Happy 2025!

THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno January-February 2025

Parker Solar Probe Rings Out the Year with a Daring Flyby of the Sun

The Parker Solar Probe, launched in 2018, made its closest approach to the Sun on December 24, 2024, flying to within 3.8 million miles of its "surface." On December 27, after almost three days of silence, it radioed back to Earth that it was safe and sound and ready to transmit findings from its close encounter. The flyby was a major triumph for NASA and the Jet Propulsion Laboratory, which designed and built the spacecraft. The craft, named after University of Chicago physicist Eugene Parker who first hypothesized the solar wind in the 1950s, was designed to withstand temperatures up to several thousand degrees Fahrenheit, in order to gather information on the still largely mysterious solar corona. After launch, it settled into an orbit that took it as far out as Venus, then back into the vicinity of the Sun. The Christmas Eve encounter was the closest that any spacecraft had come to the sun and survived. In addition, it was traveling the fastest, 430,000 miles per hour, of any spacecraft at any time when it flew by the Sun. The key to its survival was a special heat shield pointed towards the Sun while the rest of the spacecraft was heavily insulated. Project scientists were overjoyed by the successful maneuver and await the data which will be radioed back over the next few weeks.
Illustration by NASA

Astronomy Quote of the Month-

"In science, the credit goes to the man who convinces the world, not the man to whom the idea first occurs…"

-William Osler

In this Issue-

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 Events in January and February 2025

January 3-Monthly meeting at Round Table Pizza, Bullard and First in Fresno; begins at 7pm

February 1-Monthly starwatch at Eastman Lake; begins at dusk

February 7-Monthly meeting at Round Table Pizza; begins at 7pm

Number of exoplanets found as of December 2024-

Confirmed-5,811

How many more are out there?

Tens of Thousands? Hundreds of Thousands?

Astronomy (Bad) Joke

Why wasn't the disturbed spiral galaxy let into the nightclub?

He had previously been barred.

From Stargazerslounge.com

From the CVA Archives

"Enthusiasm is the electricity of life. How do you get it? You act enthusiastic until you make it a habit. Enthusiasm is natural: it is being alive, taking the initiative, seeing the importance of what you do, giving it dignity and making what you do important to yourself and others."

From the July 1987 *Observer*

The President's Report

To all CVA members:

2024 was another great year for astronomy and the CVA, with more amazing data and pictures from the James Webb Telescope but also with the solar eclipses and various comets, and even auroras, that were visible from Fresno. The club is doing well with about 50 active members and always interesting monthly presentations at the new meeting location at Round Table Pizza. More importantly, the club remains extremely active in outreach activities, going above and beyond, traveling to schools, and showing an exciting audience the wonder of the night sky. These family events are important for the local communities and participate in the informal learning of many kids. This team effort allows us to foster interest in amateur astronomy and STEM.

We will continue our outreach efforts in 2025 with monthly River Park events starting in March, three events during the summer at Millerton Lake, and finally, the Dark Sky Festival at Kings Canyon and Sequoia National Park. This year, we will start with the Quadrantid Meteor Shower (January 3). This meteor shower will peak on January 3, offering up to 120 meteors per hour under optimal conditions. We will observe a planetary alignment (February 28). It will be a rare alignment of all seven other planets—Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune- visible simultaneously in the night sky from Earth's perspective. In March, we hope to perform a Messier Marathon - depending on weather conditions, as usual - and we will observe Saturn's ring plane crossing (March). Saturn's rings will appear edge-on from Earth's viewpoint, causing them to seem invisible. This phenomenon occurs approximately every 13 to 16 years. Moreover, increased auroral activity will happen next July. With the solar maximum expected to peak in July, heightened solar activity may lead to more frequent and intense auroras, potentially visible at lower latitudes than usual.

I wish all the CVA members a Happy New Year 2025, a healthy year with clear skies, and many opportunities to meet at our favorite dark sites to enjoy the company of friendly faces we cannot see in the dark.

Clear skies-

Hubert Cecotti

To continue, a couple of the amazing pictures from the James Webb Space Telescope in 2024 that Hubert mentioned in his report-

The "Pillars of Creation," the Eagle Nebula in Aquila

M 57, the ring Nebula in Lyra

Profiles in Astronomy

Herbert Howe 1858-1926

Howe was born and raised in Brockport, New York, where his father was a college professor. He attended local schools and went to college at the University of Chicago, where he earned a bachelors degree in physics. He then moved to Cincinnati, where he worked at the Cincinnati Observatory and earned a masters degree at the University of Cincinnati. Suffering from lung problems, he moved to Denver, where the mountain air improved his condition. At first, he was a public-school teacher in Denver, then, after receiving a D.Sc. degree at the University of Denver, he stayed on and taught mathematics and astronomy, being the first astronomy professor at the school. He would be associated with the University of Denver for the rest of his life, eventually becoming dean of the school of arts and sciences, as well as interim chancellor.

Howe's interest was in lesser-known nebulae and double stars. When he began at the University, it had no observatory, so he raised funds for one, and in 1892, the Chamberlin Observatory was opened; Howe became its first director. Using the observatory's 20" Alvyn Clark refractor, he focused on mostly forgotten objects from the Herschel-New General Catalogue, which had been released only a few years earlier. He also discovered several asteroids and a comet. He was a gifted mathematician and calculated the orbits of several other comets in addition to the one he found, as well as a number of asteroids. He also worked on double stars. An asteroid is named in his honor.

Star Stories

Mintaka

Mintaka is the westernmost of the three stars in Orion's Belt. It is often overshadowed by the center star Alnilam, but has many interesting features in its own right, being a multiple star system among other things. The main star itself, Delta Orionis A, is actually a triplet system, with a 2.3 apparent magnitude O star with a faint class B star orbiting around it. A smaller star, another class B, orbits around the main pair. The other star, which itself revolves around the main triplet, is catalogued as HD36485, another class B star with an apparent magnitude of 6.9. It, in turn, has a tiny class A star orbiting around it. Nearby is a small cluster of stars that are associated with the Mintaka system. Because HD36485 passes in front of Delta Orionis A, the system is considered a spectroscopic binary. The most recent measurements show that the entire system is about 1,200 light years from Earth.

The name Mintaka comes from Arabic, and as one of the stars in the Belt, it, along with the other two, was given the name of al Nijad, "the belt." It was also known as al Mizan al Hakk, the "accurate balance beam." In Chinese, Mintaka was known as Shen Su San, the "third of the three belt stars."

Image-Orion's Belt. Mintaka is the star at upper right

The CVA 2025 Calendar

Monthly Starwatches

February 1-Eastman Lake
March 1-Eastman Lake
March 29-Eastman Lake
April 26-Eastman Lake
May 24-Big Stump
June 27-29-Courtright Reservoir
June 28-Big Stump
July 25-27-Courtright Reservoir
July 26-Big Stump
August 22-24-Courtright Reservoir
August 23-Big Stump
September 20-Big Stump
October 18-Eastman Lake
November 22-Eastman Lake
December 20-Eastman Lake

Public Outreach Starwatches

March 7-Riverpark
April 4-Riverpark
May 2-Riverpark
June 6-Riverpark
June 21-Millerton Lake
July 11-Riverpark
July 19-Millerton Lake
August 1-Riverpark
August 16-Millerton Lake
September 26-Riverpark
October 3-Riverpark

Monthly Meetings-Round Table at First and Bullard-
Start at 7pm

January 3
February 7
March 14
April 11
May 9
June 13
No meeting in July and August
September 12
October 10
November 14
December 12

Galaxy in the Eyepiece

M 109

For many years, this galaxy was not recognized as one of Messier's findings, nor did other astronomers include it in his famous catalogue until later in the 20th century. Until the 1920s, the Messier catalogue stopped at 103, and 104 through 110 were added by various astronomers over the next thirty years. This was because they were actually found by Pierre Mechian, Messier's assistant, and Messier himself did not include them as official objects, considering them secondary on his list. The most recent, M110, was not added until 1967. 109 was added in the 1950s.

M109 in is the constellation Ursa Major, not far from the star Phecda, which is part of the cup of the Big Dipper. It is classified as a SBc barred spiral, and sometimes called the Vacuum Cleaner Galaxy. It is approximately sixty-five million light years from Earth and has an apparent magnitude of 9.8. It is the most distant of all the Messier objects. It is also the brightest galaxy in the Ursa Major group of galaxies, which number over fifty. It is best known for having a bright type 1A supernova in 1956, and is also known to have at least three satellite galaxies.

Space Age Archeology

Echo

Echo was the first American communications satellite, two of which were ultimately launched. They consisted of giant mylar balloons which were inflated in space and radio transmission were bounced off them. Eventually, they were rendered obsolete by later satellites like Telstar and Relay, but they showed the feasibility of communications transmission from space.

The Echo program began in early 1958, and was initially sponsored by the Air Force, which was looking for a way to transmit communications signals quickly from one part of the world to another. Bell Laboratories proposed a giant ballon that would act as a passive satellite; signals could be bounced off it and captured by a receiving station. The Jet Propulsion Laboratory in Pasadena was also drawn into the proposal. In late 1958, NASA was formed and JPL became part of it. The project as well was taken over by the space agency, although Bell Labs remained the prime inspiration for it.

The Echo project had two distinct parts. The first was setting up the transmitters and receivers. The transmitter was at Goldstone Dry Lake on the eastern side of the Sierras in California; an 85′ radar dishing was used for west to east transmission. On the east coast, a 20′ horn antenna at Holmdel, New Jersey captured the signals(a few years later, the same horn antenna picked up the cosmic microwave background that proved the Big Bang). The second part was the "satellites" themselves. They were mylar balloons that were unfolded in space to a spherical 98′ diameter. They carried batteries to power telemetry beacons and several small solar cell panels to recharge the batteries. Fully inflated in orbit, the satellites weighted 140 Earth pounds,

The first Echo, launched on May 13, 1960, was a failure to a flaw in the second stage of the Thor-Delta rocket. The second launch came on August 12, 1960. The launch was successful, and it went into a 900 mile above the Earth orbit. Later that day, a radio signal was successfully sent form Goldstone to New Jersey as it flew over the U.S. Over the next several weeks, numerous test transmissions were achieved, and many on the ground saw it as it flew over the U.S. It lifetime was expected to be only a few weeks, but it stayed n orbit almost eight years.

Echo 2, as it was called, was launched on January 25, 1964, into a near perfect polar orbit. Since by this time, several active communications satellites were in orbit, its mission was less radio transmissions and more of testing large scale space structures. It also carried several scientific instruments and equipment for geo-sensing. Although its mission ended after a few weeks, it stayed in orbit until 1967, when it dipped into the atmosphere and burned up.

Astronomy Short

In January 1994, most of the Los Angeles area suffered a power blackout which in some areas lasted over eighteen hours, due to an earthquake which occurred just before dusk. That night, the 911-emergency services hotline received dozens of calls from people who reported a glowing cloud in the sky. It was the Milky Way, which very few of them had ever seen before.

What's New In Space

Trump to Nominate Issacman as NASA Head

On December 5, President-elect Donald Trump nominated financial entrepreneur and commercial astronaut Jerod Issacman to be the next chief administrator of NASA. Isaacman, the billionaire founder of 4Shift, an online payment processing company, has flown on two space missions, both of which he sponsored and paid for. In addition, he has always had an interest in flight, is a veteran fighter jet pilot, and currently heads an air defense consulting company, Draken International, which advises militaries on airborne defenses. At 41, Isaacman will be the youngest chief administrator in the agency's history. He will replace Bill Nelson, a former member of Congress, who, as the head of the House Space Committee in the 1980s, flew aboard a space shuttle flight in 1985. As chief administrator, one of Isaacman's main goals will be to rely less on expensive in-house space projects and more on private commercial rockets and spacecraft. Which leads to the next topic…

Trump will Probably Cancel the SLS

Sources say that Donald Trump will most likely cancel the SLS heavy lift rocket system, which has been plagued by huge cost overruns and endless delays. The SLS, which was initiated by President Obama in 2010 to replace the Constellation program, has cost $18 billion so far, over double its original cost, and is almost six years behind schedule. An Inspector-General's report on the program in 2023 concluded that each SLS launch will cost almost $5 billion, and as such is "unsustainable." SLS delays keep pushing back NASA's Artemis Moon landing program(see story below). NASA is more and more looking at private commercial heavy lift rockets, such as Space-X's Starship, Blue Origin's New Glenn, and ULA's Vulcan heavy, each of which costs up to ten times less than the SLS. However, the SLS cancellation will probably face opposition in Congress, as several states, especially Alabama, see the program as a major asset to their economies.

And on Top of that Story…

In early December, NASA announced that, due to problems and continued testing, the Artemis 2 mission, which had originally been scheduled for September 2024, will be delayed again, this time until at least April 2026. The main concern is that when Artemis 1 returned to Earth after a lunar orbiting mission in November 2022, charring to the heat shield was much more extensive than expected. The space agency has spent the last year and a half examining and testing the shield; in December, it announced that no modifications were needed on it; however, the Orion-MPCV capsule still needs to be completely checked, and the SLS booster still needs to be assembled and thoroughly checked as well. In the meantime, critics of the Orion-SLS program claim that NASA is trying to cover up serious problems with both the capsule and the rocket and are demanding several more uncrewed flights before humans are allowed to fly in it. All of this would mean more delays. The best estimate now for the Artemis 3 moon landing mission is mid-2027 at the earliest. What worries aerospace experts is that China has already announced that it will land men on the moon by 2030, and according to intelligence reports, that is a firm date.

Both Space-X and Blue Origin Gear Up for 2025

As this goes to press(metaphorically speaking), Jeff Bezos's space company Blue Origin is preparing to make the first launch of its heavy booster rocket, called New Glenn, which will take place as early as January 5. The long-awaited rocket, which has been delayed over two years, will be able to put almost 60,000 pounds into low Earth orbit. If the first flight is successful, future launches will provide an alternative to Space-X's Falcon Heavy rocket and ULA's Vulcan heavy lift rocket. Blue Origin hopes to capture a significant portion of the heavy lift market in commercial spaceflight over the next ten to twenty years.

In the meantime, Space-X is also preparing for the next launch of its Starship, which will probably come only a few days after the initial New Glenn launching. For this fight, it will attempt to land both the main and upper stages with the "chopsticks" capture method. In addition, with FAA approval, Space-X plans as many as twenty-five Starship launches in 2025, from two different sites: its Boca Chica launch complex on the Texas coast, and its newly built Cape Canaveral launch pad in Florida. Looking even further ahead, the company will make as many as one hundred Starship launchings in 2026 and even more in 2027. In 2027, it will also introduce its Starship 2, a much more powerful version which can put over 300,000 pounds into low Earth orbit.

For 2025-A New Eye on the Sky-The Vera Rubin Observatory

The new year will see the dedication of the latest giant telescope, the Vera Rubin Observatory, which is now being completed at Cerro Pachon in the Chilean Andes. Sponsored by the National Science Foundation and the Department of Energy, it will boast a 8.4 meter primary mirror and the world's largest and most powerful digital camera, which will spend the next ten years imaging the southern skies in unmatched detail. Named after the Carnegie Institute astronomer Vera Rubin, who did groundbreaking research in dark matter, the observatory is the latest in a series of major telescopes which will see first light over the next ten to twenty years. Their goals will all be basically the same: to understand dark matter and dark energy, explore the nature and possibility of life on exoplanets, and come closer to solving the mystery of how the universe began and came to be what it is today. It's another new era for astronomy and astrophysics.

Image by NSF/DOE/AURA

The Next Big Telescopes

As mentioned on the opposite page of this issue, The Vera Rubin Observatory is only the first of several new giant telescopes which will see first light in the next ten to twenty years. Several others are in either the planning or building stages. They all add up to huge and powerful eyes on the sky which will extend astronomy farther than ever. Here are just a few of them.

2027-The Nancy Grace Roman Telescope. Sponsored by NASA, it is named after Nancy Grace Roman, a NASA astronomer who was the leading force behind the Hubble Space Telescope. Like the James Webb Space Telescope, it will be put into an Earth-Sun L orbit beyond the orbit of the Moon. With a 2.4-meter primary mirror, it will study the universe in near-infrared.

2027-The Giant Magellan Telescope. Currently being built at Las Campanas in the Chilean Andes and sponsored by the Carnegie Foundation, it will eventually have seven 8-meter mirrors and will study dark matter, dark energy, and the origin of the universe. It will see first light with four mirrors in 2027; three others will be adder later.

2028-The ELT(Extremely Large Telescope)-Currently under construction at Cerro Aramzones in the Chilean Andes, it will have a 39-meter segmented mirror, and will be the largest telescope in the world when completed. It is being sponsored by a consortium of European science organizations.

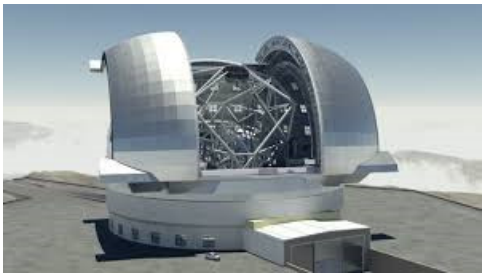
2030?-The Thirty Meter Telescope-It will have a 30 meter segmented mirror. Construction was begun on Mauna Kea in Hawaii in 2014, but has been halted since 2018 due to legal issues and opposition from native Hawaiian groups. Caltech, the main sponsor, is currently considering moving it to another site, possibly the Canary Islands.

2039-HWO(Habitable Worlds Observatory and sometimes called HAB-EX) Currently being planned by NASA and ESA, it is the successor to the James Webb Space Telescope. It will be put into an Earth-Sun L location and be able to detect the presence of biological activity in the atmospheres of exoplanets. Current plans show it to have a 6-meter primary mirror and look similar to the Hubble Space Telescope.

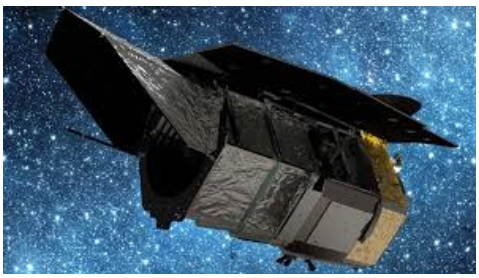
2045-2050-Colossus. The Colossus Telescope, which is in the planning stages, will consist of 58 8-meter mirrors, with an effective diameter of 74-meters. Its primary goal will be the direct observation of exoplanets, looking for evidence of life. It is being proposed by a consortium of science organizations under the umbrella group the Planets Foundation.

2050(?)-The Giant Lunar Telescope. Currently, NASA and ESA are planning a 100-meter telescope to be built on the far side of the moon. Some of the equipment, such as electronics, will be brought from Earth, but much of the structure, including the segmented mirrors, will be manufactured on the moon.

The Thirty-Meter Telescope



The Extremely Large Telescope



The Nancy Grace Roman Telescope

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

Chabot Space and Science Center

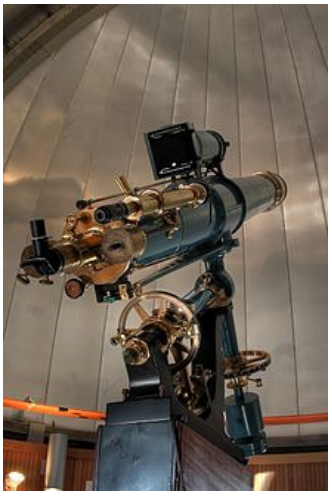
Although the Chabot Space and Science Center in Oakland is familiar to many in California, very few probably know its origins or how it got its name. It is actually over 140 years old, and has had an illustrious history as an astronomical observatory and science center.

Chabot was founded in 1883 through a bequest from Anthony Chabot, a Quebec-born businessman and engineer who made his fortune in water programs and hydraulics equipment, and was originally known as the Oakland Observatory. The original building was located in downtown Oakland and for many years had two functions: providing astronomical opportunities for the local people with an 8" Alvan Clark refractor, and, with a transit telescope, serving as the official timekeeper for the entire Bay Area. In 1915, due to increasing light pollution, the facility was moved to Mountain Boulevard in the Oakland Hills above the city. For many years the facility was managed and staffed mostly by members of the Oakland School District and was used primarily by school district students as part of the science curriculum. In the late 1960s, the facility was renamed the Chabot Observatory and Science Center. In 1977, most of it was closed and renovated to withstand possible future earthquakes. When it reopened, it was again renamed, this time the Chabot Space and Science Center. In 1992, in conjunction with a three-way partnership between the City of Oakland, the Oakland School District, and the Eastbay Astronomical Association, the Center became a non-profit organization. It immediately embarked on a fundraising drive to build an entirely new facility near the old one. This was completed and opened in 2000, with a planetarium, display rooms, classrooms, and a lecture hall.

Even though the Observatory part is no longer in the name, Chabot is still an astronomical observatory along with its other functions. It currently has three operational telescopes, which are used by the school district for science education, and also by the Eastbay astronomy group for public outreach. The largest is a 36" Cassegrain reflector called "Nellie," which is used for both public viewing and also by students and professors at UC Berkeley for research, mostly for finding and tracking near-Earth objects. A second telescope is "Rachel," a 20" refractor, which was built for the original facility in 1914, and is still used for public viewing. The third telescope is "Leah," the original 8" Alvan Clark refractor which was built and installed in 1885, and is also used for public viewing. The transit telescope is still at the Center but is no longer used and serves as a demonstration piece for students.

Left-the 20" refractor-"Rachel"

Right-the 8" Alvan Clark refractor-"Leah"



Content and images from Wikipedia