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ASTRONOMY DAY 2025

By Mary Ducca

Once again, we had a very successful Astronomy Day on May 17, 2025. Our theme this year was “Solar Max: Unlocking the Secrets of the Sun”. It was jointly supported by members of AAI and NJAG (North Jersey Astronomical Group). It was a split event at Trailside Nature & Science Center in the afternoon and at Sperry Observatory in the evening.

The day started at 10:00 AM when our volunteers began arriving to start setting up at Trailside. In addition to AAI and NJAG members, students from Scotch Plains-Fanwood High School and Cranford High School also volunteered throughout the day at Trailside.

Activities at Trailside included presentations on “Auroras”, by Dr. Mary Lou West, “The Life of an Ordinary Star” by Mike Gironda, and “Plants Have Fun in the Sun” by Paul Trader. Al Witzgall gave presentations on “Meteorites” and had a display of them. Mike Zdziarski gave presentations on “How New Jersey Rocks Compare to the Rest of the Solar System” and had displays of NJ rocks. Shelley Shaffery headed up a full list of children’s activities in one of the classrooms related to the Sun and stars. Spencer Martin ran the activity of how to make a spectroscope. In addition, the Scotch Plains-Fanwood High School Robotics Team held robot demonstrations in one of the classrooms. This was a big hit with the children. And on the main floor there were several ongoing science displays learning about gravity, light and neutrinos. All of those were created by our president Marc Stobinski. Those activities were well received by both children and adults.

There was also a scavenger hunt set up inside Trailside’s building. There were many beautiful astrophotography images taken by members of AAI and NJAG to select from for this activity. Kathy Vaccari and Mary Lou West were in charge of this and selected 12 of them to be displayed around the

building. It was a tough decision but they were able to come through with incredible images. The children had a lot of fun finding them and checking them off their lists. All left with a small takeaway prize.

Outside, visitors could observe the Sun safely through the solar telescopes. They could also take advantage of the Solar System Walk that is on permanent display at Trailside. This gives the public the opportunity to understand the distances between the Sun and the planets of our solar system.

Although we had about 160 visitors register at the welcome table at Trailside, we estimated that we had over 400 people participate in some or many of the activities and presentations that were held. Bob Ruggiero had a count of 433 people viewing through the solar telescopes.

In the evening at Sperry Observatory, Al Witzgall gave a presentation entitled “Our Star, the Sun” that was well received. Door prizes for children were a big hit. Every child got to pick a prize. Although the weather was not favorable for observing, we did have a few minutes when Mars could be observed through both telescopes. We estimated around 100 visitors attended at Sperry Observatory.

This event could not have been possible without all the support of our volunteers. This included the members of AAI and NJAG, the QOs who operate the two telescopes at Sperry Observatory, the high school students, and the Scotch Plains-Fanwood Robotics Team. All volunteered their time attending planning meetings and/or helping out at Trailside and Sperry Observatory. My thanks to all those who volunteered their time and participation for this event. Attached is a picture of some of the many volunteers at Trailside. In addition, thank you also goes to Union College, Trailside, and Union County for their support in allowing us to hold the event at the two sites.

Holding our yearly Astronomy Day is a great opportunity to bring the science of astronomy to the public in a fun and easy to understand format. Stay tuned as there is a planned date for Astronomy Day next year on May 16, 2026. And the faculty advisor of the Scotch Plains-Fanwood High School Robotics Team has already stated that they would like to come back next year. So, mark your calendars now! Planning meetings will start in October. *Wishing everyone clear skies!*



REVIVAL OF THE AAI TELESCOPE TUNE-UP & SCOPE SELECTION SHOW

By Bonnie B. Witzgall

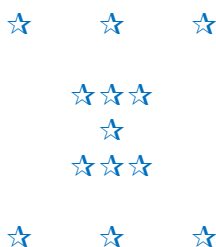
AAI sponsored a special public Telescope Tune-Up and Scope Selection event on the night of September 26, 2025. It was hoped that we would have successful attendance and personal satisfaction as we did so many decades ago.

It seems like eons since the last AAI-sponsored public Telescope Tune-Up event. Usually this experience was a derivative of our annual Astronomy Day. Back then, AAI held AstroDay as an all-day marathon, running from 10 am to 11pm or later if we had clear skies and a multitude of eager visitors. The day-long experience had various stations showing all sorts of astronomical displays and exhibits.

Inside Sperry, we offered astrophotography classes, mirror-grinding demos and gave talks about buying and using the best scopes for various needs. Outside Sperry on the big cement sundial - rest its solar soul, AAI members brought their own scopes and showed the visiting public how to set up and use different telescopes. We also advertised that visitors should bring their own scopes and an assemblage of questions. AAI members were very patient when explaining why the public's E-Z Uni-View Scope in a Box was not performing up to the standards of the Mauna Kea instruments.

Decades ago, people could not afford to buy fancy instrumentation. Elaborate cameras were expensive, but 100 ISO Kodak film was cheap. People ground and polished their own mirrors, configured big sonotubes and melted lead fishing sinkers to make custom counterweights. Now our Smart Phones can take photos of deep sky objects through an eyepiece, and people share it around the planet at the speed of light. We get on the Web and see plenty of sites explaining how to stack images and adjust the image to perfection. There are also programs to automate scopes and gather data from thousands of miles away. Now the Human operator comfortably sleeps or stays home and avoids the chilly outdoors.

Even with all this automation, there is something very personal about one learned person gently educating another on how to view the night sky. AAI offers hands-on instruction, listening to judgment-free questions and allows guests to discuss the different choices of telescopes. The media and equipment changes, price tags and priorities fall and rise. Even in this day of ChatGBT and Ask AI companions, the need for smiles and Human instruction seem to be honorable.



INTRODUCING A SPECIAL GUEST WRITER: DAVID H. LEVY, WELL-KNOWN COMET HUNTER

By Mary Ducca

The Adirondacks Astronomy Retreat (AAR) is held each year in upstate New York. It is a week of star gazing and imaging for amateur astronomers to be able to see and image the night sky in a bortle 2-3 area. This yearly retreat was started in 2004 by David H. Levy and his wife Wendee. Some of you may know that David is a well-known comet hunter who along with Gene and Carolyn Shoemaker discovered the comet Shoemaker-Levy 9 which crashed into Jupiter in July, 1994.

AAR has been held every year since except during the pandemic. David attended this year's retreat and wrote an article to be included in his astronomy club's newsletter, TAAA Desert Skies Bulletin (TAAA - Tucson Amateur Astronomy Association). It is about his first few days at AAR. I asked David if we could include it in our Asterism newsletter and he happily agreed. Also included is a picture of David with his 8-inch Dobsonian telescope named "Tranquilitaris" after the Sea of Tranquility.

We are honored to have David's article to be included in our issue of the Asterism. Enjoy!



SKYWARD

By David H. Levy
August 2025

Dr. David H. Levy is a long-time member and former TAAA President. He is a well-known astronomy writer and discoverer of comets. He writes this monthly "Skyward" column for the Vail Voice and generously allows us to publish it here.

The 2025 version of the Adirondack Astronomy Retreat, now in progress, may (or may not) be our last one. It is a chance for star gazers to gather, enjoy the fabulous Adirondack sky, and rediscover why we fell in love with the sky in the first place.

We have already had two fabulous nights. Tuesday night, July 22, was a bit hazy but David Cotterell photographed some apparent haze in the north northeast that turned out to be a faint glow of the aurora borealis. Then visually, I detected a faint greenish glow for some time thereafter. This event reminded me of my first major auroral display. That one happened right here, at this same site, on 8 July 1966. That was the night that twilight never ended. The twilight glow moved over towards the north, evolved into a bright auroral glow, a rayed arc, and lasted all night with a flaming beautiful light. Tuesday's glow was weak, but I did see several rays pop out. I did 3.6 hours of comet hunting that night.

As wonderful as Tuesday night was, it is difficult to compare it to Monday night. That might be the best sky, or surely one of the best, that I have ever seen anywhere. Not only did Messier 31, the Andromeda Galaxy, appear visible to the unaided eye, but also Messier 33 in Triangulum, became easier and easier to see as it arose out of the small microclimate cloud that was hovering over nearby Lake Champlain to our east. Later, that cloud covered most of the sky. But when it dissipated later in

the night, the Triangulum galaxy was clearly a naked eye object. I completed 3.1 hours of comet searching that night.

I began my search for comets long ago on the night of 17 December 1965. That brief 10-minute search between Pollux and Castor in Gemini did not last long, but it was the start of a lifetime search that continues to this day. I no longer expect to find another new comet, but I enjoy the search itself as much as I ever did.

My comet search, that culminated in the discovery of Periodic Comet Shoemaker-Levy 9 by Gene and Carolyn Shoemaker and me, was clearly the highlight of my career. But it was only the second highlight of my life. Meeting and marrying Wendee was the first, and it will always be.

The week at our 2025 Adirondack Astronomy Retreat is one I shall never forget. The group of people here, including Mark Zdziarski, David Rossetter, Peter Jedicke, and the others, are by far the smartest bunch I have ever had the privilege of knowing. With the coming of darkness each night, I used Tranquilitatis, a lovely 20 cm reflector that Mark Zdziarski brought with him. Particularly on Monday night, I used it to spot a cacophony of galaxies in and near the Big Dipper, galaxies I cannot see from my Vail, Arizona home because of the glow from Tucson to my northwest. As attractive as all these galaxies are, their beauty pales before the truly exquisite appearance of Messier 51, the Whirlpool, and perhaps even more so with the miracle of Messier 81, that attractive spiral in Ursa Major, and its enigmatic neighbor Messier 82. With these three galaxies, and later the Moon and Venus gently rising over nearby Ferguson Mountain and Horseshoe Ledge, my night comes to an unforgettable conclusion.



David with his 8 inch Dobsonian telescope named “Tranquilitaris” after the Sea of Tranquility.

MY AAR ADVENTURE

By Mary Ducca

The Adirondack Astronomy Retreat, also known as AAR, is a yearly retreat held in upstate New York near the town of Lewis. It is a week-long event devoted to stargazing and imaging of the night sky. Most importantly, AAR is in a location measuring 2-3 on the Bortle Dark Sky Scale, which extends from 1 (darkest sky) to 9. The retreat was created years ago by comet hunter David H. Levy (Shoemaker-Levy 9, famous for having slammed into Jupiter in 1994). Dr. Levy's presence every year at the gathering always makes for a thrilling star party.

I first learned about this opportunity in 2022 when Mark Zdziarski, an NJAG and AAI member, gave a presentation at one of the Friday night lectures, also being held via Zoom. I thought about attending as I was beginning to learn how to image the Milky Way with just my camera and tripod. I mentioned it to a friend of mine and we both signed up to attend for the first half of the week. (You can attend just half of the week – the first half or the second half, or for the whole week.) I then attended the following two years for just half of the week. In each of those years there would only be one or two clear nights.

This year, however, I decided to go for all seven nights from July 20 to July 27. This was my fourth time attending this wonderful retreat, and what a retreat it was! And as you may know, a Bortle 2-3 sky means that light pollution is at a minimum, giving way to having numerous stars and the Milky Way itself visible to the naked eye. Also visible were satellites, the Chinese Space Station, occasionally meteors, and the ISS.

The site houses a building consisting of a meeting room, a very large kitchen and women's and men's dorm rooms. There are also cabins available if you want to stay in one of them.

This year around thirty people attended the first half. It was great to meet some that were attending for the first time. One couple was from Ohio and another guy was from North Carolina. The retreat was advertised on the Cloudy Nights site, which is where some of the new attendees found out about it. In addition to myself, other members of AAI who also attended were Donna Harris, Mary Lou West, Mark Zdziarski, John Sichel, Rob Rezvani, Steve Griesmer, and Paul Dahl.

Prior to the retreat, the organizers asked the participants if they would like to give a presentation on a topic of their choosing relating to astronomy, telescopes, or something similar. Over the course of the week there were four days planned when presentations were scheduled, held in the afternoons. There were many interesting topics and we were all able to learn something from them. I gave a presentation on my trip to Norway to photograph the Northern Lights. Mary Lou gave three very interesting presentations on Exoplanets, Auroras, and the Montclair State University Ophiuchus Astronomically Aligned Sculpture.

Our meals were catered each day except for the interim day, Wednesday, when we had pizza for dinner along with any leftovers. All the meals were well-liked and snacks were always available.

Those who brought their telescopes set them up in the wide-open field which has a great view of the sky. I set up my Canon EOS 77D DSLR camera and tripod to take images of the Milky Way. I also set up my recently purchased SeeStar to image distant objects.

The first night we had clear skies for several hours until some clouds rolled in. Then we called it a night. That evening I used the SeeStar and took some images before the clouds began to obscure the sky. Every night thereafter from Monday through Friday we had mostly clear skies! Many of the nights went into the early morning. That led to some sessions when some of the participants sat around talking together while their telescopes and cameras did their “thing” of imaging, as they were set up to be automated. What a fun time it was getting to know everyone. I was able to get several deep sky images from my SeeStar. What a great way for me to get those images! And after several attempts to focus on the Milky Way, I managed to get some clear images of it with my camera.

On Saturday during the day, the last full day at AAR, some participants set up their solar telescopes for observing the Sun. Some hikers in the area showed up and were treated to observing of the Sun. As the hours passed, the skies became overcast from the afternoon into the evening. Consequently, observing and imaging were not possible. That may have been for the best as it gave us the time to start packing up our equipment and letting us get to sleep at a more decent hour!

On that last night, Donna and I went to put our folding chairs in our cars. As we walked out of the building to go to our cars we heard very interesting howling sounds. We immediately went back inside and decided it would be best to wait until daylight. The sound was probably coyotes. I hadn’t planned on potentially imaging with any four-legged critters at AAR. It seemed they may have had other ideas. We, of course, had those ever-present snacks to get us through.

Given the initial weather predictions were not that favorable for many of the nights there, we were extremely fortunate to have six out of seven nights of mostly clear skies. And we found out that it was one of the best years for observing and imaging at AAR!

Included are 2 images taken with my SeeStar. Also included are pictures of AAI members who attended.

I would like to thank Patrice Scattolin, Mark Zdziarski, and Jeff Carlisle for organizing and running this retreat. It could not have taken place without their planning, organizing, and implementation. This was the most memorable one for me.

Now to tackle the post-processing of my images!

☆☆☆



LOST, OPERATION PLUMBBOB

By Lonny Buinis, AAI, UACNJ, IAAA © 2025

Astronomers have a weird sense of time. Space artist and astronomer Willam K. Hartmann once wrote:

“ . . . we need to think like geologists . . . 2000 MY is about halfway back in geologic time, 10 MY ago is ‘recent,’ and 1 MY ago is like yesterday—essentially the present.” ^[1]

It may come as a shock to younger readers that there are people alive today who remember the beginning of the space age as if it were yesterday. In 1957 on August 27, the Sputnik 1 satellite became the first object created by human beings to be shot into space.

Or was it?

Between May and October of 1957, researchers ran “[Operation Plumbbob](#)”, a series of 29 test explosions at the [Nevada Test Site](#) (NTS). This is a 3,500 km² (1,350 mi²) region of desert that includes the famous Area 51 https://en.wikipedia.org/wiki/File:Wfm_area51_map_en.png.



FEDERAL LANDS IN SOUTHERN NEVADA

Dr. Robert R. Brownlee, test director Robert Campbell, and their team were looking for ways to reduce the amount of radioactive fallout released by nuclear explosions. They dug wells 150 meters (490 feet) deep and put small nuclear devices at the bottom.

On July 26, 1957, they conducted test “Pascal-A” but ran into trouble setting it up. By 10 o’clock at night, it was time to quit and go offsite to bed, then come back in the morning. Somebody said, “Why don’t we just shoot it now, and then go in?” Cambell’s description is pretty funny; [you can read it here](#).

His best quote was:

“ . . . it was the world’s finest Roman candle. . . Blue fire shot hundreds of feet in the air.”

Did they learn from this to be more careful next time?

[Pascal-B](#) came a month later, on August 27. This time the well had a concrete plug supporting detectors just like the one for Pascal-A, but it was placed *not* far up from the bomb, but close to the bottom. Also, someone had the brilliant idea to cap the hole with a 900 kg (one ton) iron cap four inches thick and four feet wide welded to the top. Brownlee said it wouldn’t hold. He was right.

If there had been no concrete plug, by the time the explosion reached the top of such a deep hole, it would not have the power to do much of anything. But for Pascal-B, the concrete vaporized and created so much pressure that the iron cap blew off at tremendous speed.

The team set a high-speed movie camera pointed at the hole in the ground. In those days there were only film cameras, no digital. Still at 10 million frames per second, the team at NTS expected to see the iron cap flying away, something like my animation here vimeo.com/1076797027.



Pascal-B animation © 2025 Lonny Buinis

They didn’t.

The cameras caught the cap in only a single frame. From this, Brownlee and Carey Sublette (curator of [The Nuclear Weapon Archive](#)) calculated that the plate must have been blasted from the well between 56 and 66 kilometers per second. This is an astounding 5 to 6 times the velocity needed to completely escape Earth’s gravity! ^[2]

This has often been referred to as the “manhole cover in space”. There are YouTube videos about it [3]. This was the fastest object ever to blast off from the surface of Earth. Just as the Earth’s atmosphere causes meteors to slow when they fall to Earth, it would have easily prevented the iron cap from reaching space. In fact, a simple calculation [4] shows that the cap was probably completely vaporized, or . . .

. . . was it?

Someday, you may be visiting the Area 51 Alien Center near Amargosa Valley, Nevada with your metal detector. While you’re waving it around, would you perhaps stumble across a small, mysterious piece of iron with weld marks?

While you’re thinking about this, here’s an aerial shot of the wells for Pascal-A and Pascal-B (circled), still visible to this day.



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About Amateur Astronomers, Inc. and William Miller Sperry Observatory

Amateur Astronomers, Inc. (AAI) was organized on November 14, 1949 by a group of amateur astronomers from Central and Northern New Jersey. Since then it has grown into one of the largest amateur astronomy clubs in the United States. The club supports a wide range of free functions in service of Union College, AAI members, and the general public.

William Miller Sperry Observatory began with a \$150,000 endowment to Union College by Mrs. Frederick W. Beinecke and son, William. It was dedicated on May 21, 1967 in honor of her father, William Miller Sperry. The Observatory houses 2 telescopes, a 10-inch custom made refractor and a 24-inch Ritchey-Chretien reflector. AAI now makes its home at Sperry Observatory with close to 200 members.



Sperry Observatory

HISTORY OF ASTRONOMY IX: SEVENTEENTH CENTURY DISCOVERIES

By Alberto Guzman

Eighteen centuries passed between the heliocentrism of Aristarchus and that of Copernicus. Then within just fifty years, Galileo and Kepler brought mathematics to the studies of motion and the solar system. Here we look at some who advanced the mathematization of astronomy in the 1600s.

First view the political situation. Europe begins to look the way we think of it now. The national states have mostly formed, Spain the most powerful of them. Its New World empire covers half of South America, all of Central America, the North American expanse from Mexico into Oregon, and Florida. In 1585, Spain held much of Italy, along with Holland and the Philippines. Three years later, it sent an armada to conquer England. The failure of that venture was the dawn of England's dominion of the seas, and inspired the Dutch to break free. Both England and Netherlands then began making their own conquests in the Americas and Asia. France is already under a strong central government; the Bourbon line began 1589, and the three-quarter-century reign of Louis XIV is on the horizon.

More important, by 1600 Europe has become undisputed leader in scientific and mathematical inquiry. Galileo and Kepler were more than examples. They sparked a revolution in scientific thought. The revolution extended to the relation between math and science, as advances in each began to drive progress in the other.

Huygens

We start with Christiaan Huygens (1629-1695), one of the most important figures in the history of science. He was Dutch, but many of his accomplishments came during his years in Paris. [We usually say his name "HY-ggens," because English lacks the Dutch sounds of both "uy" and "g." The former sounds something like the vowel in "hErd." The "g" is slightly guttural. In writing, the usual way to suggest the sound is with the combination "khee." With those approximations, we would say "HE-khee-ens."] The best we can do is touch upon his innumerable discoveries.

In mathematics, he defined "curvature" (Check it out in the [details page](#).), did important "rectifications" (finding the lengths) of curves, and published the first book (*On Reasoning in Games of Chance*) on the newly-born field of probability.

In physics, his contributions include the wave theory of light, which allowed him to explain refraction. In 1659, he analyzed the motion of an object moving at constant speed around a circular path to find its *acceleration*: Despite the constant speed, the object is accelerating toward the center of the circle at a rate of (speed squared)/radius. (See evidence in the [details page](#).)

For astronomy, around 1655 he worked out improvements to the design of telescopes. Observing with thus improved instruments, he realized that the "companions" Galileo saw next to Saturn were actually a ring (yes: singular), discovered the big moon Titan, and (based on observations of surface features) made a remarkably close estimate of the rotation period of Mars.

Cassini

The Italian Giovanni Domenico Cassini (1625-1712) showed early promise in astronomy. In 1650 he was appointed professor in astronomy and mathematics at the University of Bologna. There he used a projection of the Sun's image to confirm the variability of Sun-Earth distance. Summoned to Rome, he established the rotation period of Jupiter in 1664 and confirmed that of Mars. Such achievement brought him to the attention of Louis XIV, who invited him to help create the Paris Observatory. He moved to Paris in 1669, the observatory opened in 1671, and he did his greatest work there. He became so thoroughly French that he adopted the Gallic name "Jean-Dominique."

One of his first projects in Paris was to measure France. Recall Galileo's idea to determine longitude via the moons of Jupiter: Given an ephemeris (table) of eclipses of the satellites indicating, say, that Io enters eclipse at midnight as seen from Paris; if you see Io entering eclipse at 10 pm your time, then you know you are 2/24 of the way around Earth west of Paris. The hole in the idea is: Two hours west of Paris is open Atlantic; you cannot observe through a telescope on a ship bobbing in the ocean. However, the idea is perfectly workable on land. Cassini dispatched observers to the edges of France and made the first accurate determination of the country's width. (It proved to be narrower than had been thought. Louis complained—in jest, fortunately—that he had lost more land to Cassini than he had to his wartime enemies.)

Turning to Saturn, he added four (mid-size) satellites to Titan. Those included Iapetus, whose odd brightness variation he correctly attributed to a forward-facing side darker than the trailer. Then he discovered that Huygens's "ring" was two, separated by the dark band we call the Cassini Division. It is fitting that the probe that gave us a world of data and images for Saturn was named in his honor.

Next, with Mars, he measured the solar system. Remember that Kepler's laws dictated the proportions of the solar system, the relative sizes of the orbits. Fixing one distance—Sun-Earth, say, or Earth-Mars—would imply all the others. For the close Martian opposition of 1672, Cassini sent Jean Richer to French Guiana to gauge the parallax of Mars relative to its position from Paris. That gave an estimate of our distance to Mars, and from that Cassini's remarkable estimate of our distance from the Sun: about 87 million miles.

He thought up another measuring project. It was known that the phenomena of Jupiter's satellites—eclipses, transits, and so on—become increasingly delayed as Earth in its orbit moves away from the giant (from opposition to conjunction) and increasingly advanced as Earth returns toward it. Cassini drew the right conclusion: The events don't get later or earlier; it is just that the light announcing them takes more or less time to get to us. The time variation could be used to measure the speed of light.

Eclipses of Io

For eclipses, Io is the most reliable of Jupiter's moons. It orbits just three Jovian diameters away, close to the plane of Jupiter's orbit, so that it enters the planet's shadow *every time around*. Compare that with our Moon: Orbiting as much as 30 Earths away, it completely misses the shadow about 10 orbits out of 12. (For that matter, consider Callisto: At a distance of 13 Jupiters, it alternates three-year periods when it always sees the Sun with like periods when it always enters the shadow.)

For a given eclipse, it is impossible for us to see both Io's entry into the shadow ("immersion") and its exit ("emersion"). Figure 1 shows the orbits of Earth and Jupiter (dashed circles) roughly to scale, and

the Sun and planets wildly out of scale. When Earth is at O (top of the orbit in the figure), Jupiter (at opposition) blocks our view of the (dark gray) shadow. When Earth is at C, we cannot even see Jupiter; it is in conjunction, lost to us in the solar glare (except maybe at an earthly solar eclipse). While Earth is in the right half of its orbit, we can observe Io's immersions, suggested by the green arrow, but not emersions. From the left half, it is the other way around. Either view is especially good from Q₁ and Q₂, where the Earth-Jupiter line (dotted green) is tangent to Earth's orbit. There - pretend that Earth's orbit is a circle - the Earth-Sun line (dashed red) is perpendicular to the Earth-Jupiter line. When Earth is there, Jupiter is at "quadrature."

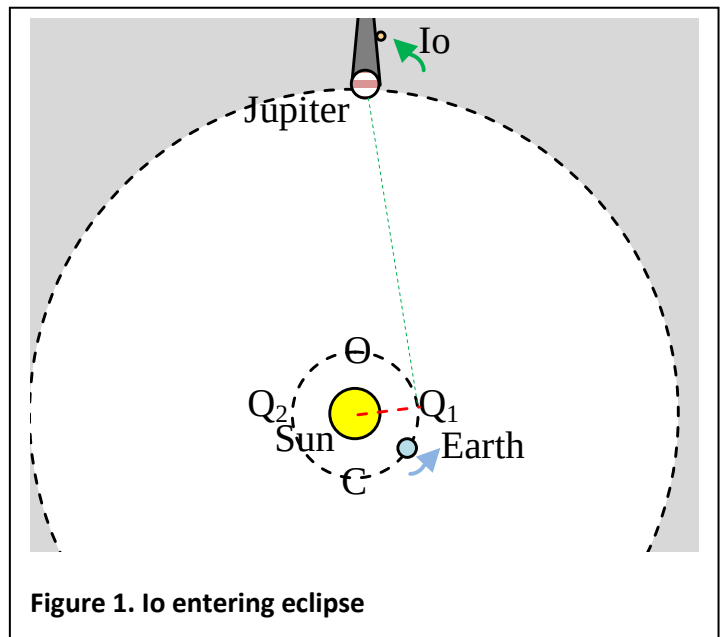


Figure 1. Io entering eclipse

Rømer

Ole Rømer (1644-1710; pronounced "Oleh REmer," the "E" having that "hErd" sound) was Danish. His early astronomy work was at Tycho's Uraniborg, under one of Cassini's longitude researchers, Jean Picard. His skill merited an invitation to Paris, where Cassini set him the task of using eclipses of Io figure out the speed of light.

Cassini may have suggested using the quadratures to compare the advancement (or delay) in Io's immersion (respectively, emersion) to the change in the calculated Earth-Jupiter distance; at the quadratures, Earth is moving directly toward or away from Jupiter. What Rømer actually did was to combine dozens of observations—especially back at Uraniborg, 1671-73—of the time changes and calculated distances. Cassini disapproved of Rømer's method and never did accept the result, even though it was he that announced to the *Académie des Sciences* Rømer's conclusion that light requires about 22 minutes to cross the orbit of Earth.

Put that in earthbound terms, as Huygens did. Earth's orbit is, by Cassini's estimate, 174M miles across. There are 1360 seconds in 22 minutes. Rømer's estimate was that light travels at $174,000,000 \text{ mi} / 1360 \text{ sec} \approx 128,000 \text{ mi/sec}$.

Even at only about 69% of the modern value, Rømer's discovery is a stunning accomplishment. It demonstrated conclusively that light does not travel instantaneously from place to place. Instead, light travels at a finite speed that is subject to determination by scientific means.

Incidentally, that was not his only achievement. He returned to the capital in 1781 as professor of astronomy at the University of Copenhagen. Over time, he made outstanding contributions to the city's development (including as police chief and mayor), invented a thermometer marking the freezing and boiling points of water (whose scale Daniel Fahrenheit later modified), devised a set of weights and measures for Denmark, and persuaded King Frederick IV to adopt the Gregorian calendar.

Next

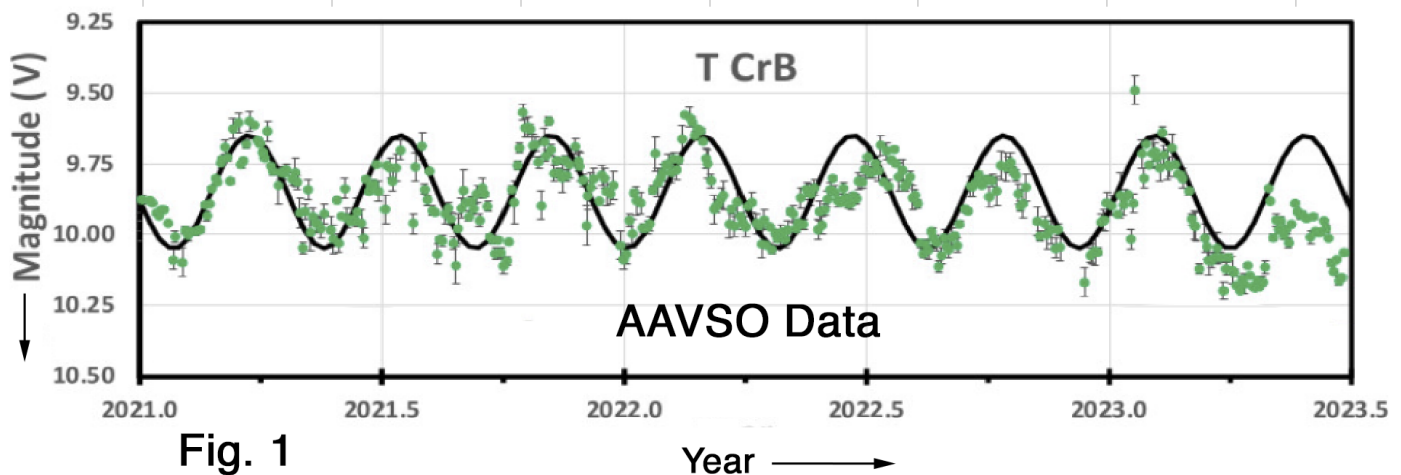
With Rømer's investigation, we reach four-fifths of the way through the seventeenth century. Next time, we move to England for the scientific supernova that came with its final phase. ☆ ☆ ☆

T CORONAE BOREALIS

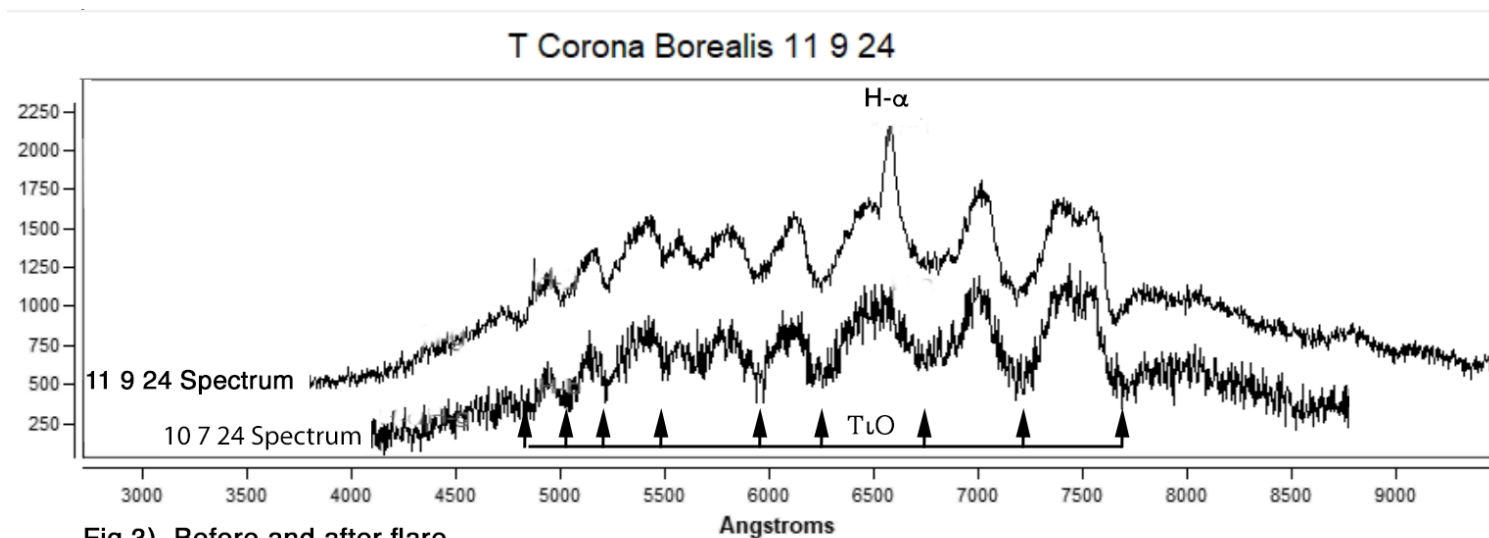
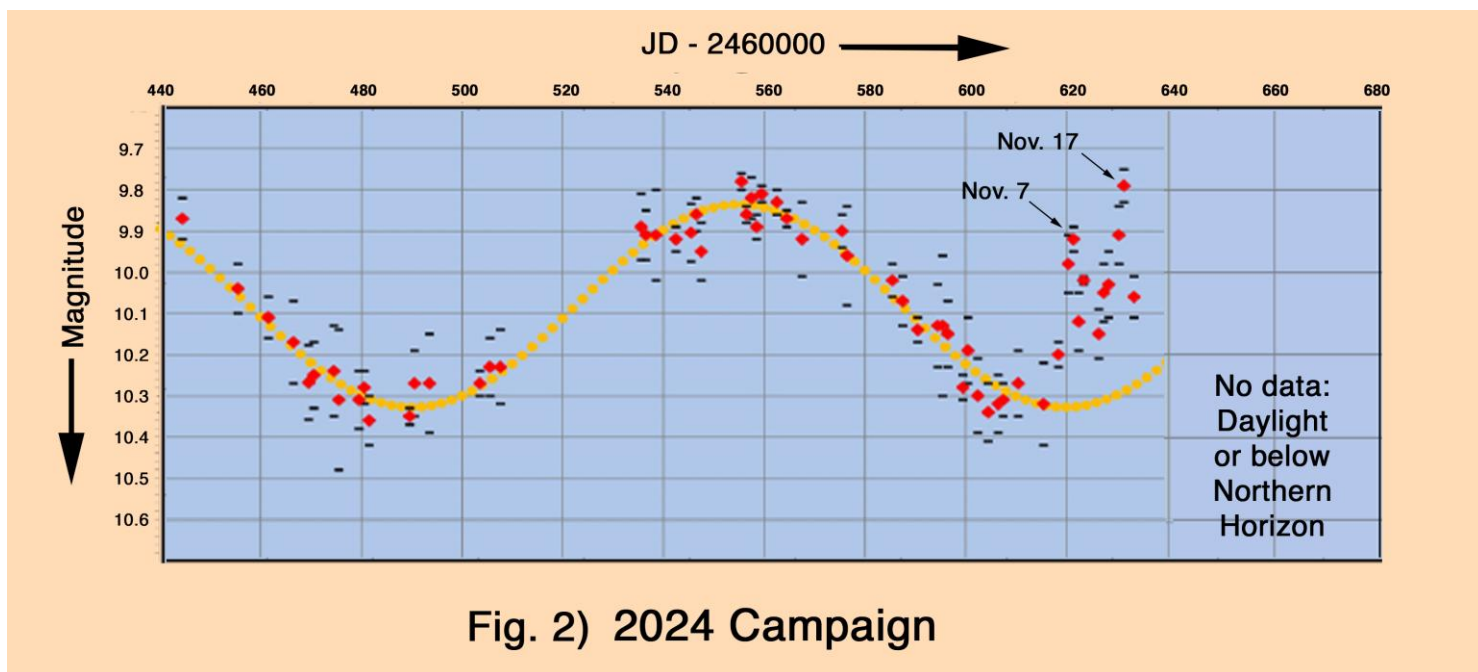
By Clif Ashcraft

T Coronae Borealis (T CrB) is one of the ten known recurrent novae in the Milky Way galaxy. These interesting objects are close binary stars where the more massive component has evolved through the main sequence and ended up as a white dwarf consisting of the star's heavy element core of mostly carbon, oxygen and neon. Meanwhile, the less massive component of the double has finally gotten to the red giant stage and is slowly losing its outer atmosphere. The intense gravitational field of the white dwarf captures this in an accretion disk which funnels it down to the surface of the dwarf where it is compressed into a thin, intensely hot layer. When this layer reaches a critical mass, it detonates in a thermonuclear explosion that creates the visible nova display. Both members of the binary star survive this event and they go back to the quiescent phase where the red giant continues to lose atmosphere and the white dwarf continues to collect it with its accretion disk. Depending upon a number of factors (how close the components are, how fast the red giant is losing its atmosphere), this process takes a certain amount of time to accumulate enough hydrogen to reach the critical mass to explode. In the case of T CrB, this process takes about 80 years.

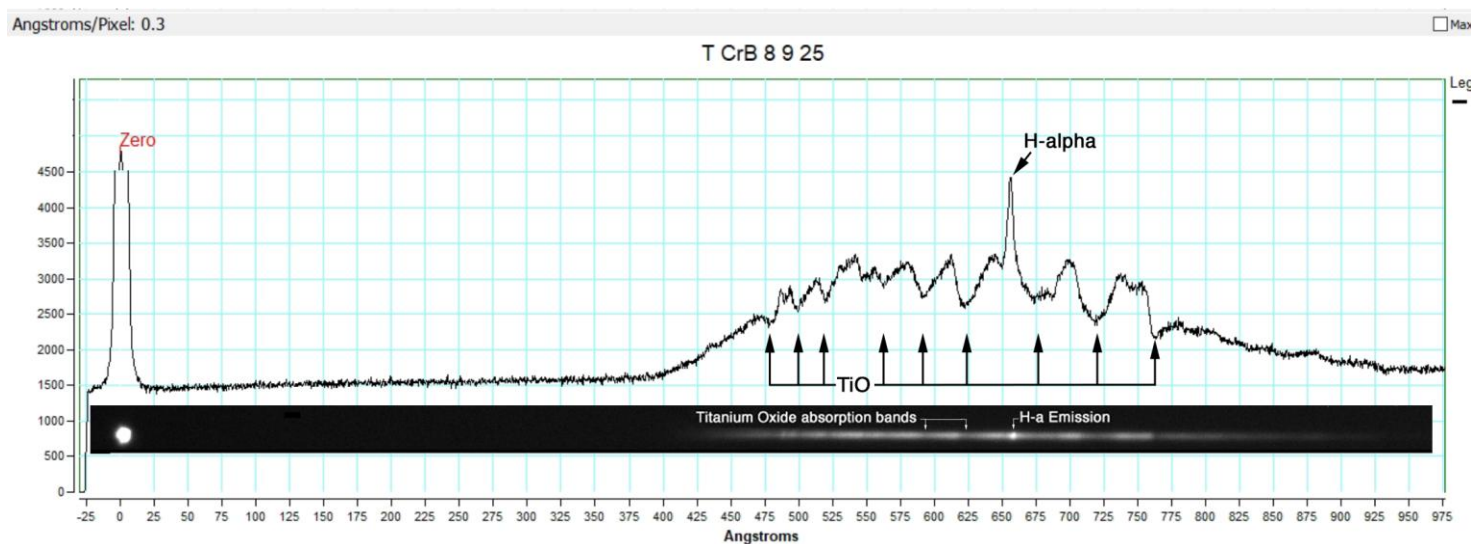
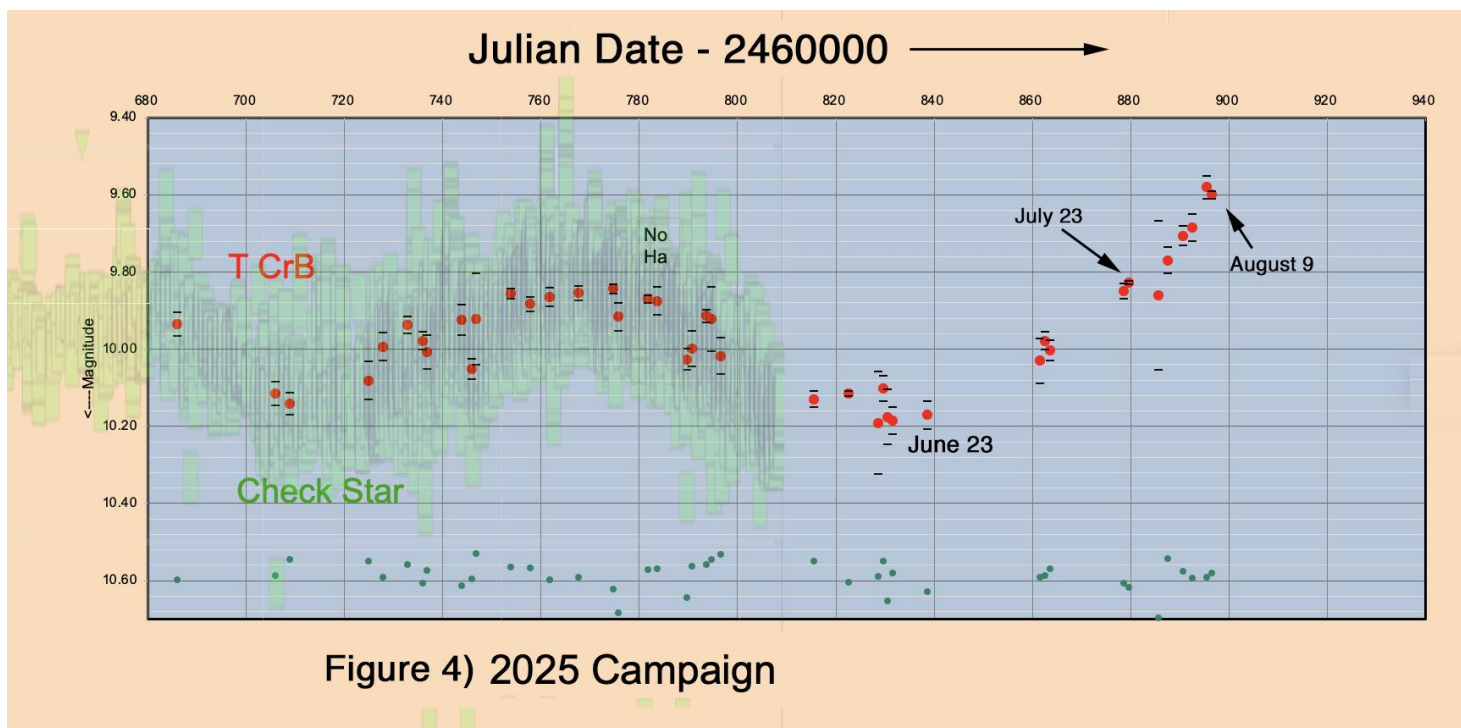
T CrB was first identified as a nova in 1866 by John Birmingham who called it the Blaze Star. It had been observed before, but just as an inconspicuous 10th magnitude star. It erupted again in 1946 giving us the period of 80 years. For this reason, we expect an eruption in 2026 +/- a few years. During 2021 to 2023 T CrB varied between magnitude 9.8 and 10.4 in a sinusoidal pattern with a period roughly matching half the rotation period of the binary, 114 days. See Figure 1.



I began my observing program in May of 2024, taking photometric observations using a 72 mm f/6 refractor and an ASI432MM camera fitted with a photometric V (green) filter and an ASI178MM camera fitted with a 100 line per mm transmission grating at the f/7 reduced focus of my C14. I took data up until the end of November when I lost Corona Borealis in the evening twilight. Figure 2 Shows my photometric data which was typical of the variation during the quiescent period except for some brief spikes in brightness on November 7 and November 17. Shortly after these spikes, H- α emission showed up in the slitless spectra where only Titanium Oxide molecular bands had been before, normal for a type M3 red giant. I interpreted this as ionization when a slug of the red giants atmosphere hit the accretion disk of the white dwarf. See figure 3.



I resumed observation in January of 2025. It had not blown up while I could not see it and I have been observing it every clear night that I get. A plot of all my 2025 results so far is shown in Figure 4. The light green foggy region shows AAVSO V filter observations. My observations are the red dots with error bars. Note the steady increase in brightness after June 11. By July 23 it reached magnitude 9.83, the brightest I had seen up to that point and continued up to my last measures of August 8 and 9 where it was brighter than 9.6. I got a slitless spectrum on August 9, and it showed H alpha emission. Looks like another mass ejection from the red giant hitting the accretion disk. See figure 5. The image of the slitless spectrum image is also shown in this figure. I use RSpec to process these images to get the scanned and calibrated spectra.



I will continue to observe T CrB hoping to catch the actual nova explosion. I am betting on either late this year or early next year.



AAI MEMBERSHIP RENEWAL INFORMATION



Dear Members,

This is a reminder of the many ways to renew your membership to AAI. After you receive a reminder that your dues are due, please send your check and the form attached to the reminder to Box 111, Garwood, NJ 07027-0111. You can also renew during the monthly meetings from September to May by giving the form and check directly to me. Or, you can renew online at our website, www.asterism.org, using your credit card number plus an added processing fee.

Your information, similar to the membership form, will be filled out on the website and forwarded to membership along with the payment. If you renew more than one month in advance, you will receive a bonus month added on to your membership renewal date. Also, please consider renewing for two or three years. There is a slight discount to your fee if you do that.

Thank you for renewing on time.

Irene Greenstein
Membership Chair
8.7.25

Interested in Serving on an AAI Committee?

AAI's Committees can be found on our website at www.asterism.org. The Club is organized into a number of interest and service committees, supporting all areas of astronomy and public relations. We are always looking for volunteers. On the Home Page click on About and scroll down to Committees. Click on Research Committee or Standing Committees or activity name to see a description of its functions and its chair or principal member. If you would like to help, contact the listed member. In most cases, you can simply click on his or her name to email them. This is a great way to meet members of AAI and make new friends!

Next GENERAL MEMBERSHIP MEETING: November 21, 2025

ROY SMITH THEATER – UCNJ CAMPUS 8:00 PM



NASA's Psyche Mission: Exploration of a Metal World

Dr. David Williams

Arizona State University

Arizona State University has led the team to develop and lead a Discovery-class robotic mission to Main Belt asteroid (16) Psyche, the largest M-type (metallic) asteroid in the Solar System. The Psyche spacecraft launched in 2023, and is currently in interplanetary cruise. Join Professor David Williams, the deputy Imager Lead on Psyche, for a discussion of the mission goals and operations as it explores one of the few remaining types of new worlds in our Solar System.



New Members

Amateur Astronomers, Inc. welcomes new members to our club since MAY 2025:

**Mitchell Rubenstein
Arnold Rubenstein
Claudia Rubenstein**

**Anton Aasme
Maria Reyes
Marcelo Reyes**

**Katherine Huang
Charles Liu
Fred Pignatlli
Joseph Croghan**

We hope you enjoy using Sperry Observatory and all the opportunities available to you as a member such as seminars, lectures, training, observing, and research. Our Qualified Observer course is a great place to start. Equivalent to a college-level introduction to Astronomy, it includes hands-on training on our 24-inch reflecting telescope. Check out our website to see all the opportunities.

Again, welcome to AAI! Irene Greenstein, Membership Chair

Amateur Astronomers, Inc. invites you to...

Experience Your Universe



Amateur Astronomers, Inc.
Proudly Presents

NASA's Psyche Mission: Exploring a Metal World

Dr. David Williams
Arizona State University

WHEN

November 21, 2025
9:00 pm

WHERE

Roy Smith Theater
Cranford Campus
UCNJ
1033 Springfield Ave.
Cranford, NJ 07016

COST

FREE admission
Plenty of free parking

MORE INFORMATION

www.asterism.org



Psyche, the largest metallic type asteroid in the Solar System, will be visited by a robotic mission developed by Arizona State University. This mission will explore one of the few remaining types of unexplored worlds in our Solar System.

Following the presentation, join us at the William Miller Sperry Observatory for refreshments and the chance to look through two of the largest amateur telescopes in the North East (weather permitting).

Sperry Observatory is open to the public every Friday evening, clear or cloudy, between 7:30 and 10:30 pm for an informal talk and observing. AAI has been bringing the night sky to the public for 75 years.

EMAIL CONTACTS

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Kathy Wydner Kawalec, Editor

Deadline for submissions to the newsletter is ~ two weeks prior to its next publication.

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technical@asterism.org

Technical Committee

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Sidewalk and Solar Astronomy

MEMBERSHIP DUES

Regular Membership:	\$25
Sustaining Membership:	\$40
Sponsoring Membership:	\$55
Family (12 Years Old and Up):	\$10
Youth (Under 12 Years of Age):	\$5

Sky & Telescope: \$32.95

(Subscription renewals to *Sky & Telescope* can be done directly by AAI members. See "Membership-Dues" on website for details.)

AAI Dues can be paid through the AAI website, in person to our Membership Chair, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111

DOMESTIC DUTY

October 17 - Team A

October 24 - Team B

October 31 - Team C

November 7 - Team D

November 14 - Team E

Presentations In Person at Sperry

Observatory and Online:

FRIDAYS@HOME

8:30-9:30 PM

October 24, 2025

The Legacy Survey of Space and Time Dr. Bill Griffeth

October 31, 2025

Why Night Creatures Make Good Astronomers

Bonnie Witzgall

November 7, 2025

What's Up: A Down to Earth Sky Guide Kathy Vaccari

November 14, 2025

Explorer of the Universe: The Life & Times of William Herschel Al Witzgall

November 28, 2025

Dark Objects for Black Friday

Melinda Callis

All schedules above were accurate at time of publication. Please check www.asterism.org for latest information

General Membership Meetings are held the **third Friday** of each month from September to May.

December 19, 2025:

Mysteries of our 7th Planet
Dr. Emma Friedman

Goddard Space Flight Center-NASA

PLEASE JOIN US!

RESERVATIONS TO ATTEND THE SATURDAY NIGHT PROGRAMS AT JENNY JUMP STATE PARK IN HOPE, NJ ARE RECOMMENDED

Go to UACNJ.ORG and click on "our reservation page"

Photo Gallery:

The Moon - with Eclipses & Occultations, Deep Sky, and Titan Transitting Saturn

Four Images by Stan Honda

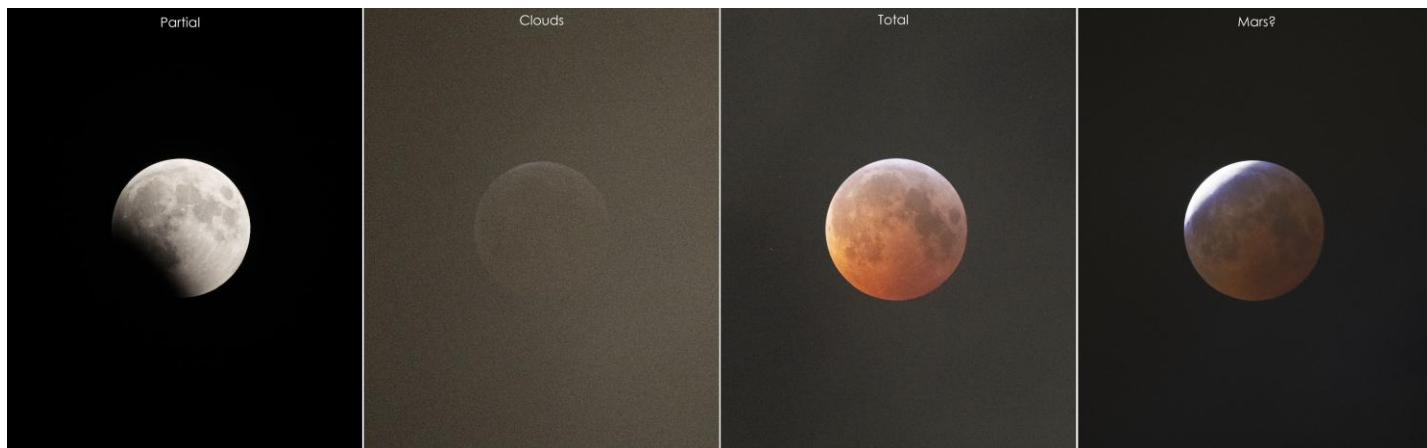
Moon-Pleiades

On April 1, the two were seen very close to each other, setting by two apartment buildings on the west side of Manhattan. Taken from the reservoir in Central Park at dawn.



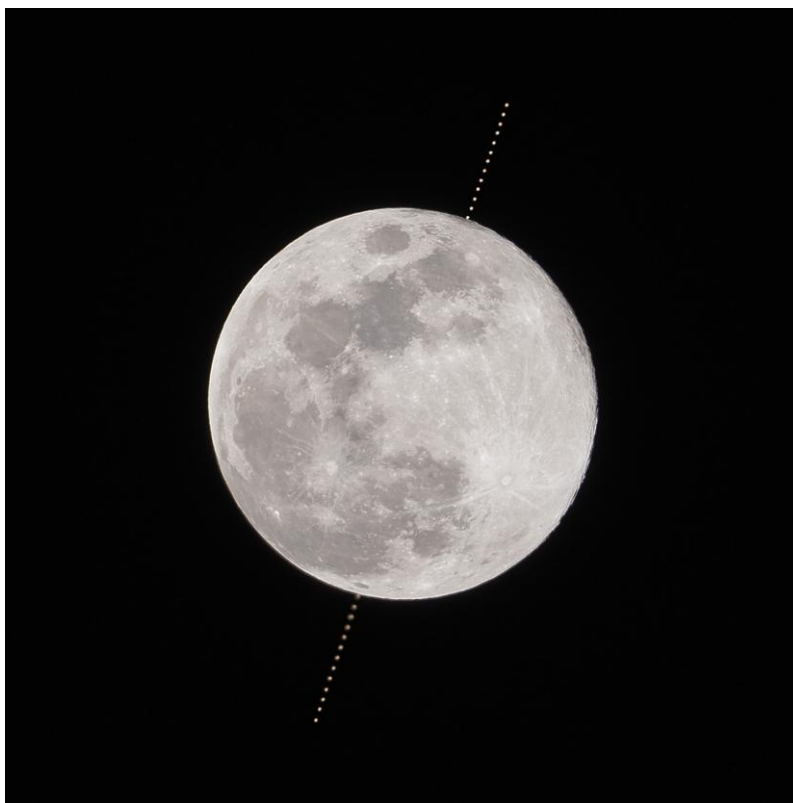
Lunar eclipse phases during the March 14 total lunar eclipse

Conditions were variable - Poughkeepsie, NY. Phases (L→ R): 1. Very clear and nice views of most of the first partial phase, until 2. A big bank of clouds covered mostly the south-south-west sky. 3. Occasionally, the totally eclipsed moon would peek through. 4. As the moon slipped out of Earth's shadow, it did a nice imitation of Mars with a polar ice cap.



Moon-Mars occultation

The Jan. 13, 2025 occultation of Mars by the full moon from Hoboken, NJ. This is a 26 frame composite as Mars "approaches" the moon from the bottom and exits from the top. There is a 1 minute interval between each Mars image.



Moon-planets

A crescent moon rises before dawn on April 25 with Mercury, Venus and Saturn. Taken in City of Rocks State Park, NM. Both unannotated and annotated versions are shown below.
(Mercury is very faint so finding it is a good eye test!)



Eight Images by Wayne Zuhl

Horsehead and Flame Nebula in Orion

12 hours, 24 minutes total exposure.

Shot through a TeleVue Pronto with a .8x reducer and Optolong L-Extreme filter.



The Monkey Head Nebula (NGC 2174) in Orion

15 hours total exposure.
TeleVue Pronto with a .8x reducer and Optolong L-Extreme filter.



The Tadpoles Nebula (IC 410) in Auriga

26 hours and 40 minutes exposure.
TeleVue Pronto with a .8x reducer and Optolong L-Extreme filter.



M52, the Bubble and the Brain Nebulae

18 hours total exposure.

TeleVue Pronto with a .8x reducer and Optolong L-Extreme filter.



The Soul Nebula IC 1848 and IC 1871 in Cassiopeia

25 hours total exposure.
TeleVue Pronto with a .8x reducer and Optolong L-Extreme filter.



**M13 the Great Cluster in Hercules
and the tiny galaxy IC 4617 (right edge above the middle)**

10 hours 18 minutes total exposure.
Shot through a C8 at f/6.3 with an Optolong L-Quad Enhance filter.



The Moon on June 3, 2025

Lucky Imaging with a Celestron 8 at f/6.3. Shot through a UV/IR cut filter.
This is an 8 panel mosaic.



NGC 6888, the Crescent Nebula in Cygnus.

It is shaped by the Wolf-Rayet star WR136, about 5000 light years from us.

25 hours and 10 minutes total exposure time over several nights in July & August.
Celestron C8 with a .63x reducer/flattener & an Optolong L-Extreme filter.

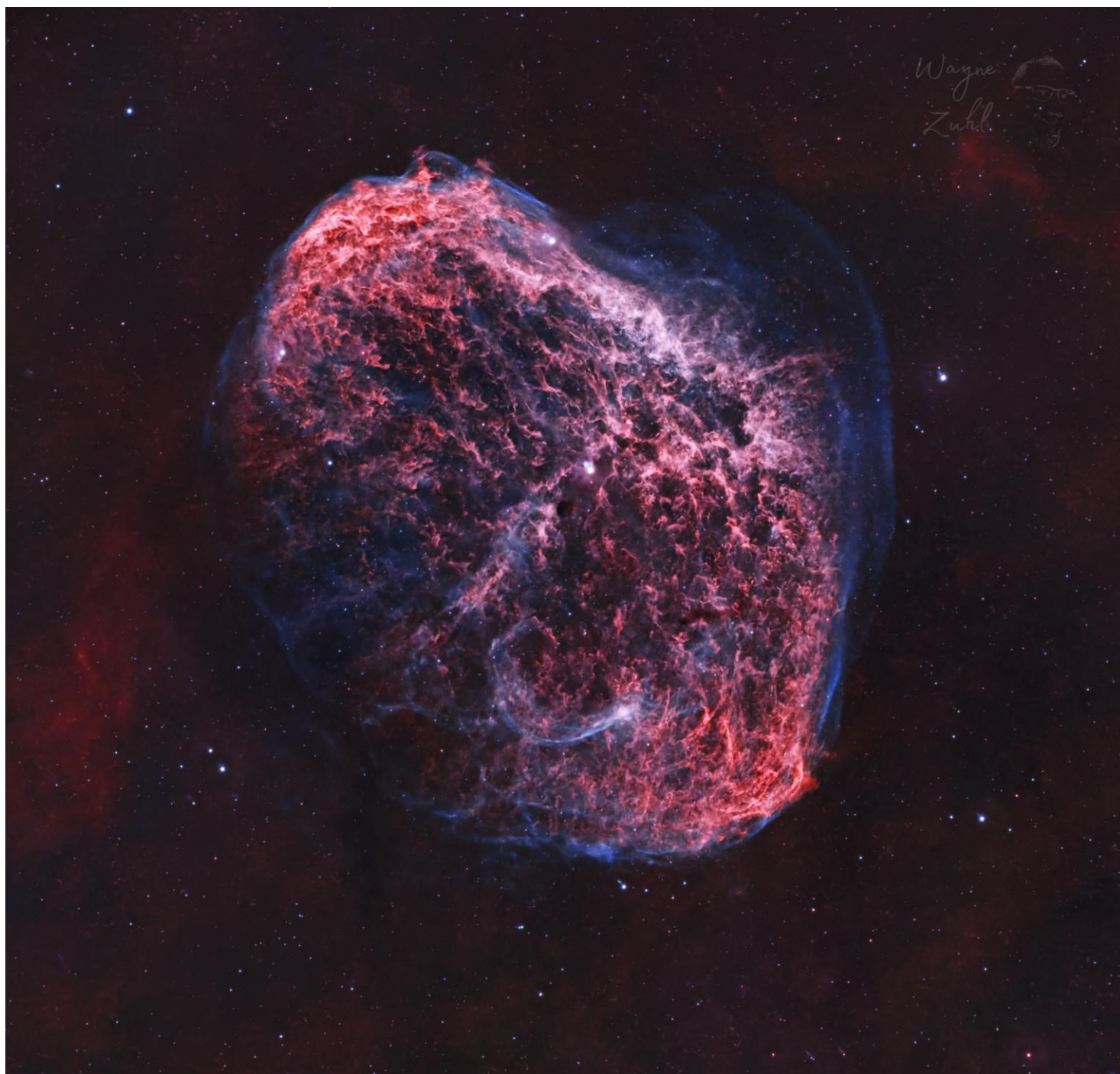


Image by Clif Ashcraft

Titan Shadow Transit

The transits of Titan's shadow on Saturn are rare events, occurring every 15 years when the alignments are right, near the time that Saturn's rings are edge on as seen from earth. I observed the most recent one in the wee hours of August 3 with my 7.25" Schupmann f/14 telescope coupled to my ASI183MC camera with a 1.5x Barlow lens. Saturn was 18.62 arc seconds in diameter at the time of the observation and magnitude 0.89. The picture below was prepared from a 60 second video of 600 frames using Autostakkert and Registax. 60 of the best frames were stacked and sharpened with wavelets. It is interesting that the disk of Titan was resolved. It was easy to see live in the raw video on my computer screen.



Titan Shadow Transit
August 3, 07:00 UT (3 AM EDT)
7.25" Schupmann
Clif Ashcraft, Perrineville, NJ, USA

