CVA's Fall Star-b-que at Eastman Lake on October 14!

THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno September-October 2023

The Annular Solar Eclipse on October 14

Get ready for the October 14, 2023, annular(sometimes called The Ring of Fire) eclipse! It's sneaking up on everyone and will be here before we know it. Below is a map of the eclipse's path, taken from the NASA website. Fresno will experience about 75% of totality. In the Fresno, the eclipse will have first contact at 8:06am; maximum coverage will come at 9:22am, and the eclipse will end(fourth contact) at 10:46am. And remember, it's just a warmup for the total solar eclipse on April 8, 2024!

Astronomy Quote of the Month-

"Astronomy Teaches us our insignificance in nature…"

-Ralph Waldo Emerson

In this Issue-

Central Valley Astronomers

Web address
www.cvafresno.org

Webmaster-Scott Davis

Officers and Board- 2023

President-Hubert Cecotti

1st Vice-President-Brian Bellis

2d Vice president-Scott Davis

Secretary/Treasurer-Steve Harness

Star Party Coordinator-Brian Bellis

Historian/Observer Editor-Larry Parmeter

Education Coordinator-Vacant

Director- Warren Maguire

Director-Fred Lusk

Director-Lynn Kleiwer

[redacted]

Larry Parmeter is the editor of *The Observer*

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

An event of special interest to CVA members:

Wednesday, October 18, 2023 10:30am at the Saroyan Theater

At the annual San Joaquin Town Hall lecture series

Dr. Amber Straughn of NASA will talk about the James Webb Space Telescope

Number of exoplanets found as of August 2023-

Confirmed-5,502 Possibles-9,820

Confirmed planetary systems-4,234

How many more are out there?

Tens of thousands? Hundreds of thousands?

Maybe millions?

(From NASA's Exoplanet Exploration Website)

CVA Annual Board Meeting

The CVA board of directors met at Fresno State on August 5, 2023. Present were Hubert Cocetti, Steve Harness, Brian Bellis, and Larry Parmeter. The meeting began at 2:30pm

Brian Bellis started out with a discussion of the club's 20" reflector telescope. He took it over from Ryan Ledak, and has been refurbishing it over the past few months. He proposed, and it was approved, that it be named "Big Lou," in honor of Louis Mendoza, who was a CVA officer and keeper of the telescope for over thirty years. Brian also needs a place to keep the telescope; he has nowhere at home for it. Hubert suggested that the planetarium at Fresno State might be a place to store it and will look into it.

The 2024 calendar was discussed. Hubert had already sent a rough draft to officers, and it was reviewed and approved with a few minor modifications (See the 2024 calendar elsewhere in this issue). The one major area had to do with the CVA monthly meetings. Earlier in the year, a proposal was made to move them from Saturdays to Friday nights, in order to improve attendance and leave weekends open for people. Although everyone at the meeting supported this, it was felt that it was too small a group to approve it. The possible switching will be brought up at a fall meeting when more people are present, and also an online polling app might be used to get member input on such a move.

Another proposal had to do with membership. CVA has many lapsed members who still might be interested in participating if they were given notice of club events on a regular basis. A suggestion was made to use CVA's online contact system, known as MMS, to keep them up to date, even though they're not officially in the club. At the same time, there was a discussion about whether or not yearly dues should be made voluntarily. No consensus was reached on this proposal.

Three other topics of more immediate interest were discussed. One is that on October 18, the San Joaquin Valley Town Hall lecture series will feature Amber Straughn, a scientist with NASA, who will talk about the James Webb Space Telescope. Steve Harness has been approached about holding a star party or some similar event for Amber while she's in Fresno. A possibility is that an evening reception be given for her at a local country club, and CVA will bring out its telescopes for the occasion.

Another has to do with the October 14 annular solar eclipse, which is the same day as the scheduled CVA fall Star-B-Que. It was eventually decided to keep the October 14 date for the Star-b-que, since only a few members will be gone. Also, Steve proposed that CVA have a public eclipse party at McDonald Park in Clovis. Since, in the Fresno area, the eclipse will be early in the morning, and a place is needed which will have clear views of the Sun when it's low in the eastern sky. For an event like this, Fresno State has too many trees blocking the view. More information will be forthcoming.

The Sequoia Dark Sky Festival was brought up; it will be held on Saturday, September 9, and CVA's contribution will be at the Big Stump parking lot. Since space is limited, members will need to sign up for a spot in the parking lot. There may be camping spaces available at Grant Grove for CVA members who don't want to drive back down to Fresno afterwards. Notices about sign-ups will come soon.

The Young Astronomers Program was the last major area of discussion. YA has been suspended since the pandemic began in 2020, but many would like to see it restarted. It's been noted that a number of young people who are interested in astronomy have been attending star parties lately, and some of them might want to participate in the program. CVA will immediately start advertising the YA program, handing out applications at Riverpark and elsewhere, and starting the next year-long "class" in January 2024. As such, requests will soon go out for CVA members to be YA mentors for students.

The meeting ended at 4pm.

Tentative 2024 CVA Calendar

Monthly star parties at Eastman Lake

January 13
February 10
March 9
April 6
May 4 Spring Star-B-Que
June 1 and 8
July 6
August 3 and 31
September 28 Fall Star-B-Que
October 26
November 2, 23, and 30
December 30

Riverpark Public Star Parties

March 15
April 12
May 17
June 14
July 12
August 9
September 13
October 11
November 8

CVA monthly meeting -East Engineering Bld, Fresno State, Rm 191
January 20
February 24
March 23
April 20
May 25
June 22
July-no meeting
August-no meeting
September 21
October 19
November 16
December 14

Courtright Star Party Weekend

June 7,8, 9

Millerton Lake Public Star Parties
June 29
July 27
August 24

CVA Events in September and October 2023

September 9-Star Party at Eastman Lake

September 9-Dark Sky Festival at Big Stump, Kings Canyon NP

September 16-Star Party at Eastman Lake

September 23-Riverpark Public Star Party

September 30-CVA monthly meeting at E. Engineering Bld 7pm. Brian Bellis will talk on "Going the Distance to Your Favorite Object"

October 14-Annular Solar Eclipse(see front cover)

October 14-Star party at Eastman Lake, Fall Star-b-que

October 20-Riverpark Public Star Party

October 28-CVA monthly meeting at E. Engineering Bld 7pm-speaker and topic TBA

Astronomy (bad) Joke-

As part of an experiment, a crab was brought up to the International Space Station to study the effects of long-term isolation. At first, the astronauts were surprised that the animal seemed to enjoy being alone. Then they realized it was a hermit crab.

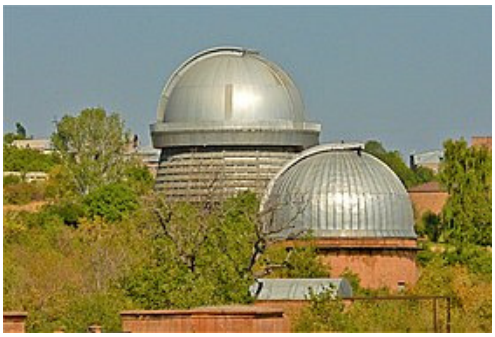
From the cosmiccompanion,.com

Profiles in Astronomy

Vitkor Amazaspovich Ambartsumian 1908-1996

Ambartsumain, one of the twentieth century's foremost scientists, was born and raised in what today is Tiblisi in Georgia, south of what was then Russia and later part of the Soviet Union, into a family of Armenian descent. He showed an early proficiency in mathematics and became interested in astronomy at age twelve. After attending local schools in his home city, he moved to St. Petersburg(which was renamed Leningrad after the 1917 Russian revolution) and eventually attended Leningrad State University, where among his classmates were Lev Landau and George Gamov. While an undergraduate at LSU, he also began doing research at the Pulkovo Observatory, and in 1931 graduated with a degree in astronomy. He later said that he liked mathematics, but considered it merely a hobby, and his real passion was astronomy.

In 1934, Ambartsumian became a professor at Leningrad State University, and shortly afterwards established the department of astrophysics at the university, the first in the Soviet Union. He also became the director of the LSU observatory. In 1941, in the wake of the Nazi invasion of the Soviet Union, he moved the astrophysics department to Tartarstan, in what is now Kazakhstan, and at the same time, moved his family to Yerevan, now the capital of Armenia, where many of his relatives lived, and where he would live off and on for the rest of his life. In 1945, he became a professor at Yerevan State University and established the astrophysics department there. He also took over the directorship of the Yerevan Observatory; at the time, it did not, he said, "rise much above the level of amateur variable star observing,"



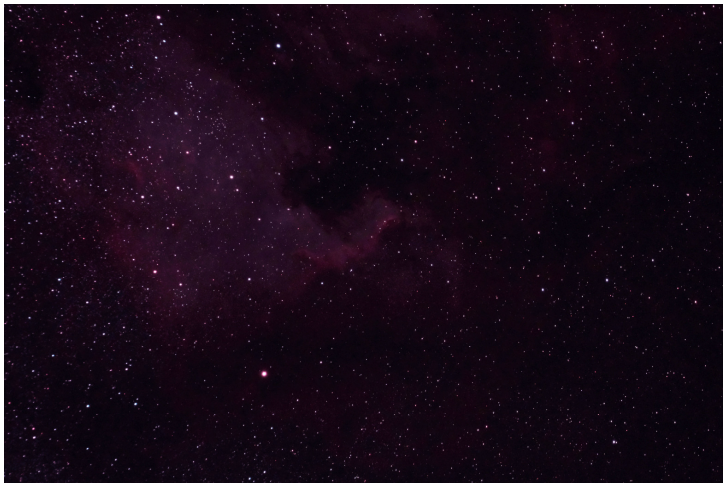
and eventually turned it into a world-class scientific facility. He would stay with Yerevan State and the Observatory until 1994, when he finally retired. He also founded the Byurakan Astrophysical Observatory, on Mt. Aragats near Yerevan, in 1946, and made it into a world-class observatory as well. Eventually, astronomers from all over the world traveled to Byurakan for research and meetings and put Armenia on the map as a major scientific site.

Besides his establishment of many different facilities and scientific programs(most of the Soviet Union's leading astrophysicists in the mid and late twentieth century did their doctoral studies under him), Ambartsumian advanced astronomical reach and discoveries in many ways. In the late 1940s, he proposed that stellar formation was still occurring in the Milky Way, and that it was happening in large clusters; this was a new concept at the time and was criticized at first, until the 1950s and 60s, when large telescopes found evidence of stellar birth and formation in our galaxy. Ambartsumian also proposed I the 1950s that galaxies have active, sometimes explosive, nuclei, and that galaxy formation is still going on in the universe. This, too, was met with doubt, until it was confirmed with observations in 1960s, especially involving Markarian galaxies and quasars. The first evidence of this was, in fact, found at the Byurakan Observatory. He was also the first to study what is known as radiation transfer in nebulas and between double and binary stars. Ambartsumian was also one of the first to advocate putting astronomical instruments in orbit, above Earth's atmosphere, in order to get a much clearer view of the universe. Under his direction, Gregor Gurdazyan, who was one of his foremost students and a pioneer in orbital astronomy, launched the first astronomical rockets in 1961, to study the Sun. In 1971, the Salyut 1 space station carried a telescope, Orion 1, also designed and built by Gurdazyan under Ambartsumain's direction, which was used by the Soyuz 11 cosmonauts as the first space observatory. Even though he said that mathematics was only a hobby, he also contributed to that field with several groundbreaking papers. (con't)

Ambartsumian rose to become a powerful figure in Soviet science. He eventually became a full member of the Russian Academy of Sciences(an extremely prestigious designation, given only to a few top scientists) and was one of the founding members of the Armenian Academy of Sciences as well. Those who knew him say he was a skilled political operator who knew how to maneuver through the Soviet system to gain support and funding for his and his colleagues' scientific projects. He was also president of the International Astronomical Union for several years during the 1960s and spoke at the United Nations several times to promote international scientific cooperation. Although the Soviet government restricted his travels on occasion, he had many friends and colleagues in the West, and collaborated with them frequently. He is remembered as one of the great scientists of the twentieth century, on a par with Einstein, Hubble, Heisenberg, and only a few others.

Three Good Astrophotos by Hubert Cocetti

The Lagoon Nebula, M8, in Sagittarius(with the Trifid Nebula, M20, above it)



NGC 7000, The North American Nebula in Cygnus

Caldwell 27(NGC 6888), the Crescent Nebula, in Cygnus

Images of CVA's Summer 2023 Activities

By Alan Englund

Space Age Archeology

The Ranger Program

The Ranger spacecraft are all but forgotten today, but at the time of their launchings, they were an important part of the quest to understand more about the Moon, and also paved the way for America's astronauts to land on it.

The Ranger program began in 1959 as an outgrowth of the International Geophysical Year(1957-58). The Moon up to that time was still poorly understood. Although basic facts about it were known: its size, distance from Earth, and so on, its age, composition, and evolution were still not known with certainty. Ranger was to be the first step in answering some of those questions. The Ranger program was approved by Congress in 1960, and NASA assigned it to the Jet Propulsion Laboratory in Pasadena, California. The program envisioned nine spacecraft in three phases or blocks, each being more advanced than the previous. The Rangers would be launched, put into a three day trajectory to the Moon, and then deliberately crash onto its surface, taking high-resolution images all the way to the point of impact. At first, the purpose was purely scientific: what was the surface of the moon like? By mid-1961, with President Kennedy's challenge to put Americans on the Moon by 1970, the Ranger Program gained a second objective: was the Moon's surface strong and solid enough to allow a spacecraft to land and remain on it? These were the questions that NASA wanted the Rangers to answer.

Each Ranger craft, designed and built by engineers at JPL, had a tower-like main instrument bus which would house the cameras and other equipment, and solar panel "wings" on either side to provide electricity. The early versions had only two cameras; the later more advanced ones held up to six cameras, as well as other scientific instruments. Eventually, the Ranger design and engineering were used for the Mariner 2 spacecraft that went to Venus.

The Ranger spacecraft had an inauspicious start, to say the least. Ranger 1 was launched on August 23, 1961. It never got out of Earth orbit, due to failures in the stability and electrical systems. Ranger 2, launched on November 18, 1961, also never left Earth orbit. Ranger 3, which, besides cameras, carried a radiation detector and a seismometer that was designed to survive the lunar impact, was launched on January 26, 1962. Due to a booster rocket error, it missed the Moon by 20,000 miles and is in solar orbit today. Ranger 4, launched on April 23, 1962, went completely dead a few hours before crashing into the moon; the seismometer probably landed safely, but beyond the area of communication contact. Ranger 5, launched on October 18, 1962, missed the Moon due to a navigation error.

With the failures of the first five missions, NASA and JPL were under pressure from Congress to produce a successful mission. Ranger 6, the first of the Block 3 Rangers, carried six advanced television cameras which would transmit in real time as the spacecraft descended to the Moon's surface. Ranger 6 was launched on January 30, 1964. The launch and flight were flawless, but the cameras went dead as the spacecraft approached the moon. After Ranger 6, Congress threatened to cancel the entire program and NASA told program leaders at JPL that heads would be on the chopping block if there were any more failures. With all that in mind, Ranger 7 was launched on July 28, 1964. It performed flawlessly, transmitting over 4,000 high quality images to Earth before it crashed into Mare Cognitum on July 31. Ranger 8 was launched on February 17, 1965, and impacted on the Sea of Tranquility on February 21. It, too, performed perfectly, transmitting over 5,000 images, the last one showing the moon only about fifty feet above its surface. With a renewed sense of confidence, Ranger 9 was launched on March 21, and impacted in Alphonsus Crater on March 24. It, as well, performed flawlessly, the cameras working all the way to the surface, and the seismometer sending back information for several days afterwards.

The Rangers gave scientists their first closeup images of the moon's surface and also gave the Apollo program managers an idea of how to design the lunar landers and the scientific equipment that the astronauts on the Moon would use. After a rocky start, the Rangers proved their worth, and paved the way for more advanced spacecraft to visit the Moon.

What's New in Space

The Mars Soil Sample Return Mission is in Trouble

In July, the Senate Appropriations Committee, after hearing testimony on the status of NASA and ESA's Mars Soil Sample Return mission, proposed to give the space agency only about one third of the funding that it says it needs to continue with the program. Even Senate supporters of the mission say that it is now projected cost far above its original estimates and its projected launch date will probably be delayed. Originally scheduled to cost $4 billion over ten years, the estimates now say that it may be double that, due to being far more complex than first imagined. Also, NASA says, that staff turnovers and delays at the Jet Propulsion Laboratory, where the mission is being put together, have slowed down the progress. NASA asked for $1 billion for the 2024 fiscal year for the mission, but the Senate committee is recommending only about $330 million. The scientific community considers the MSSRM a major priority, NASA wants to go ahead with it, and may have to cut back on or scrap other projects if Congress does not give it all the funding it says it needs.

The Mars Soil Sample Return Mission is a complex multi-spacecraft, multi-phase project that is currently scheduled to be launched in 2028. The first phase, in the form of the Perservance rover, is already underway, with the rover selecting soil samples, putting them in sealed cylinders the size of pencils, and leaving them on the Martian surface. In phase two, a smaller second rover will land on the surface, pick up the sample cylinders, and insert them into a third spacecraft, which will launched from the surface into Martian orbit. There, it will rendezvous with a fourth spacecraft, which will carry the cylinders back to Earth, arriving in 2033. The European Space Agency is currently designing and building the return craft. A specially designed and highly sealed laboratory, similar to the Lunar Receiving Laboratory which handled the Apollo moon rocks, will be built at the Johnson Space Center to study the Martian soil.

Adding pressure to NASA and ESA is that fact that the Chinese Space Agency has said that it will launch a soil return spacecraft to Mars in 2030. The Chinese have said very little about this mission, other than estimates that it will probably return to Earth around 2035.

Voyager, Phone Home

On July 21, an engineer at NASA's Jet Propulsion Laboratory in Pasadena accidently sent an erroneous command to the Voyager 2 spacecraft; it caused the spacecraft to tilt its antenna away from Earth, losing contact with NASA for almost two weeks. Then, on August 1, JPL picked up a signal from Voyager, leading to cheers after almost two weeks of worry and consternation that the venerable spacecraft, now in its forty-sixth year of operation, had been lost for good. After several days of coaxing the aging spacecraft, JPL scientists and engineers regained full contact with it and were able to tilt it back towards Earth, regaining full communication, and not having to wait until October, when the automatic system would retilt it.

The two Voyagers, both launched in 1977 to explore the outer planets, are now in interstellar space, having passed the Heliopause many years ago. Now called the VIM, for Voyager Interstellar Mission, Voyager 1 is almost eighteen billion miles from Earth, on a trajectory almost perpendicular to that of the plane of the solar system. Voyager 2, which took a different route to Jupiter, Saturn Uranus, and

Neptune, and is now twelve billion miles away. Because the radioactive power generators in both spacecraft are slowly fading, most of the scientific instruments aboard them have been shut down to save electricity; the only major instrument still active on both is the cosmic ray and particle counter, which is currently measuring the intensity of particles along its path, giving scientists an idea of what constitutes interstellar space. The magnetometer is also still working. One recent major finding, by Voyager 1 is that it detected a second and powerful plasma wave front far beyond the Heliospause, which scientists want to know more about. JPL currently estimates that the two Voyages will last about ten more years before their power supply becomes so diminished that they cannot send signals back to Earth anymore. Still, that's doing pretty good for two spacecraft with 1970s hardware and software that were expected to last only fifteen years.

In a Race to The Moon's South Pole, Luna fails but Chandrayaan Delivers

For a few days in August, the world focused its sights on the South Pole of the moon, where two spacecraft, Russia's Luna 25 and India's Chandrayaan-3, competed to become the first to make a soft landing. Luna-25, launched on August 14, arrived in lunar orbit on August 17, and settled in before making a landing attempt. But on August 19, the spacecraft started spinning out of control, possibly due to a malfunctioning thruster, and the next day crashed onto the moon's surface, ending Russia's attempt to beat the Indian spacecraft. In the meantime, the Chandrayaan-3 lander, which was launched on July 14, and took a round-about multiorbital lunar path to the moon, separated from its orbiter on August 21, and on August 23, successfully landed near an area where previous research shows that water, in the form of tiny beads, might be present. The landing was a major accomplishment for India's growing space program, and makes it the fourth nation, after The U.S., Russia, and China, to soft- land a spacecraft on Earth's natural satellite. The lander, known as Vikram, carries a small rover, called Pragyan, which will spend the next few weeks surveying the area and collecting soil samples for analysis.
Image on right-the Chandrayaan-3; lander on top, orbiter on bottom. The small rover(about the size of a briefcase) is inside the lander.

From *The Observer* Archives

"Consider the remarkable sequence of integers: 31, 331; 3,331; 33,331; 333,331; 3,333,331. Each of these is a prime number, that is, divisible only by itself and one. Is the sequence's next number: 33,333,331, a prime? The answer is yes. Sadly, the sequence falls apart with the next number, 333,333,331, which turns out to be a product of 17 and 19,607,843. A promising pattern is slain by a cruel counterexample."

From the May 1988 *Observer*

Does anyone know other number sequences like this that are primes? If so, send them to the editor at *The Observer* and they will be put in the next issue.

Star Stories

Ruchbah

Ruchbah is also known as Delta Cassiopoeiae. It was also at one time the name given to the star Alpha Sagittarii, but today refers only to the star in Cassiopoeia. It is one of the stars that make up the "W" in Cassiopoeia, is about 99 light years from Earth, has an apparent magnitude of 2.68, and an absolute magnitude of .28.

Ruchbah is widely believed to be an eclipsing binary with a rotational period of 759 days. The primary star, known as WDS J01258+6014Aa, is an A5 type star that has exhausted its hydrogen and is entering the supergiant phase. It is currently four times the size of our Sun and is thought to be about 600 million years old. The second star is given the designation of WDS J01258+6014Ab

Ruchbah comes from the Arabic and means "knee," a reference to the knees of Cassiopoeia, the Queen. In 2016, the International Astronomical Union's committee on nomenclature, as part of its reorganization of stellar names, officially named Delta Cassiopoeiae Ruchbah, and gave the similar name of Rukbat to Alpha Sagittarii. Delta Cassiopoeiae has gone by other names over the years, among them Ksora, Rucba, and Rucbar.

Galaxy in the Eyepiece

IC 342-The "Hidden Galaxy"

IC 342, also known as Caldwell 5, is a large spiral galaxy in Camelopardis. Scientists say that if it were not partially hidden behind dust clouds near the Milky Way's galactic center, it would probably be visible to the unaided eye. As such, it is sometimes called the "Hidden Galaxy." It is officially designated as an SAB galaxy with an apparent magnitude of 9.1 and a diameter of 75,000 light years. The latest measurements place it at about eleven million light years from Earth(although, because of the obscuring dust, accurate measurements are difficult, and other distance markers place it as close as seven million light years away). At one point, it was thought to be a member of the Local Group of galaxies, but scientists now believe that it is far outside that, in the Maffei Group. IC 342 was first seen by William Frederick Denning in 1892.

IC 342 is known to have a satellite galaxy, KKH 32, which is about 10.5 million light years from Earth and is 4,300 light years in diameter. KKH 32 has been identified as a dwarf spheroidal galaxy. Scientists believe that it may have another satellite dwarf galaxy nearby but have not been able find convincing evidence so far.

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

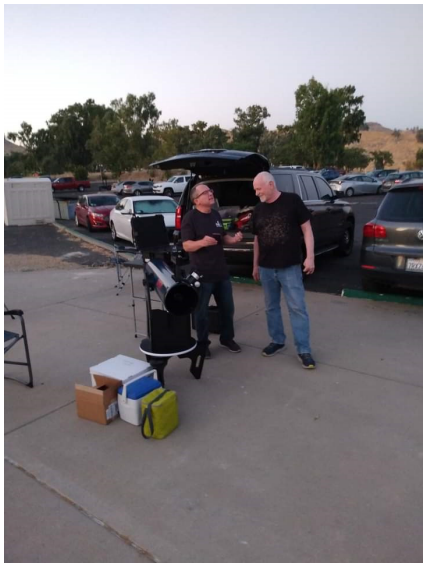
The Hoober Observatory

The Hoober Observatory is located in South Yorkshire, England, near the towns of Hoober and Wentworth, and is owned and operated by the Nextborough & Swinton Astronomical Society. It is also called the R.A. Jones Observatory, after one of the Society's founding members.

The Nextborough & Swinton Astronomical Society was founded in 1978 and was originally known as the Night Sky Astronomy Club. In the early 1990s, it decided to build a permanent facility to house its telescopes and chose a site just outside the town of Hoober; construction was started in 1991 and completed in 1993. In 1999, a larger dome was put on the building. In 2018, the club began a major expansion program at the facility, adding a meeting and lecture hall, bathrooms, accommodations for disabled people, and increasing outdoor observing space for its members and guests.

The original telescope at the observatory was an 18" Newtonian reflector known as the Rayna Telescope. It has since been replaced by a 5.1" Takahashi refractor. The other main telescope at the facility is a 14" Celestron Schmidt-Cassigrain reflector. The club also has several smaller telescopes at the site; one of them is a 60mm Coronado Solar-Max solar telescope.

Some More CVA Summer 2023 Images-Again, thanks to Alan Englund



Above and top center-"Big Lou," CVA's 20" Dobsonian reflector, named in honor of Louis Mendoza