p-9:30p**
 - Come help share the fun of astronomy with the public. There will be tables with different themed topics plus solar and night viewing.

Regular Contributors:



William Troxel



Robin Byrne



Jason Dorfman



Adam Thanz

William is the current chair of the club. He enjoys everything to do with astronomy, including sharing this exciting and interesting hobby with anyone that will listen! He has been a member since 2010.

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).

Jason Dorfman works as a planetarium creative and technical genius at Bays Mountain Park. He has been a member since 2006.

Adam Thanz has been the BMAC Newsletter Editor for all but a 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 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 Association member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. For renewals, you will be sent an e-mail with an invoice and a direct link to pay online. You can also pay by mail, over the phone or in person at the gift shop.

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.
- **Celestial Happenings image of sunset at the Bays Mountain Park Lake during a twilight kayak program by Jason Dorfman.**
 - Image captured October 1, 2020.
- **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.**