To all CVA Members-Summer

Starwatching is here!

THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno July-August 2024

CVA Summer 2024 Starwatches

CVA members at Millerton Lake on June 29

Astronomy Quote of the Month-

"The scientific theory I like best is that Saturn's rings are composed entirely of lost airline luggage…"

-Michael Russell

In this Issue-

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CVA Events in July and August

July 6-Monthly starparty at Eastman Lake

July 12-Public starparty at Riverpark

July 25-Starparty at Fowler Public Library

July 27-Public starparty at Millerton Lake

August 3-Monthly starparty at Eastman Lake

August 9-Public starparty at Riverpark

August 10-Starparty at Edward Ray Park in Chowchilla

August 24-Public starparty at Millerton Lake

September-7-Dark Sky Festival at Big Stump

Reminder-no monthly meetings in July or August

Number of exoplanets found as of June 2024-

Confirmed-5,678

How many more are out there?

Tens of Thousands? Hundreds of Thousands?

Millions?

(From NASA's Exoplanet Exploration Website)

Astronomy Short-

A recently published paper argues that Jupiter's Great Red Spot today is not the same one first seen by Giovanni Cassini in 1665. Scientists now believe that atmospheric storm died out in the mid-1700s and was replace by another storm, first seen in 1815 and still there today. They also theorize that today's Great Red Spot is fading and may be gone within a hundred years.

The President's Message

By Hubert Cecotti

The main mission of the Central Valley Astronomers is public outreach, sharing views of the night sky, and engaging the audience with amateur astronomy. Summertime is a busy time for the club as we have various events: River Park, Millerton Lake, Eastman Lake, and Big Stump, some may go to remote places such as Courtright Reservoir. In addition, we will have to be ready for the Dark Sky Festival happening in September. Summertime is also a great time to enjoy clear skies in the mountains and appreciate all the wonders of the Milky Way. Sagittarius has the greatest number of Messier objects (15) and provides a great collection of nebulae and globular clusters. Ophiuchus has seven Messier objects, and Scorpius has four. Nearby, Serpens and Scoutum have 4 Messier objects together. With the failed attempts to do a Messier marathon, summer can be an opportunity to do a globular cluster marathon or a Messier half-marathon.

Cygnus is another great region to share with people. Cygnus has targets that can be appreciated with different instruments, including telescopes with short focal lengths or small apertures. From double star to dim nebulae that require a filter, Cygnus has a lot to offer. The North America (emission) Nebula (NGC 7000) is named for its resemblance to the North American continent. It is large and bright, making it a popular target for astrophotographers as it does not require a long focal. The Pelican (emission) Nebula (IC 5070) is located near the North America Nebula, the Pelican Nebula is part of the same larger H II region. It has a distinct shape that resembles a pelican. The Veil Nebula (NGC 6960, NGC 6992, NGC 6995) is a supernova remnant. It is one of the best target in Cygnus. The Veil Nebula is composed of several sections. NGC 6960 is the Western Veil or the Witch's Broom, and NGC 6992/6995 is the Eastern Veil. Albireo (Beta Cygni) is a double star. It is an easy target and one of the most beautiful double stars in the sky, with a striking contrast between its blue and gold components. It is the beak of the swan in the constellation. The Crescent Nebula (NGC 6888) is formed by the fast stellar wind from the Wolf-Rayet star WR 136 interacting with the slower wind ejected by the star when it became a red giant. The Cygnus X Region, star Formation Region, is one of the richest star-forming regions in the Milky Way, the Cygnus X region contains numerous young, massive stars and star clusters. The Northern Coal Sack is a dark nebula, an area of interstellar dust that obscures the light from the stars behind it. It is located near Deneb, the brightest star in Cygnus. The Sadr Region (IC 1318), surrounding the star Sadr (Gamma Cygni), is filled with nebulosity and is part of a larger complex of emission nebulae. The Blinking Planetary (NGC 6826) is a great target to show the power of inverted vision. This planetary nebula gets its name because its central star appears to blink in and out of view when observed through a telescope.

Clear Skies-Hubert

Profiles in Astronomy

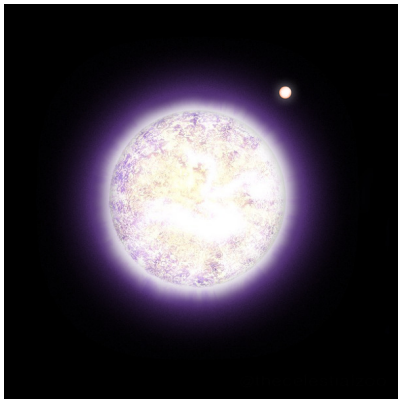
John Dreyer(b. Johan Ludvig Emil Dreyer) 1852-1926

Dreyer was born and raised in Copenhagen, Denmark, where his father was a general in the Danish Army and later the Danish Minister of War. He attended local schools and then the University of Copenhagen, where he studied physics and astronomy, which had been his interest since childhood. In 1874, he was awarded a doctorate in astronomy from Copenhagen, and the same year accepted a position as an assistant to the fourth Lord Rosse(the also-astronomer son of the famous Lord Rosse who established the Parsonstown Observatory and studied the spiral structure of galaxies) at his observatory in Ireland. He spent the rest of his life living in the British Isles and become a British citizen in 1885.

In 1878, Dreyer moved to Dublin, where he worked at the Trinity College Observatory, and in 1882, he moved to Aramagh to become the director of the Armagh Observatory, where he stayed until his retirement in 1916. Afterwards, he was offered a research position at Oxford University, and lived and worked in Oxford until his death in 1926.

Dreyer is best known for compiling the NGC and IC catalogues(which are discussed later in this issue), but he is also noted for organizing and cataloguing the papers of Tycho Brahe, as well as writing a highly lauded biography of Brahe, all of which he did during his years at Oxford. In addition, he wrote two books on the history of astronomy, and also a book on the history of the Royal Astronomical Society, of which he was the president from 1923 to 1925.

Star Stories



Adhara

Adhara, also known as Epsilon Canis Majoris, is in the constellation Canis Major, the Big Dog. With an apparent magnitude of 1.50, it is the twenty-second brightest star in the sky, and its absolute magnitude is -4.8. Its age is estimated at about twenty-five million years. The latest distance measurements show it to be 430 light years from our Sun.

Adhara is a binary system. The main star known as E Canis Majoris A, is classified as a B2 II star about twelve times the size of the Sun. It is interesting in that it is putting out tremendous amounts of ultraviolet light, which accounts for its very high temperature, about 22,000 degrees K. It rotates on its axis every five days. The second star, E Canis Majoris B, is a much smaller and dimmer object, with an apparent magnitude of 7.5, and an absolute magnitude of 1.9.

Scientists have determined that Adhara was once much closer to our solar system than it is now. About five million years ago, it was thirty-four light years away and had an apparent magnitude of -3.99, the brightest any star has ever been as seen from Earth. Since then, it has been slowly moving away from us.

The name Adhara come from Arabic, and was originally Aoara, maning "virgin." It was used in conjunction with two other stars in Canis Major, and collectively the three were known as Al Adhara-the Virgins. In ancient China, the star was named Hu Shi-the Bow and Arrow.

Space Age Archeology
Korabl-Sputnik

The Soviet Vostok spacecraft is best known as the capsule that took cosmonauts into space from 1961 to 1963, and in a modified form known as Voshkod in 1964 and 1965. Yet, the craft's beginnings had a very different purpose, and even today, 2024, some aspects of the program are still unknown.

The Vostok program began in late 1957 and was the brainchild of Sergei Korelev's OBK-1 Bureau. At the time, the Communist Party was not thinking of human space travel, but Korelev realized the importance of Russians in space before the Americans. By early 1958, his team had designed a vehicle that they called Korabl-Sputnik(meaning "space traveler"), and they sold it to the Party as a military spy craft, capable of carrying high-resolution cameras and other surveillance equipment. At the same time, they quietly worked on a version that could carry one man into space. The Party agreed to funding and the first prototypes were built by the end of 1958. Both looked pretty much the same from the outside. The main compartment was a seven-foot diameter sphere made of steel, covered with an ablative material to survive reentry(the spy version's cameras and film would be returned to Earth). The service module was roughly conical-shaped and attached to the sphere by metal straps. It held fuel, oxygen tanks(for the manned version), communications equipment, and retrorockets. Fully loaded, the spacecraft weighed almost 10,000 Earth pounds.

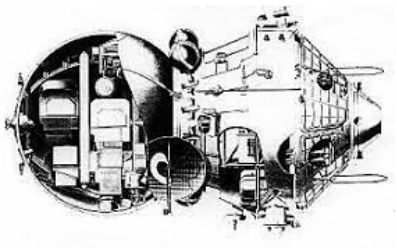
The prototype, known as 1K, is believed to have test-flown a sub-orbital flight on January 20, 1960. A second test similar to the first was launched on January 31, 1960. The first orbital test flight with the crewed version was launched, unmanned, on May 15, 1960; it was scheduled to return to Earth on May 19, but various failures caused it to stay in orbit until 1965. Over the next ten months, five more test flights were launched; three were failures but the two after that; Korabl-Sputnik 4B, carrying a dog and several mice and guinea pigs, launched on March 9, 1961; and Korabl-Sputnik-5, carrying a mannikin in a space suit launched on March 25, 1961, were successful, leading to Yuri Gagarin's spaceflight on April 11, 1961.

Not until after a few days after Gagarin's flight was the capsule's name changed. The Soviet political hierarchy decided that Korabl-Sputnik was too technical, and instead called it Vostok, which means "East" in Russian. The name stuck. The crewed Vostok craft was used for six manned flights from 1961 to 1963. A seventh Vostok mission was planned for early 1964, but was cancelled. When the Soviet Politburo demanded in late 1963 that multi-man flights be instituted to keep ahead of the American Gemini program, a modified version of Vostok, known as Voskhod, was designed and built. Only two flights, Voskhod 1 in October 1964 and Voskhod 2 in March 1965, ever flew(Voskhod 3, which was scheduled for September 1965, was reportedly cancelled ten days before launch). Korelev also considered using another modified version of the Vostok for the Soviet Moon landing missions, but realized that a much more sophisticated spacecraft was needed, and ended up designing Soyuz.

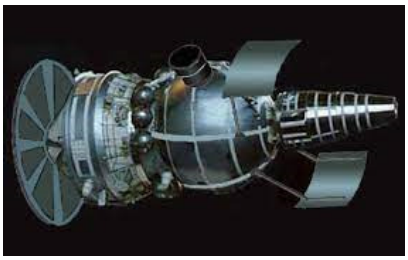
In the meantime, the spy version of Korabl-Sputnik, known as K2, also proceeded. Officially called Zenit 2 by OKB-1, the first launch attempt was on December 11, 1961, and was a failure. The second launch,

Top right-the original Korabl-Sputnik in 1958 Left-The crewed Vostok spacecraft Bottom right-Voshkod

called Kosmos 4, was on July 28, 1962, and the capsule returned to Earth with exposed film after three days. In all eighty-one Zenit 2 spy craft were launched between 1962 and 1970; of them fifty-seven were successful. A second-generation spy craft, known as Zenit 2M, was first launched in 1968 and used through 1978. After that, other versions of the Korabl-Sputnik-Zenit were used, each increasingly sophisticated. According to released Russian files, the last Zenit spacecraft was launched in 1994, although there is some evidence that even more modern versions were used through 2010. Intelligence estimates are that over 700 surveillance spacecraft based on the original Korabl-Sputnik have been launched. It is also known that Roscosmos, the Russian space agency, has used the Korabl-Sputnik design for earth resources, remote sensing and bio-medical spacecraft over the years. All of this is testament to the fact that the Russians don't throw away proven space hardware; they use the same design for many different purposes



Zenit 2-1964



Zenit 4M-1980

Bion 1-1975

Uncrewed bio-medical satellite

The NGC and IC Catalogues

Next to the Messier catalogue, the New General Catalogue(NGC) and Index Catalogues(IC) are arguably the best-known astronomical listings in the world today, used by both professional and amateur astronomers. Their origins actually date back to the 1700s.

From about 1775 on, William Herschel, the German-born English astronomer and his sister Caroline Herschel observed and listed over 1,000 celestial objects: galaxies, nebulas, and clusters of various types. The Herschels used the capital letter "H" to designate their findings, followed by a number. In 1786, they compiled their discoveries into what they called The Catalogue of Nebulae and Clusters of Stars, abbreviated CN. In 1789, the two Herschels added over 1,000 more objects to it, and in 1802, 500 more. After both William's and Caroline's deaths, William's son John Herschel expanded the CN, adding almost 3,000 more entries and publishing it in 1864 under the title of The General Catalogue of Nebulae and Clusters of Stars, commonly known as the GC.

After John Herschel's death in 1871, John Dreyer took over the General Catalogue, and it 1878, added a supplement to it, including another 1,000 objects. In the mid-1880s, he proposed a second supplement, but the Royal Astronomical Society, which had rights to the GC, asked him to completely reorganize and rewrite it. Dreyer spent the next two years working on the catalogue, and in 1888, it was published as The New General Catalogue, which contained 7,840 celestial objects. In 1895, Dreyer published a supplement to the NGC, which became known as the Index Catalogue(IC), containing 1,520 objects, and in 1908, he published the second supplement, the IC II, which contained 3,866 objects.

Over the years numerous errors were found in both the NGC and the IC catalogues, so in 1973, the Revised New Catalogue of Non-Stellar Objects was published. Over 800 objects from the NGC and IC catalogues were found to be either non-existent or mixed up with other objects. In 2009, another revised catalogue, The Revised New General Catalogue and Index Catalogue was published. It noted over 300 errors and subsequent corrections that were in the 1973 revision. The most recent revision was published in 2017 by a consortium of astronomers. It is known as the NGC/IC Project. The most recent editions contain 13,957 objects in the combined NGC and IC catalogues.

What's New In Space

William Anders 1933-2024

William Anders, one of the 1960s astronauts who was a member of the Apollo 8 crew and took the now-iconic image of the Earth rising over the Moon, was killed on June 7, 2024, when the small private plane he was flying went out of control and crashed into Puget Sound north of Seattle, Washington. He was 90 years old.

Anders was born and raised in Hong Kong, where his father was stationed as a U.S. Navy officer. He attended the Naval Academy at Annapolis and then went into the Air Force, where he was trained as a fighter pilot. At the same time, he earned a master's degree in nuclear engineering. In 1963, he applied for the third group of astronauts, and was chosen later that year, even though he had not gone to test pilot school (NASA made it optional starting with Group 3). After astronaut training, he was assigned to the backup crew of Gemini 11.

After the Gemini program ended, he was assigned to what was then the third Apollo mission, along with commander Frank Borman and command module pilot Michael Collins. Anders was to be the lunar module pilot on what would be the second test flight of the LM. However, fate intervened. Intelligence reports indicated that the Russians were planning a manned circumlunar mission by the end of 1968; at the same time, the lunar module was delayed into 1969. NASA decided to make the second Apollo mission a lunar orbital flight, without the LM. Jim McDivitt, the commander of the second flight, decided to stay with the LM, since he and his crew had spent so much time training for it. Borman's crew was moved up to the second flight. Then, there was a crew change. Collins suffered a neck disc injury and had to have surgery, and Jim Lovell, his backup, took his place.

The second Apollo mission, now designated Apollo 8, was launched on December 21, 1968. It was the first crewed mission with the giant Saturn 5 rocket, and the first to go to the moon. On December 24, Christmas Eve, the Apollo spacecraft reached the moon and went into orbit around it. As the astronauts later told it, when they came back around the front of the moon after the first orbit, they saw the Earth rising, a brilliant blue-and-white ball in the blackness of space. Anders quickly grabbed one of the cameras and took several images of it. One of them, known as *Earthrise* , became perhaps the most famous image ever of the space program. Anders said many years later, "We came all this way to explore the moon and what we discovered instead was the Earth…"

After Apollo 8, Anders was a member of the backup crew of Apollo 11, then served as a NASA administrator, and afterwards as a member of the Atomic Energy Commission. In the late 1970s, he was the U.S. Ambassador to Norway. After that, he worked in private industry until his retirement in 1994. Even in retirement, he established a environmental education foundation and was active in aviation history and flying. With his death, of the 24 astronauts who went to the moon, only seven are still alive.

Starliner finally Makes a Crewed Flight-But the Problems Continue

Over five years behind schedule, and costing Boeing billions in extra money, the Starliner commercial spacecraft was launched on June 5 with astronauts Barry Wilmore and Sunni Williams aboard. Even then, it had trouble with its thrusters as it prepared to dock with ISS on June 6, and was over an hour late in docking. Starliner was originally scheduled to be launched on May 6, then was delayed due to helium pressure problems; it was rescheduled For June 1, then delayed again because of a software error. The spacecraft,

named Calyspo in honor of Jacques Cousteau's research ship, finally reached space on June 5. However, more problems with the thrusters have extended the mission into July, and indications are that it may last as long as three months. Contrary to what the news media is saying, Wilmore and Williams are not "stranded," and are doing valuable work aboard ISS, helping the astronaut crews get caught up on their programs and testing Starliner to understand and solve the thruster concerns.

Starship's Fourth Flight a Success

Only a day after the launch of Starliner, Space-X's fourth Starship launch, on June 6, was successful, with the huge booster rocket, the most powerful ever built, carrying the Starship spacecraft into an orbital trajectory. After flying in space for over forty minutes, it reentered the atmosphere; cameras on the outside of the craft showed heat plasma buildup and part of one of the craft's stabilizers being damaged. But it survived the reentry, performed a flip maneuver, and splashed into the Indian Ocean off the west coast of Australia. Elon Musk later said that that the splashdown point was a few miles off due to a navigation error, but that will be corrected on the next flight. He also explained that the stabilizer fin damage had already been anticipated, and it is being corrected as well. Musk also said that the next Starship test flight will come by the end of July, and will include a capture of the booster by a giant grappling claw on the Starship launch pad.

A few days later, Space-X announced that its Starship manufacturing facility on the Texas Coast will be expanded to turn out at least one complete booster rocket and spacecraft a week from now on. Space experts speculate that the company is gearing up for regular operational flights by the end of 2025. At the fourth Starship launch event, observers and journalists noted that Space-X has at least four complete booster rockets and spacecraft ready to be launched, and several more in various stages of construction.

On June 9, Japanese billionaire fashion designer Yasaku Mazeawa, who contracted a circumlunar Starship flight with eight colleagues, announced that he is cancelling the mission. He had hoped to make the flight by 2023, but said that because of delays in the Starship program, he is not willing to wait any longer. Mazeawa and his colleague Yozo Hirano spent a week aboard ISS in 2022 as paying passengers on Soyuz MS20. Space-X still has a commitment from American Dennis Tito to fly him, his wife, and eight friends on a circumlunar mission as early as 2026. Tito was one of the first space "tourists," aboard Soyuz TM-32 in 2001.

NASA Says No to a Hubble Repair Mission

In early June, NASA announced that it is declining an offer from billionaire entrepreneur and astronaut commander Jerod Isaacman to devote a Crew Dragon mission to repairing the Hubble Space Telescope. After Isaacman's Inspiration4 private commercial spaceflight in 2021, he signed a contract with Space-X for four more crewed flights, collectively called the Polaris missions. In early 2023, he proposed to NASA to use one of the missions, probably the third, to go to and repair and update the Hubble Space Telescope using the Crew Dragon spacecraft. At first, the space agency was warmly receptive to the idea, but after seeking input from many different scientists and engineers, started to back off from it. It was noted that Crew Dragon was never designed to do anything like a complex repair mission, there is no room for an airlock aboard it, it is too small to hold the extra parts and tools needed, and no matter how careful the repair astronauts are, the possibility of further damaging the already fragile telescope is just too great. NASA thanked Isaacman for his offer, but said that it will take its chances on the space telescope lasting at least several more years.

The Ed Dwight Saga

On May 19, 2024, Blue Origin's New Shepard spacecraft made its first crewed flight, NS-25, in almost two years. One of the passengers aboard was Ed Dwight, who, at 90 years 8 months old, became the oldest person ever to fly above the von Karman Line(62 miles or 100 kilometers above the Earth) and qualify as an astronaut. Some of the stories and articles about him indicated that he already was an astronaut and only racial prejudice(he is African-American) prevented him from going into space. They contend that in the 1960s, when he applied for NASA's astronaut program and was rejected, it was due solely to race. The history of his story, though, is much more complicated and needs to be explained.

(At this point, some background is necessary. In the early 1960s, the U.S. Air Force was developing its own human spaceflight program that was completely separate from NASA's. It was already flying the X-15 rocket plane, was developing the X-20 "Dyna-Soar," a manned space plane that would launched into orbit atop at Titan rocket, and was working on MOL, the Manned Orbiting Laboratory, a military space station using a modified Gemini capsule that it planned to have operational by the mid-1960s. In addition, it wanted as many Air Force pilots as possible to be chosen for NASA's astronaut corps. As such, in early 1962, it established the Aerospace Research Pilot's School(ASRP) as a follow-up to its test pilot school at Edwards Air Force Base in Southern California. Qualified pilots would go through the six month test pilot program, then the best of them would be allowed into the six month ASRP program, which was essentially a spaceflight school, where they would learn fields like celestial navigation and aerospace engineering, along with training in a highly sophisticated spacecraft simulator and flying F-104 jets with rocket engines attached to take them up to 100,000 feet or higher, where they could practice spaceflight-like maneuvers. The ones who successfully completed the program would apply for the X-15, Dyna-Soar, and MOL programs, as well as have an advantage in the competition to be NASA astronauts. To head up the school, the Air Force brought in Chuck Yeager, the already legendary test pilot who was the first to fly faster than sound. It was sometimes called Yeager's Spaceflight Academy, and eventually a number of its graduates did go on to become NASA astronauts.)

With this in mind, back to Ed Dwight. He was born in 1933, raised in Kansas City, Missouri, and always had an interest in aviation. In 1953, after high school and junior college, he enlisted in the Air Force and was able to qualify for flight school as a non-commissioned officer(NCO), through a flying program left over from World War II. He earned his pilot's wings and second lieutenant commission in 1955. In 1957, he earned a bachelor's degree in engineering from Arizona State University. When the space age began in the late 1950s, Dwight was highly interested in becoming an astronaut. This is when external forces intervened in his life and career. According to most sources, in 1961, President John F. Kennedy pledged to Civil Rights groups that an African-American military pilot would be chosen as a NASA astronaut. Kennedy had won the 1960 election(just barely) with African-American support, and felt that minorities needed to be represented in America's space program, which was becoming a cornerstone of his administration. He subsequently ordered the Air Force to find a qualified African-American pilot. Dwight was chosen.

Dwight was enthusiastic about going into space, but his flight resume was thin compared to many other astronaut candidates. Among other things, he did not have test pilot accreditation nor had he done any extraordinary cutting-edge flying, so the Air Force arranged for him to go through test pilot school and then enter the ASRP program, which would greatly strengthen his chances of being chosen by NASA.

Apparently, the test pilot program was difficult for him but he did complete it and received his certificate. In the meantime, the Kennedy Administration and the Air Force were publicizing him as the "first Black astronaut," and he was making public appearances and giving speeches about becoming an

astronaut. However, problems arose. When Dwight graduated from test pilot school, he ranked fourteenth in his class, and only the top eleven could go on to ASRP, due to funding and space limitations. Lawyers from the Department of Justice's Civil Rights division visited Yeager and put pressure on him to allow Dwight into ASRP. Finally, a compromise was reached where Dwight could go on to ASRP, as long as all the pilots ahead of him did as well. Dwight's class, then, had fourteen students instead of the usual eleven. Right -Dwight in 1962

Yeager devoted a whole chapter in his autobiography to the Ed Dwight controversy, and Tom Wolf, in *The Right Stuff,* called ASRP at that time "The Ed Dwight case with a few pieces of hardware and classrooms attached." DOJ lawyers were at Edwards constantly, questioning Yeager and his staff about Dwight's progress, or lack of it. Yeager said that he assigned special tutors to Dwight to help with the classwork and gave him extra time to master hands-on skills, but he still struggled. Yeager wrote that, at one point, he met with then-Air Force Chief of Staff Curtis LeMay, who asked him about Dwight. Yeager said, "I just don't know if he can make it, General. He's so far behind everyone else." LeMay replied, "Chuck, if you feel he should be washed out, then do it. I'll take the heat." Dwight did finish the program and receive his ASRP diploma, but when he applied for the next astronaut class, he was rejected. NASA never said why, but the implication was that there were so many other much more qualified candidates that it could not justify choosing him over them. The DOJ lawyers came back to Edwards to confront Yeager and demand to know why. Yeager pulled out Dwight's file and showed his test scores and evaluations; the DOJ did not realize how poorly he had done. Nevertheless, many were convinced that he was rejected, not because of his lack of skills, but because of his race, an accusation that increased over the years. Upper left-Yeager around 1963

Dwight, in his autobiography, has always believed that he was a victim of racial prejudice and that he could have made it as an astronaut. He and his supporters claim that, due to racism, Yeager, the Air Force, and NASA deliberately set him up to fail. A 2019 TV movie about the early days of the space program, which included the Dwight episode, depicted Yeager as an out-and-out racist, which he denied. He claimed he did everything he could to help Dwight succeed, but was put in a no-win situation for political reasons. He saw Dwight as a nice guy and a decent pilot, but, much as he wanted to be, just wasn't astronaut caliber. In his autobiography, Yeager mentioned several other African-American pilots who could have qualified for the astronaut corps, but they weren't interested in the space program like Dwight was (editor's note-One of them was named Oren Hatch. When I taught at Milpitas High School near San Jose around 1988, I had a young African-American student named Steven Hatch in one of my classes. I had read Yeager's autobiography by then but didn't think much of the name Hatch until Steven wrote in an essay, "My father was an Air Force fighter pilot who flew with Chuck Yeager;" then I made the connection. Later in the school year, I met Oren Hatch at a parent-teacher conference; he was a very impressive and knowledgeable person).

In 1967, The Air Force announced that five additional candidates had been chosen for the MOL program, along with the dozen or so already selected. One of them was Robert Lawrence, an African-American Air Force pilot who had a doctorate in chemistry and had passed the Air Force's Test Pilot school and ASRP near the top of his class. He was scheduled to fly MOL missions in 1970, but less than a year after his selection was killed in an aircraft training accident. Had he lived, he would have become an astronaut when the MOL pilots were transferred to NASA after the program was cancelled in 1969. ASRP itself ended as a separate school in 1972, when much of its curriculum was incorporated into the test pilot program. Above right- Lawrence with other MOL pilots in 1967

Not until 1978, when the first Space Shuttle astronaut group was chosen, did African-Americans, along with women, enter NASA's astronaut corps. The first person of African descent to fly in space was Arnaldo Mendez of Cuba, who flew aboard Soyuz 38 in 1980. The first African-American in space was Guion Blufford, an Air Force pilot who flew on STS-8 in 1983.

Yeager left ASRP in 1966 for other Air Force assignments and retired from the military in 1974. He died in 2020. Dwight stayed in the Air Force until 1966, then left, saying that he felt too much racial prejudice while in it. After several years as an engineer and a businessman, he returned to a field that he had always had an interest in: art, which he had enjoyed in high school and junior college. While living in Denver, Colorado, he earned an MFA in art from the University of Denver and became an accomplished sculptor, working mostly in bronze; many of his creations include representations of Black History events. He opened a studio and art gallery in Denver and still runs it today. He eventually became associated with Space for Humanity, a non-profit organization advocating access to space for all. Like him, it felt that he had been unfairly treated by the Air Force and NASA in the 1960s and paid for his seat aboard Blue Origin's NS-25 mission. When he was helped out of the New Shepard capsule on May 19, he said he was glad that he finally got to go into space.

Galaxy in the Eyepiece

NGC 4889

4889 is one of the brightest and largest galaxies in the Coma Cluster and is so close to the center of the cluster that it is sometimes called the Center Galaxy. It is classified as an E4 supergiant elliptical galaxy with an apparent magnitude of 12.9 and a distance of about 300 million light years from our solar system.

Right-4889 in the center

Science historians have speculated that Charles Messier probably observed 4889 but for some reason never included it in his famous list of celestial objects. It was first described by both William and Caroline Herschel in 1785 and is notably mentioned in their catalogue in 1786. In 1864, John Herschel, William's son, also noted it in his catalogue, and in 1888, John Dreyer put it into the NGC catalogue under two numbers, 4889 and 4884. In the 1970s, when the NGC catalogue was revised, the 4884 was dropped and it was simply known as 4889. In the 1990s, it was given the designation of Caldwell 35.

4889 is widely believed to have a massive black hole at its center; scientists have calculated it to be one of the largest known, over 5,000 times the size of the black hole at the center of the Milky Way. As such it is spewing out tremendous amounts of gamma radiation. They also have evidence that it may have been a quasar at one time but has since gone quiet. Because of its size and attributes, it is an object of concerted study by both amateur and professional astronomers.

Astronomy (Bad) Joke

Who is an astronomer's favorite singer? Freddie Mercury

From Boredpanda.com/space_jokes

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

Apache Point Observatory

The Apache Point Observatory is located in southern New Mexico, in the Sacramento Mountains near Sunspot, New Mexico. It was established in 1984 by a group of colleges and universities known as ARC, the Astrophysical Research Consortium, led by New Mexico State University, whose physics and astronomy department manages it. The site is at 9,140 feet above sea level and is noted for its clear dry skies and generally excellent viewing conditions.

The observatory has four telescopes in all; the largest is a 3.5m(140 inch) reflector known as the ARC Telescope because it is used by all of the ARC members. It is designed to be operated either remotely or at the site, and can hold a number of instruments, including a spectroscope, a near-infrared camera, and an optical laser device for measuring lunar distances. A 2.5m(100 inch) reflector is also used by all members as part of the ongoing Sloan Digital Sky Survey. A 1.0m (40 inch)reflector belongs to and is used exclusively by New Mexico State University professors and student researchers. A smaller.5m(20 inch) reflector is used for general observing and student research. Although the observatory has been involved in everything from galactic studies to nebulas and clusters, it is noted for its discovery of minor planets; at least a dozen have been found since 2004. Image-on left, the 1m telescope dome, and right, the 3.5m reflector shed

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"Why should be bother to look at these galaxies, which are often hardly discernable in amateur telescopes? Not for what they seem to be, but for what they are. Each is a distant Milky Way seen by light millions of years older than prehistoric man. They can help us gain true perspective. We and our world are the minutiae and curiosa—galaxies are the grand realities. Thoughts like these explain why some of us pass leisure hours hunting for thin misty spots…for us, those hazy blobs and splinters of light are among the major details of existence."

-Leland Copeland

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