

No CVA monthly meetings in July and August

Riverpark public star parties are now on Friday nights!

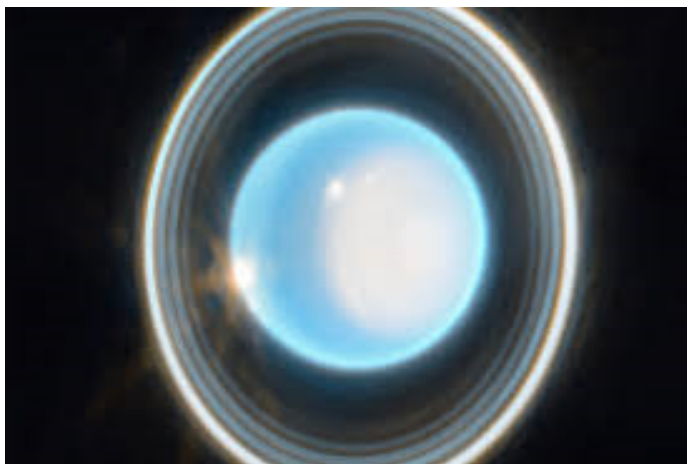


THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno

July-August 2023

Recent Images from the James Webb Space Telescope



Top-Uranus, and bottom, M74, the "Phantom Galaxy," both from the James Webb Space Telescope. They show the power and flexibility of this amazing astronomical instrument.

Images from NASA/ESA/CSA/JWST

Astronomy Quote of the Month-

"I don't think any of us changed all that much. More than anything else, being an astronaut allowed us to become more of what we really always wanted to be.."

-Alan Bean, commenting on how he and his fellow 1960s astronauts were affected by their iconic status. Bean himself became an artist after he left the space program.

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Central Valley Astronomers

Web address

www.cvafresno.org

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Larry Parmeter is the
editor of *The Observer*

He can be contacted at
559-288-3456 or at
lanpar362@gmail.com

CVA Monthly Meeting June 3, 2023

Central Valley Astronomers met for the monthly meeting at Fresno State on Saturday, June 3. Hubert Cocetti began the meeting at 7:05pm with 14 members and guests present. He also mentioned that the meeting was being livestreamed on Zoom, with one person watching (this will be done at every meeting from now on). Hubert also gave the main presentation, a follow-up on Fred Lusk's May presentation on Globular Clusters. Hubert talked about and showed images of many lesser-known and harder-to-see globulars in the Milky Way Galaxy, including several IC globular clusters, and the Terzan and Palomar globular cluster lists. Judging from the reactions and questions, much of this was new to those present, making it well worth the trip to Fresno State.

Afterwards, Daniel Hecker from the Sequoia Parks Conservancy spoke about the upcoming Sequoia Dark Sky Festival, which will take place on September 9. This, too, sparked a good deal of discussion and questions. Daniel noted, among other things, that over 800 people attended last year's festival starwatch, and expects just as big, if not bigger crowd this year. CVA's starwatching spot will be at Big Stump parking lot. For more questions, contact Steve Harness, who is coordinating the CVA contribution.

It was noted that there will be no monthly meetings in July or August, and that the annual board meeting will be on August 5, a Saturday. Also, CVA will be involved in several starwatches for private groups during the summer; all members are encouraged to participate, and dates and times will be posted on the CVA website.

The meeting adjourned at 8:35pm.

Number of exoplanets found as of June 2023-

Confirmed-5,438 Candidates-9,631

How many more are out there?

Tens of thousands? Hundreds of thousands?

Maybe millions?

(From NASA's Exoplanet Exploration Website)

Astronomy (Bad) Pun-

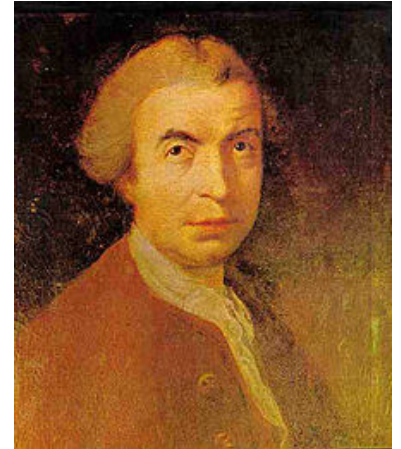
Why don't aliens visit our solar system? They read the reviews-
only one star!

From the cosmiccompanion.net

Profiles in Astronomy

Roger Joseph Boscovich(born Ruder Jozip Bosokovic) 1711-1787

Boscovich was born and raised in Duborvnik, today in Croatia, but then in the Republic of Ragusa, a part of the Ottoman Empire. He showed early intellectual abilities, and at age eight, was placed in the care of Jesuit priests, who first educated him at a local Jesuit school, then took him to Rome to the Jesuit Collegio Romano, where he excelled in mathematics and physics. Eventually he was ordained a Jesuit priest and became a professor of mathematics at the Collegio Romano. In 1764, he became the head of the mathematics division at the University of Pavia, and at the same time assumed the directorship at the Brera Observatory near Milan. In 1773, learning that Italy was going to expel the Jesuit order (by the mid-1700s, several European governments, concerned, with some justification, that the Jesuits were more interested in Earthly political power than spiritual salvation, banned them. The situation grew so serious that in late 1773, Pope Clement XIV officially abolished the Jesuit order, although it continued to operate in parts of Northern and Eastern Europe. It was quietly reestablished by Pope Pius VII in 1814), he moved to Paris and worked for the French military, developing optical devices. In 1783, with his health failing, he returned to Italy and spent his last years at Brera. He died in 1787 and is buried in a church in Milan.



Boscovich had interests in many areas of astronomy and physics. He wrote and published a number of treatises on various astronomical and mathematical subjects, studied the transits of Mercury and Venus, put forth a new theory of comets and their orbital trajectories, studied and wrote about the auroras, and tried to reconcile Newton's theory of gravity with Leibniz's metaphysical theory. He studied and wrote a new theory on unequal gravitation of the Earth, as well as the mathematics of the Earth's curvature. He wrote several papers on atomic theory, presaging the quantum era of the early 1900s. In mathematics, Boscovich made substantial contributions to cycloids, logistics curves and spherical trigonometry. In optics, he applied mathematics to the development of telescopes, and designed the first achromatic lenses, eliminating chromatic aberration in refractor telescopes.

Boscovich traveled widely in his capacities as both a Catholic priest and a scientist, and was honored by many organizations. In 1761, in St. Petersburg, he was elected a member of the prestigious Russian Academy of Sciences, and while in London in 1769, he became a member of England's Royal Society. The Croatian Institute of Natural Sciences is named after him, and the oldest astronomical association in the Balkans, headquartered in Belgrade, is named after him as well. Also, he was one of the founders of the Italian Academy of Sciences. A crater on the Moon bears his name.

CVA Summer Activities

Jul 8-Millerton Lake public star party

July 15-Eastman Lake monthly star party

July 21-Riverpark public star party

July 21- Madera Library star party at Madera Municipal golf course

August 5-CVA annual board meeting

August 5-Millerton Lake public star party

August 12-Eastman Lake star party

August 25-Riverpark public star party

September 9-Sequoia Dark Sky Festival at Big Stump

See the CVA website for more details and locations

Remember-no CVA monthly meetings in July and August-The next monthly meeting will be on September 30

What's New In Space

Space-X and Vast Team up to Put First Commercial Space Station in Orbit by 2025

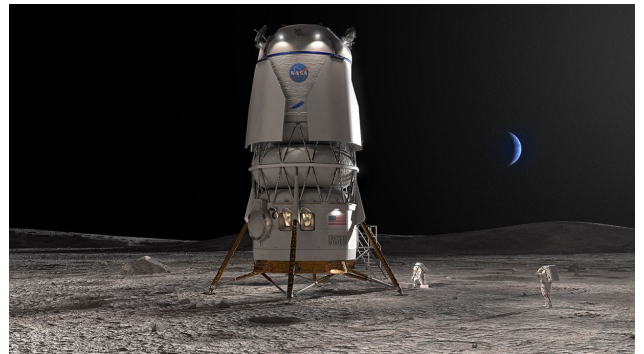
On Wednesday, May 9, Space-X and Vast, a start-up space technology company based in Long Beach, California, announced that they will jointly build a commercial space station that will be launched as early as August 2025, and will be occupied shortly afterwards. The space station, to be known as Haven-1, will be thirty feet long and about twelve feet in diameter, and will hold up to four people at a time. It will be launched atop a Falcon 9 heavy rocket. According to the two companies, the first crew of four will be launched aboard a Crew Dragon spacecraft only a week or so after Haven-1 goes into orbit and will spend at least thirty days aboard the space station before returning to Earth. Space-X will start taking applications from both companies and individuals for the first crews within the next few months. It is also in talks with NASA and the European Space Agency to send some of their astronauts to Haven-1 for varying periods of time.



Vast is a recent space company, founded in 2021 by Jed McCaleb, who made a fortune in cryptocurrency and is investing \$300 million of his own money into the space station project. In a released statement with Space-X, he envisions the Haven station growing to eventually be almost 300 feet long and capable of spinning to provide gravity, about 20% of that of Earth, which he feels may offset some of the weightlessness problems that many astronauts have had while living in space for long periods.

NASA Announces That the Third Moon Landing Mission Will Use Blue Origin Lander

On May 19, NASA announced that the third moon landing mission, known as Artemis V, will use Blue Origin's Blue Moon lander. Artemis V is now scheduled for 2028, after Artemis III, in 2025, and Artemis IV, in 2027, both of which will use a modified version of Space-X's Starship as the lunar lander. Artemis V is now scheduled to be launched in 2028, for a landing near the south pole of the moon. The NASA grant to develop the Blue Moon lander is said to be worth close to \$3 billion over the next several



years. According to Blue Origin, for the Artemis V mission, the lander will be launched first aboard its New Glenn heavy lift rocket, it will travel to and dock with the newly completed Gateway space station in lunar orbit, the Artemis crew will meet and enter it from there, take it to the lunar surface, then return to the Gateway before leaving for Earth. NASA also hinted that the fourth moon mission, Artemis VI, may also use the Blue Origin lander.

Blue Origin, founded and owned by Jeff Bezos, has been competing with Elon Musk's Space-X for NASA contracts for several years. When Space-X was awarded the initial moon lander contract in 2021, Blue Origin sued the space agency, claiming that it reneged on the original proposal to give two companies funding for moon landers; instead, NASA, saying it had only enough money for one, gave funding for the first lander to Space-X. A federal judge eventually ruled that NASA had the right to do that, but space experts say that the dispute set back the moon landing timeline by at least a year and possibly longer. NASA has since said that it wants to use landers from at least two and possibly three companies in the event of delays or accidents. Several other aerospace companies other than Space-X and Blue Origin have also submitted proposals to NASA for lunar landers.

Starliner's First Crewed Mission Again Delayed; Dreamchaser Aims for Year-end Flight

On June 1, NASA and Boeing announced that the first crewed mission, OFT-3, for the Starliner spacecraft has once again been delayed, for at least several months and possibly into 2024. OFT-3 was scheduled to be launched on July 21 with veteran astronauts Sunita Williams and Barry Witmore, for a two week mission to ISS, but NASA personnel have found problems with the landing parachutes as well as possible fire issues concerning some of the wiring. All of this will have to be fixed before the craft can be certified safe to launch with humans aboard. NASA is now looking towards a launch sometime in the late fall, but with ISS's tight schedule involving both crewed spacecraft and uncrewed cargo craft, OFT-3 may have to wait until early in 2024. This is only the latest in a string of problems involving Starliner. It was originally scheduled to make its first crewed flight in early 2020, but an aborted test flight in December 2019 necessitated over two years of modifications and checks. After several delays in 2021 and early 2022, it finally made a second uncrewed test flight in May 2022, which, although it had some issues, was considered a success. Since then, OFT-3, originally scheduled for fall 2022, has been delayed several times, due both to ISS's schedule and further problems that have popped up. NASA would like to see Starliner operational as soon as possible in order to have a backup in the event that Space-X's Crew Dragon runs into problems. Currently, Boeing has a contract for seven crewed missions for NASA.



In the meantime, Sierra System's (formerly Sierra-Nevada Space Systems) Dreamchaser mini-space shuttle, which lost out to Space-X and Boeing in the commercial crew spacecraft competition, passed a critical static test of its systems at its Denver facility in late May. Company representatives now say that the spacecraft is ready for its first uncrewed test flight; its main problem is that its booster rocket, United Launch Alliance's Vulcan Heavy, is a year behind schedule, and has yet to make its first test launch. Although Dreamchaser was not chosen to carry

NASA astronauts, its uncrewed version has a NASA contract to deliver cargo to ISS starting in 2025. Dreamchaser will also be the main craft to deliver crews and cargo to the Orbital Reef, a commercial space station that is being designed and built by Jeff Bezos's Blue Origin in partnership with several other companies. Orbital Reef is now scheduled to be operational by 2029.

Spaceflight Historical Short

With the International Space Station receiving much of human spaceflight attention in recent years, the American Skylab program of the 1970s has been all but forgotten. Of particular interest was the last Skylab mission, Skylab 4, which was launched on November 16, 1973. At the time, it was the longest spaceflight ever at 84 days, with the crew of Gerald Carr, William Pogue, and Edward Gibson returning to Earth on February 8, 1974. It was notable for the fact that the crew staged a "rebellion" of sorts: a number of extra experiments and projects were added to the flight manifest at the last minute, and the crew was working overtime to complete them. Finally, Carr, the commander, had a long terse talk with NASA mission managers, saying that he and his crew were exhausted from trying to keep up, and were going to take some time off, regardless of the flight schedule. NASA eventually agreed to ease up on the workload. As a result, mission doctors and psychologists realized that astronauts could only do so much while in space, lessons that are now used aboard ISS.



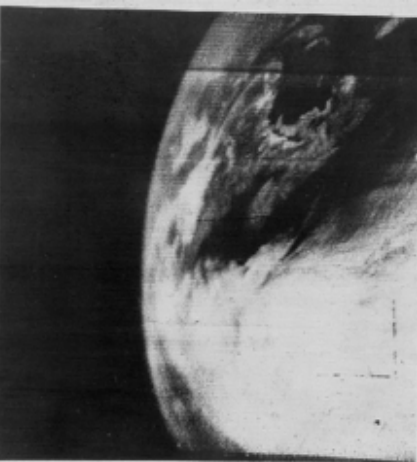
Space Age Archeology

Tiros-1

Tiros-1 was the first weather satellite, and the first satellite ever to be used for remote sensing of Earth. It was the progenitor of a whole family of weather and Earth observation satellites that are used to this day.

Tiros(for Televised Infrared Observation Satellite) was the brainchild of Henry Wexler, a meteorologist who headed the science research division of the U.S. Weather Bureau(today the National Weather Service) and was also the chief scientist for the American contribution to the International Geophysical Year in 1957-58.* In the mid-1950s, he foresaw the coming space age and felt that remote observation satellites could provide a whole new perspectives on Earth's weather and climate changes. Wexler's vision eventually caught on with NASA, and the newly formed space agency approved the funding for an experimental satellite to survey the Earth from orbit.

The satellite itself was designed and built by RCA; it was an 18-sided prism shaped object, 42" in diameter, 22" high, covered all around with solar panels and weighing 270 Earth pounds. It carried two television cameras, one wide field, the other telescopic. The interior held the two cameras, several batteries for backup, and a magnetic tape recorder to store images and replay them when the satellite came within range of Earth transmission stations. The first Tiros was launched on April 1, 1960 atop a Thor-Able(later known as the Delta) rocket. It went into an orbit 450 miles above the Earth, was slowly spun to maintain stability,



and spent the next two and a half months imaging our planet and sending back the results. Before it became disabled on June 15, 1960, Tiros-1 returned 19,000 useful images of the Earth, including cloud patterns and a tropical storm, the first viewed from orbit. From these, scientists could determine future storms, and in a few cases, tornados, as well as jet stream movements. Tiros-1 proved the usefulness and importance of remote sensing to predict weather patterns and changes on Earth. It is still in orbit today.

Tiros-1 was the first of ten Tiros satellites, all based on the original, which were launched between 1960 and 1967. Its name was eventually given to a whole family of weather/Earth observation satellites, starting with the Tiros-ESSA satellites(1967-1969), the Tiros-M satellites(1970-1976), the Tiros-N satellites(1978-1991), and the Advanced Tiros-N satellites(1993-2010).

Today, the GEOS(for Geostationary Environmental Orbiting Satellite) satellites, first launched in 2016 and operated by NOAA, the National Oceanographic and Atmospheric Administration, are this country's main weather eyes-in-the-sky, and they, too, are the descendants of the original Tiros-1 satellite.

*The International Geophysical Year, commonly known as the IGY, has been all but forgotten, but it played a key role in, among many other things, the development of the international space program. A future *Observer* article will discuss the IGY and how it still influences science and scientific exploration to this day.

Images-Top right-the original Tiros-1; bottom left-one of the first television images from Tiros-1, April 1960

Supernova in M101

By Dave Morrow

Last month on May 19th a new supernova was seen in M101, the Pinwheel Galaxy. It was discovered by an amateur astronomer in Japan. I was able to image the supernova a few days after the discovery. Named SN 2023ixf, it's one of the closest and brightest supernova we've seen in decades. 21 million ly years from my front yard means we're witnessing something that happened \approx 21 million years ago. This image is about 8 hours of imaging time over several nights from my front yard in Clovis. More time would have been better but the weather hasn't been kind for imaging lately.



Astronomy Short

In 1975, scientists digging in an area of the Lebombo Mountains in South Africa known as Border Cave, came across a broken-off portion of a Baboon femur. What is interesting about it is that it has 29 parallel lines etched into it. While still disputed, many archeologists believe that the Lebombo Bone may be the world's oldest lunar calendar, the lines corresponding to a complete cycle of the Moon (at the same time, some scientists speculate that it may have also been used by women to keep track of their menstrual cycles, which correspond to the moon cycles) It has been accurately dated to 42,000 BC. Some archeologists argue that there could be more lines on the still-missing broken part, but others note that other tally sticks, as they're called, and several have been found dating back to 70,000 BC, usually have only about 10 lines on them.



Five Good, but often Overlooked, Summer Objects

NGC 6229

M13 and M92 in Hercules are well-known globulars, in fact, M13 arguably being the best-known of all globulars, but there's another globular in the same constellation that garners little attention. It's NGC 6229. First seen by William Herschel in 1787, it's a magnitude 9.4 object that's about 100,000 light years from Earth. Some scientists who have studied it believe it is all that remains of what was once a small spherical galaxy.



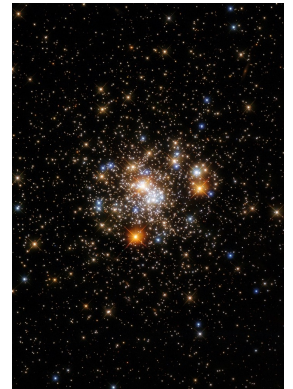
NGC 3610



Like so many other celestial objects, NGC 3610 was first seen by William Herschel in 1793. It is one of over thirty galaxies in the "cup" of the Big Dipper, and as such, is a member of the Ura Major group of galaxies. It is an E5 type elliptical galaxy with a magnitude of 11.4.

Palomar 9

Among the many globulars and other objects in Sagittarius, Palomar 9, also known as NGC 6717, is often passed by. It is a small globular cluster, again, first seen by William Herschel, in 1786. It has a magnitude of 9.3 and is about 25,000 light years from Earth. In the 1950s, it was included in the Palomar Sky Survey as the ninth of a series of small and faint globular clusters.



Collinder 399

Collinder (designated Cr on astronomical maps) 399, in Vulpecula, is one of almost 500 open clusters catalogued by Swedish astronomer Per Collinder in 1931. Not far from Alberio in Cygnus, it consists of about thirty stars, and has a magnitude of 3.6, making it very visible, even to the unaided eye. Because of its distinctive pattern, it is sometimes called the Coathanger Cluster, and is also known as Brocchi's Cluster.



NGC 6441

NGC 6441 is another one of the small and relatively unnoticed globular clusters in Sagittarius. It was first seen by the Scottish astronomer James Dunlap in 1826. It has an apparent magnitude of 9.6 and is about 43,000 light years from Earth.



Star Stories

Pherkad-

Pherkad is also known as Gamma Ursa Minoris, and forms one of the four stars in the cup of the Little Dipper. It is classified as an A2 white star, with an apparent magnitude of 3.05 and an absolute magnitude of -2.8. It is about fifteen times the size of our Sun, classifying it as an intermediate supergiant, and has a luminosity of over 1,000 times that of the Sun. According to the latest measurements, it is 487 light years from Earth and does not have any companion stars.



Pherkad is of interest to scientists because it is considered a “shell star;” it has a disc of gas surrounding its equatorial area. Astronomers believe that its extreme heat is giving off the gas, forming a ring around the star. Because of this, it has some qualities of a variable star, although it is not classified as such. It is also spinning very rapidly.

The name Pherkad comes from Arabic and is derived from the word *Farqad*, which means “calf.” It was originally named in conjunction with Kochab and was called “the dim one of the two calves.” In Chinese, Pherkad was known as the “Crown Prince,” and was part of a five star asterism referring to the stars of the North Pole.

Galaxy in the Eyepiece

NGC 4102

M109 is one of the last objects found by Charles Messier in his now famous catalogue. But not far from it is a much less well-known but still interesting and fairly easy to see galaxy with the designation of NGC 4102 (in fact, many scientists have wondered why, with it being so close to M109 and probably easily visible, Messier did not notice it and put it in his catalogue). This is large (about three times the size of the Milky Way) galaxy, an SABab type with a barred inner structure and moderately tight spiral arms. It was first observed by William Herschel in 1789 and was extensively studied by John Dreyer before becoming part of his NGC catalogue. It has an apparent magnitude of 11.2, and the latest distance measurements put it at 60 million light years from Earth. It is a member of the Ursa Major Group of galaxies.



4102 is considered an active galaxy with many starburst regions (areas of massive star formation) and a highly active nucleus emitting huge amounts of x-rays, leading scientists to believe that a massive black hole is at its center. It has many of the qualities of a Seyfert galaxy (has a highly active galactic core with a possible black hole that has quasar-like attributes; about ten percent of all known galaxies are classified as Seyfert galaxies). In the past one hundred years, one supernova has been observed and studied in it: SN 1975E.

Another in a continuing series on lesser known-but still important-observatories throughout the world

The Veen Observatory

The James Veen Observatory is located a few miles outside Lowell, Michigan, and is owned and operated by the Grand Rapids Amateur Astronomical Association. Named in honor of the first president of the GRAAA, it was built by a group of amateur astronomers in the late 1960s and officially opened in 1970. Today, it houses three telescopes: a 16" Meade Schmidt-Cassegrain, a 14" Celestron Schmidt-Cassegrain, and a 17" Dobsonian. The GRAAA has an active program of community outreach every month, as well as a large cement telescope pad next to the building with electrical outlets for members' telescopes. The facility itself has a large hall for regular meetings as well as talks by invited guest speakers, which are also open to the public. In addition to its astronomical activities, the GRAAA also owns several acres of woodland surrounding the facility and has built hiking and nature trails for use during daylight hours.



From the Observer Archives-

“Baseball provides escape. Furthermore, there is no other place in our society that I know of (not on Earth, in the air, in astronomy, in space nor even in today’s knowledge of Scientific “facts”) in which the perimeter of play and the rules are clearly defined and known to everyone—in which justice is absolutely equal and sure. Three strikes, you’re out. I don’t care if you hire Edward Bennet Williams or Perry Mason to defend you; three strikes, you’re still out. Baseball is an island of stability in an unstable world. ”



From the April 1988 Observer

CVA at Millerton Lake on June 17, 2023

