THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno November-December 2024

2024-A Remarkable Year for Those who Watch the Sky

2024 proved to be a skygazer's delight, with, among many other sights, three major celestial events in the United States. First off, the total solar eclipse of April 8, which was seen by millions in the south, Midwest, and parts of the East. Then, due to an active solar period, auroras seen as far south as Los Angeles(and by many in the Fresno area). And finally, Comet 2023/C A3 Tsuchinshan-ATLAS, commonly known as Comet A3, which put on a stupendous show in the October skies. Those, along with Saturn's edge-on rings, Space-X's amazing capture of it Starship booster, the launch of Europa Clipper, and many other events, combined for an outstanding twelve months in astronomy and the space sciences. They just don't make years like this anymore.

Images by NASA

Astronomy Quote of the Month-

Space isn't remote at all; it's only an hour away if your car could drive straight up-

Fred Hoyle

In this Issue-

Central Valley Astronomers

Web address www.cvafresno.org

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CVA Events in November and December

November 1-Monthly meeting at Round Table, First and Bullard. Garrett Weimer talks about binoculars and astronomy

November 2-Monthly starwatch at Eastman Lake

November 8-Public starwatch at Riverpark-last of the year

November 12-starwatch at Woodrow Wilson Middle School in Hanford

November 23-starwatch at Eastman Lake

November 30-starwatch at Eastman Lake

December 6-Monthly meeting at Round Table. Robert West talks about the Cassini mission to Saturn

December 30-Monthly starwatch at Eastman Lake

Number of exoplanets found as of October 2024-

Confirmed-5,785

How many more are out there?

Tens of Thousands? Hundreds of Thousands?

Millions?

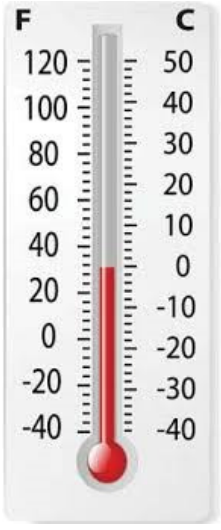
(From NASA's Exoplanet Exploration Website)

Astronomy (Bad) Joke

Swedish astronomer Andres Celsius died in 1744 at the age of 43.

Though his rival, Gabriel Fahrenheit, was convinced he was 108.

From cloudynights.com



The President's Message

By Hubert Cecotti

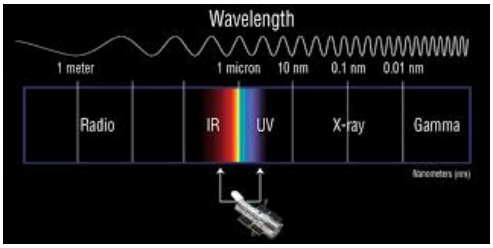
The members of the Central Valley Astronomers continue their mission of outreach, faithful to the monthly event at River Park to show the Moon and going above and beyond at different schools and local parks to show the night sky to the local population of the Central Valley of California. We can be thankful for the absence of substantial fires in the areas around Fresno that could have spoiled the seasons with poor views of the night sky.

Fall can be a calm season for observing the night sky, the weather is not as ideal as summer, and the targets can be limited. During fall, the night sky showcases a rich array of deep-sky objects perfect for exploration. Among them, the Andromeda Galaxy (M31) is one of the most stunning autumn sights. Easily visible even with the naked eye under dark skies, this spiral galaxy lies about 2.5 million light-years away and is our Milky Way's closest galactic neighbor. Andromeda reveals its sprawling arms and bright core through a telescope, offering a glimpse into a world of billions of stars. Close by in the constellation of Andromeda, the Triangulum Galaxy (M33) is another treat. Known for its delicate, pinwheel-like structure, this spiral galaxy is best seen in dark, clear skies, as its relatively low surface brightness can make it a challenging but rewarding sight. In the constellation of Pegasus, the Great Pegasus Cluster (M15) is a dense, spherical collection of stars, one of the oldest and most densely packed globular clusters in the Milky Way. Through binoculars, M15 appears as a soft, luminous glow, while a telescope reveals its densely packed core with a sprinkle of stars in its outer edges. For something truly unique, the Helix Nebula (NGC 7293) in Aquarius offers a striking view of a dying star's last stages. Often called the "Eye of God" due to its circular, eye-like structure, the Helix is one of the closest planetary nebulae to Earth and appears as a faint, ghostly ring through a telescope. This planetary nebula requires an Oiii or UHC filter to see the object better.

Observations online suggest that using a UHC filter shows a noticeable increase in contrast, showing a clear fat, slightly diffuse ring with a glowing center and hints of structure. With an Oiii filter, there is more contrast than the UHC, with hints of helical nature and indications of outer filamentary nebulosity. It is, however, noticeably dimmer than in UHC, but it stands out a bit better than in the UHC, especially at lower powers. Rounding out the fall sky are the galaxies of the Sculptor Group, especially NGC 253 (the Sculptor Galaxy), a bright spiral galaxy easily seen in the southern skies. Each object brings a unique beauty to the autumn sky, making fall a season of spectacular sights for stargazers.

This year's last River Park event will be on Friday, November 8, 2024. I hope to see many CVA members at this event. We will have two meetings before the end of the year. On Friday, November 1st, 2024, Garrett Wimer will give a presentation about binoculars for astronomy. Finally, our last meeting will welcome Robert West, who will present "Selected Highlights from the Cassini/Huygens Missions to the Saturn System".

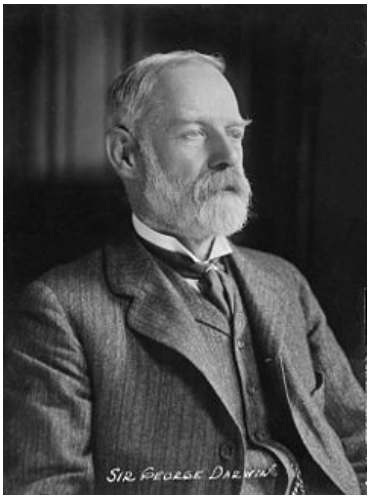
Astronomy Short-



Everyone knows that William Herschel discovered Uranus in 1781. What is much less known about him is that he also discovered infrared radiation, among many other things. He was experimenting with a prism one day around 1805, measuring the temperature of each color on the visible spectrum, when he moved it beyond the red part, and suddenly realized that the temperature increased even though there was no color there. He concluded that there was another source of radiation beyond the visible spectrum, one that could be detected by heat, not visible color. This was eventually shown to be infrared heat.

Profiles in Astronomy

George Darwin 1845-1912



When you're the child of famous parents, it's hard to establish your own identity. When your father is *very* famous, and, to some, infamous, it's even harder. Nevertheless, George Darwin forged his own path and made his name in several fields, including astronomy.

Darwin was born in 1845 to Charles Darwin and Emma Wedgwood Darwin;* he was their second son and the fifth of nine children. After receiving his primary education at local schools, he attended Trinity College at Cambridge University, where he earned both bachelors and masters degrees, after which he became a barrister.+ However, after a few years, he tired of the law and returned to geology, which he had studied at Cambridge and had always been his main interest.

Darwin's geological studies led him into astronomy; his examination of geological processes on Earth inspired him to formulate a new and radical(at that time) theory as to how the moon formed. In the late 1800s, most scientists believed the moon had formed separately along with the Earth, what today is called co-formation. Darwin, though, with his geological training, believed that the moon was once a part of the Earth, and, through dynamic forces, was spun off from it. He called it the "Fission" theory of lunar formation. When he first came out with this idea in the 1870s, it was not widely accepted, and not until the Apollo moon landings of the late 1960s when the astronauts brought back lunar rocks and soil, and it was shown that the Earth and the moon were very similar geologically, was it taken seriously. Today, the leading theory of lunar formation is that early in the Earth's history, a Mars-sized body crashed into the Earth and the resulting material formed the moon, very similar to Darwin's idea.

Darwin also extensively studied the ocean's tides and their relationship to the Earth, the moon, and the Sun, and concluded that the moon played a leading role in their occurrences, although he did not know the exact mechanism.

Darwin's original and innovative ideas won him the Plumian Chair of Astronomy at Cambridge University, one of the most prestigious positions in the academic world. He also was awarded the Copley Medal by the Royal Society, the then-equivalent of a Nobel Prize, as well as the Gold Medal of the Royal Astronomical Society, among many other honors. A crater on Mars is named after him.

***Charles Darwin and Emma Wedgwood were first cousins; their maternal grandfather was Josiah Wedgwood, the founder of the famous china and glassware company. In those days, especially among the upper classes, it was not unusual for first cousins to marry(gross as it may sound, it was also not unusual for uncles to marry their nieces).**

+In the English legal system, attorneys are divided into two groups. Solicitors can give legal advice, draw up contracts, deeds, wills, and so on, but cannot argue cases in a court of law. Barristers, who have more training, can do everything solicitors do, as well as argue cases in civil and criminal trials.

Space Age Archeology

The Corona Spy Satellites

Their existence was not made public until 1990s, but the early Corona satellites, also known as the KH, or Keyhole, series, was America's first generation of spy satellites. The first of these was the KH-1, which was operational from 1959 to 1960.

With the launching of the Soviet Union's Sputnik in late 1957, both the American intelligence agencies and the military realized that spy surveillance from space needed to be a priority. The Corona program, which actually began in 1956, was based on a study by the RAND Corporation involving military spy technology in space. President Eisenhower approved the program in late 1957. The first-generation Corona satellites were launched under the name of Discoverer, and their purpose was publicly announced as scientific research.

The Corona KH-1 satellites were built by a consortium of companies. Lockheed designed and built the main satellite bus, a modified Agena upper stage. Fairchild built the high-definition photographic cameras, and General Electric designed and built the capsules which would return the exposed film to Earth. The satellites' mission was to be launched, fly over Russia or China and take images from space, the exposed film would be transferred to the return capsule, which would detach from the main satellite and return to Earth, where it would be recovered by military crews. To maintain the pretense of a scientific program, some of the KH-1 satellites carried scientific experiments, including mice and rats. Their orbital operating lifetime was two to three days at the most.

The first Corona, called Discoverer-1, was launched on February 28, 1959, into polar orbit. It was a test flight and returned no useful information. It, like all of the KH-1 satellites, was launched from Cape Canaveral on top of a Thor-Able rocket. The second, Discoverer-2, was launched on April 14, 1959, and was a failure. Not until "Discoverer-13," the seventh Corona launch in August 1960, was there a successful return of the film capsule(Actually, two earlier Corona capsules returned successfully to Earth, but the film had been damaged by the space environment and was useless. Subsequently, the Air Force had Eastman Kodak develop a photographic film that could withstand the rigors of space). By this time, due to the shooting down of a U-2 spy plane over the Soviet Union earlier in the year, the Corona program became a top priority, and the next "Discoverer"-Corona launch-number 14, only a week after Discoverer-13, provided the U.S. intelligence agencies with detailed images of Soviet missile sites and allowed an accurate estimate of how many ICBMs the Soviets had. It was a major success for the program and gave the U.S. renewed confidence that spy satellites could provide reliable intelligence.

The last of the original Corona KH-1 satellites(there were ten in all; two were successful) was launched in September 1960. It was succeeded by the KH-2 program, which was a more advanced version of the Corona. In 1963, the Corona program was ordered classified by President John F. Kennedy, and the Discoverer cover was dropped. Also, starting in 1963, the Corona satellites were launched almost exclusively from Vandenberg Air Force Base in Southern California, which could provide more security and secrecy. The entire Corona program, with ever more advanced versions, did not end until 1972 with the KH-8, when it was replaced by the KH-9 "Hexagon"* program. The Corona program was classified Top Secret until 1992; parts of it were declassified under an order by President Bill Clinton in 1995. Not until then did the full story of Corona come out.

The Hexagon spy satellites went under the nickname of "Big Bird," after the puppet character on the PBS program *Sesame Street

What's New In Space

Another Space Age Pioneer Passes On: Joe Engle 1932-2024

Joe Engle, one of the 1960s astronauts, died at his home in Houston, Texas, on July 10 at age 91. He held the distinction of being the only space traveler of that era who already had astronaut wings when he was selected by NASA in 1966.

Engle was born and raised in Chapland, Kansas, attended public schools there, and then went to the University of Kansas, where he earned a bachelor's degree in engineering in 1955. While at KU, he was involved in the ROTC unit, and after graduation, entered the Air Force. He already had piloting experience; during his summers while in college, he worked for Cessna Aircraft and learned to fly small private planes. He went through the Air Force's pilot training school, then through test pilot school and the Advanced Research Pilot's School program, after which he was assigned to the X-15 spaceplane program. In 1964 and 1965, Engle flew the X-15 to fifty miles or higher on three occasions, earning the Air Force's astronaut wings.* In 1966, he applied for and was chosen for the fifth class of NASA astronauts, after which he was assigned to the Apollo program. Engle was one of the backup crew of Apollo 14 and then the prime crew of Apollo 17, along with Eugene Cernan and Ronald Evans. But when it was realized that Apollo 17 would be the last lunar landing mission, NASA's scientists wanted a professional geologist on the Moon, and Engle was replaced with Harrison Schmidt. He was subsequently offered a crew position on the second Skylab space station mission and also the Apollo-Soyuz Test Project but turned down both to be part of the space shuttle program, saying that he preferred to fly fixed-wing aircraft. He flew the Enterprise shuttle on test flights, and then was assigned, with Richard Truly, to the second space shuttle mission, which was launched on November 12, 1981. Four years later, he was the commander of STS-51-I, in August 1985. Afterwards, Engle became a NASA administrator, and in 1986, left the space agency and the Air Force to serve in the Kansas Air National Guard, which he did until his retirement as a two star general in 1991. Even in retirement, he continued to fly high performance aircraft and serve as a consultant to aerospace companies.

***Between 1959 and 1968, when the program ended, twelve pilots in all flew the X-15. With Engle's death, they are all gone now.**

Artemis Program Delayed-Again

The Artemis 2 mission, which was scheduled to send four astronauts on a circumlunar mission in November 2024, has been delayed to at least September 2025 and maybe longer. Space experts are now saying that the first lunar landing mission, Artemis 3, which was planned for the Fall of 2026, will probably be delayed until at least 2027 or 2028. In addition, Gateway lunar space station construction, which was scheduled to begin in 2025, will probably not occur until at least 2027 if not later. The reason behind all these delays? The usual suspect-money. The SLS rocket program has taken up so much of NASA's resources that it is starving all the other lunar-based programs. Added to that is that the Space-X Starship, which NASA plans to use for the first two lunar landings, is behind schedule as well. Although Elon Musk says it will be ready in 2026, space experts say that 2027 or 2028 is a more realistic date(but Space-X has confounded the critics before). On top of all this, the Chinese Space Agency introduced its lunar spacesuit to the world press in late September 2024 and said that it definitely plans to land Chinese astronauts on the Moon by 2030.

Space-X Pulls Off an Amazing Feat

It's probably been seen millions of times on YouTube and elsewhere, but each time doesn't take away from the awe and wonder of it-Space-X's capturing of the giant first stage of the Starship with its "chopstick" handles shortly after launch on October 13. Before the launch, even veteran aerospace engineers thought that such a feat wouldn't occur for several more years, after several failed tries. But Musk and company did it the first time, and jaws dropped absolutely everywhere. Lost in all the acclaim was the second stage, which also performed well, making a little under one orbit before dropping into the Pacific Ocean near Australia. NASA, which has high stakes in the Starship program, congratulated Space-X on the mission, and is looking forward to the next flight.

And when will that come? Maybe as early as late November or early December 2024, according to hints being put out by Space-X. As of this writing(October 27), the sixth Starship launch is being set up and rehearsed. Space-X has hinted that the sixth launch will not only see another "chopstick" capture of the lower stage, but the upper stage as well, after it returns from orbit. Part of it, of course, depends on when the FAA will issue a launch permit, but the holdups that delayed the fifth launch appear to have been resolved, and unless a major issue pops up, future launches will see open and friendly skies. Musk has hinted that 2025 may see up to fifteen Starship launches, and if they are successful, twice that number in 2026. Musk has also said that if the 2025 launches go well, Space-X will send as many as four uncrewed Starships to Mars in 2026, and if they are successful, it will start training pilots and scientists for crewed missions to Mars in 2030. In the meantime, NASA said that it is pleased with the progress being made on the moon-lander version of Starship, and Space-X has promised it will be ready for the first scheduled lunar landing in September 2026. The naysayers are telling the news media that Space-X's goals and timelines are a fantasy, but they've said that before. As one aerospace critic said in the wake of October 13, "Never underestimate Elon Musk."

The First Post-ISS Space Station

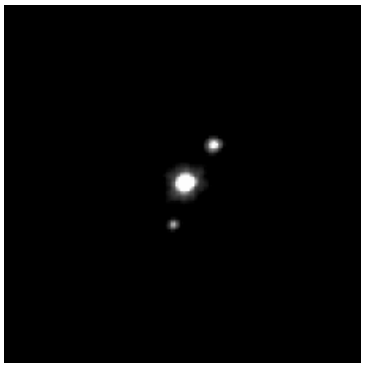
On October 17, Vast Space Systems, an aerospace company based in Long Beach, announced the Haven-1 space station, which will be launched as early as 2026, and already has two crewed missions assigned to it. The space station, which is about the size of the early Soviet Salyut space stations, will be able to hold up to four people at a time and will be used for scientific and industrial research, as well as a space tourist "getaway" hotel. Crews will stay between 40-50 days at a time. Vast also announced that in 2028, it will launch Haven-2, a larger and more advanced version of Haven-1. Between 2028 and 2032, up to eight Haven-2 modules will link together to a central core to form a permanent space station that will hold up to ten people at a time and will rotate to provide artificial gravity. Space-X is a partner in the Haven project, so Falcon-9 rockets will be used to launch the modules. NASA is also involved in the Haven project, providing some funding and technical expertise. NASA is planning to abandon and deorbit the International Space Station by 2030, so afterwards, it may send its astronauts to live and work aboard the Haven complex.

Top right-a Crew Dragon approaching the Haven-1; bottom left, the completed Haven-2 complex

How Are the Planets and their Moons Named?

Recently, a couple of us were discussing how the planet Neptune got its name, following the presentation on Neptune at the September CVA meeting. Neptune, was, of course, the sea god from Roman mythology, and the name was suggested by Frederick von Struve of the Russian Academy of Sciences shortly after it was discovered in 1846. Similarly, the name Uranus was chosen by German astronomer Johann Bode in 1783. At that time, keeping in tradition from ancient times, the names of the planets were in accordance with Greek and Roman mythology. With the invention of the telescope in the early 1600s, moons started to be found in orbit around several of the planets. In most cases, they were simply given numbers; the four large moons of Jupiter were, for over two hundred years, known as Jupiter 1, 2,3, and 4. It was not until the 1800s that they were given the formal names of Io, Europa, Callisto, and Ganymede. Similarly, although Christian Huygens discovered the large moon of Saturn in 1655, it was not given the name of Titan until 1847. Even then, tradition dictated that the moons be given Greek and Roman mythological names. An exception to this was when John Herschel named the moons of Uranus, which was discovered by his father, after Shakespearean characters. Mostly, however, up through the 1950s, moons were given the names from Greek and Roman mythology and literature. There was no formal process; they were simply agreed upon by a majority of astronomers and came into common usage. (left-Triton, largest moon of Neptune)

In 1973, the International Astronomical Union (IAU) established a committee for the naming of planetary objects. Today known as the Working Group for Planetary System Nomenclature, it is now in charge of formally naming all planetary objects and their moons. This has become a full-time job in recent years, due to the explosion of moons found around the gas giant planets(Jupiter, Saturn, Uranus, and Neptune), and also the minor planets being found in and near the Kuiper Belt. In naming a newly found object, the WGPSN, as it's called, employs a multi-step process. First, the object is given a provisional identity, based on the year it's found, and the accession number or letter within that year. Then the founder(s) is/are asked to recommend possible names. Then the committee will go over the recommendations and vote on what it considers the best one. Although the committee will usually follow traditional Greek and Roman names, in recent years, it has chosen names from other cultures' mythologies in order to represent a more inclusive view(and also the fact that it's running out of Greek and Roman names). Names from Norse mythology, like Odin, Skoll, and Ymir have become popular; also, since several minor planets and their moons have been found at the Mauna Kea observatory, names from Hawaiian mythology have been used, like Haumea(right image), one of the Kuiper Belt minor planets; Haumea was the Hawaiian mother goddess. Quaoar(left image), another KB minor planet, is named after the creator god of the Tongva indigenous tribe of Southern California. A small moon of Saturn, known as Saturn XXII, has been named Ijiruq, after a deity in Inuit mythology. Similarly, another moon of Saturn, provisionally named S/2000 S5, was formally named Kiviuq, an Inuit mythological hero. A third Saturnian moon, also discovered in 2000 and provisionally designated S2000 S11, was officially named Albiorix, after a hero in Gallic(French) mythology. If all members agree, the formal naming process can be short, within a few years, or it can stretch out to ten years or more.



So, these days, the WGPSN has the final word on planetary names. And probably in the next few decades, when exoplanets are more thoroughly studied, it will no doubt give names to them as well.

Cal Star 2024

This year, Hubert Cecotti attended the CalStar 2024 event, which occurs from October 2, to October 6, 2024. He attended the event only for one night. CalStar 2024 took place at Lake San Antonio County Park. CalStar is a regional dark-sky star party held annually in late September or early October in Monterey County, California. It takes about two hours and 45 minutes from Fresno: take the 41 until Paso Robles and then continue on some country roads to reach Lake Nacimiento, then Lake San Antonio.

The event format and atmosphere are quite casual, and there are no scheduled activities, vendors, or fees other than the camping fee collected at the park entrance. At CalStar, the focus is on observing and enjoying the dark skies and good company. Camping is not cheap; it is $45 per day, and the price is per vehicle. The location has restrooms, but it is necessary to walk to another campground nearby to find showers. The audience includes people from different parts of California, mainly from the Bay Area. The audience is equally spread between visual observers, electronic-assisted astronomy, and astrophotography. People are friendly and knowledgeable, and as usual, it is great to meet other amateur astronomers who can describe their equipment and share some views. Overall, it is a great experience despite the distance from Fresno.

From the Observer Archives

Extra Extra Extra UFO Spotted!

"A formation of UFOs was spotted by some fifty or more people on the night of December 24-245 at about 11:45pm. In the northerly direction. For a while it seemed to be pacing Skylab but then it veered away and dropped down to a lower altitude. There was a blinking red light on the leading component of the formation and the others were following in a very close formation with a large object at the tail end as thought being the tail scout, protecting the rear flanks. After several minutes it dropped down to below the horizon from our vantage point. We were wondering what to do when suddenly, there it was again moving about in an erratic manner at a very low altitude, dropping down now and then flitting about again. At about 11:58 it appeared to be heading for Fresno and we were trying to decide whether to trying to contact the formation by blinking bright lights or to run and hide. We trained our binoculars on the group and there it was plain as day—Ho Ho Ho! 'Merry Christmas to all and to all a good night!'"

From the December 27, 1977 Observer

Spaceflight Short

As this issue was being finished up, rumors were floating around the aerospace community that Boeing, beset with technical and financial problems, is planning to sell its space systems division, including the troubled Starliner spacecraft, and Jeff Bezos's Blue Origin is said to be the most interested buyer. Aerospace experts are saying that this may be a good move for Blue Origin, which is far behind its rival Space-X in the commercial space race. Adding to the pressure on Boeing is that fact that in mid-October, NASA released its launch manifest for 2025, and the Starliner is not among the scheduled launches.

CVA member contributions-

Two great images by Dave Morrow

The Shark Nebula, LDN 1235 in Cephus

Comet 2023/C A3

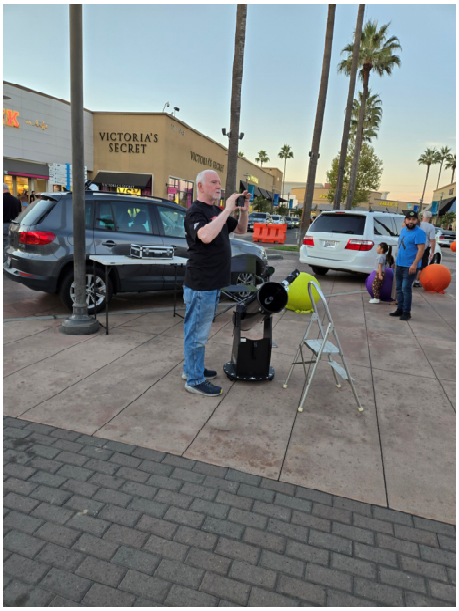
Three more wonderful images of Comet 2023/C A3 by Hubert Cecotti

CVA Events in The Fall

Sequoia-Kings Canyon Dark Sky Festival-September 7

Star-B-Que-September 28

Riverpark October 11



Galaxy in the Eyepiece

M82

M82, also called the Cigar Galaxy, is best known as the companion to M81 in the constellation Ursa Major. It is approximately twelve million light years from Earth, has an apparent magnitude of 8.4 and a size of 41,000 light years, a little bit smaller than the Milky Way. It is part of the M81 group, a cluster of about thirty galaxies, most of which are little-known dwarf galaxies. M82 was first seen by Johann Bode in 1774; a few years later, Charles Messier also observed it and added it to his now famous list of celestial objects

M82 is officially described as a starburst galaxy, due to the large number of star-forming regions in it. At one time, it was thought that the entire galaxy was exploding, but this was eventually shown to be an optical illusion, caused by gas and dust clouds. More recently, however, M82 has been revealed to have very thin spiral arms, which may cause it to be redesignated as an edge-on spiral galaxy. Also, scientists have observed a large number of supernovas as well as a gamma-ray burst, the first known from a galaxy other than the Milky Way. They are as well studying a mysterious object near the galaxy's nucleus which gives off radio waves but does not fit any known stellar or exotic object pattern.

M82 is known to be interacting gravitationally with M81, as well as with several other smaller galaxies in the M81 group. It believed that this is what is causing its large starburst and star formation activity.

Star Stories

Betelgeuse Might Have a Companion

Scientists who have been studying the erratic behavior of Betelgeuse over the last few years believe that have come up with an answer. For some time now, the star, which is a red giant in its last stage of life, has been dimming and brightening, which has led some to think that it is getting ready to explode into a possible supernova. However, a new study suggests that it may have a very small companion star, which has gone unnoticed until now. The possible star, which is being called "Betelbuddy," is the outgrowth of research by astronomers at the University of Wyoming, the Flatiron Institute in New York City, and the Center for Astronomy in Budapest, Hungary. They believe that, based on calculations, Betelgeuse has a companion about the size of our Sun, which orbits it, subsequently explaining its dimming and brightening. The group does acknowledge that more studies are needed, and other scientists are not so sure, saying that other explanations might be the answer to Betelguese's odd behavior.

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

Las Campanas Observatory

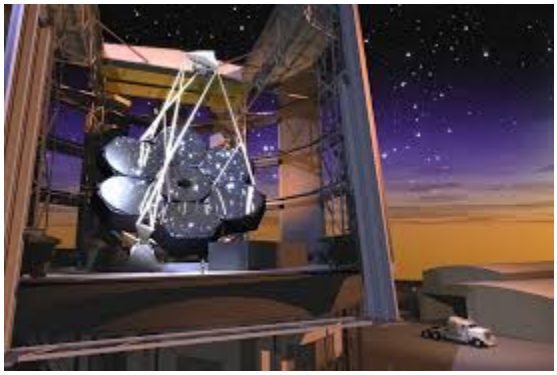
Las Campanas Observatory is owned and managed by the Carnegie Institute for Science, which was originally the Mt. Wilson Observatory, with main offices in Pasadena, California. The site itself, though, is in the Chilean Andes. By the 1960s, the Mt. Wilson management realized that the facilities and equipment at its original site on Mt. Wilson,* in the San Gabriel Mountains northeast of Los Angeles, were outdated and threatened by light pollution from the increasingly growing LA area. In addition, it was recognized that very little scientific research was being done in the skies below the equator. Mt. Wilson then made a decision to devote much of its future resources to the southern skies, and the Las Campanas Observatory was instituted. A site in the Andes was found, agreements were drawn up, and construction began in 1969(At about the same time, several other observatories were also making plans to build telescopes in South America, for the same reasons as Mt. Wilson, with the result that many of the world's largest telescopes are now in the Chilean Andes).

Currently, the Observatory has three permanent telescopes, and several others which are not part of the Carnegie Institute but are operated by other organizations. The original telescope at the site is the 1m (39 inch) Swope Telescope, which has been in operation since 1971. The 2.5 m(98 inch) duPont Telescope saw first light in 1977. The largest of the three is the Magellan Telescope, which has two 6.5 m(260 inch) mirrors. In addition, the University of Warsaw operates a 1.3m(51inch) telescope, and the University of Budapest and the University of Birmingham also operate smaller telescopes at the site.

Currently, one of the world's largest telescopes is being built at Las Campanas. The Giant Magellan Telescope will have seven 8.4m mirrors and is expected to see first light in 2029. It will be managed by a consortium of organizations led by the Carnegie Institute.

***All of the telescopes on Mt. Wilson were shut down in the late 1980s and are no longer available for scientific research. They are now used by amateur organizations and are also part of a public outreach program. However, because of the original agreement between Mt. Wilson and CalTech, dating back to the 1920s, the Carnegie astronomers still have access to the telescopes at Palomar Observatory, including the 200" Hale telescope.**

A future issue of The Observer will feature a history of the Mt. Wilson Observatory.



The Giant Magellan Telescope currently being built at Las Campanas