COVID restrictions still in place-See the CVA website for information

THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno January-February 2021

2021-The Year of, Well, a Lot of Things

After 2020, The Year of COVID, 2021 promises to be much more positive, especially in astronomy and space sciences. A number of breathtaking events will take place-Here are just a few of them:

February 18-The Perservance rover lands on Mars

February 24 –China's Tianwen-1 orbiter/lander arrives at Mars

March 29-Boeing's Starliner spacecraft is launched on its second test flight

July-First crewed flight of Starliner

October 31-The James Webb Space Telescope is (finally!!!) launched

November-Artemis 1 launched

Quote of the month-

"Astronomy-impossible to understand and madness to investigate…"

Sophocles-Greek playwright 497-405 BC

In this Issue-

Central Valley Astronomers

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The President's Report:

Greetings fellow astronomers!

I don't know about all of you, but given the state of things, I feel like I've gotten the chance to do quite a bit of observing! From three major planetary oppositions to a comet to the conjunction of Jupiter and Saturn, it has been a dazzling year for astronomy. The professional scientific field has also been ripe with success. With sample return missions from asteroids successful and underway, additional data from Juno in orbit around Jupiter and American astronauts launched from American soil, it has been quite a year!

Personally, I have been attempting to hone my abilities in astrophotography while keeping some semblance of a budget, but we will see how I do with that in this following year; the properties of aperture fever apply to all kinds of other astronomical adventures. My comet photo from Courtright reservoir is something I'm particularly proud of at this point, despite its lack of perfection. Getting to view the conjunction a week ago was a similarly special event. Though I've personally seen Jupiter and Saturn in better glory separately, being able to see both planets and their moons at the same time was an event to remember.

As 2020 draws to a close, I look forward to the future and getting back to some semblance of normalcy. With vaccines being distributed, we can see there is light at the end of the tunnel and staying the course will get us there faster and in better condition. Hopefully everyone is getting to do all the astronomy they desire, even if it isn't with the full club, and I look forward to our next virtual meeting and seeing everyone's faces.

Stay strong. Stay safe, and clear skies!

-Ryan A. Ledak

Larry Parmeter is the editor of *The Observer*

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Number of exoplanets found as of December 2020-4,395

How many more are out there?

Tens of thousands? Hundreds of thousands?

Maybe millions?

A Year of Education by Scott Davis

The primary mission of Central Valley Astronomers is to educate the public about the night sky and its wonders. We have many means at our disposal to carry out our mission, including dark sky star parties, sidewalk astronomy events, private observing events, and public speaking. One feature that has gotten a bit more publicity lately is our monthly club meetings, due to the fact that they are now being broadcast live in Facebook. Members of our community now have the ability to tune in and watch our many quality educational presentations, either live or after the fact, on our Facebook page (soon to come on our YouTube channel as well).

The "videos" section of our Facebook page shows the success our virtual meetings are having. Looking at the most recent three videos from those meetings:

Our December 5 meeting has been viewed 256 times.
Our November 7 meeting has been viewed 252 times.
Our October 3 meeting has been viewed 318 times.

Of course, there is no way to know how many of those views were people watching the entire meeting, or even the entire presentation, however, we can say for sure that it's a huge increase from when we did in-person meetings only.

We have already lined up our full list of presenters for 2021:

January 30 – Gadget night! Everyone shows off their latest gadgets and gizmos!
February 27 – Scott Davis
March 27 – Fred Ringwald
April 24 – Larry Parmeter
May 22 – Fred Lusk
June 26 – Ryan Ledak
September 18 – Steve Harness
October 23 – Scott Davis
November 20 – Ryan Ledak
December 18 – John Baptista

Giving a presentation is rewarding in two ways. First, everyone who watches the presentation is enriched by learning something new and/or having information presented in a unique way. Second, it is a learning experience for the presenter, as the research process inevitably results in new information being learned.

We look forward to another great year of education, presented by people who are passionate about the beauties of space and sharing that passion with others.

Astronomy (Bad) Joke

A photon checked into a hotel and the clerk asked if he needed help with his luggage. The photon replied, "No, I'm traveling light."

From Astro Bob

Profiles in Astronomy

Janet Akyuz Mattei 1943-2004

Janet Akyuz Mattei was born in Bordrum, Turkey to a Turkish Jewish family. Her early education was in Turkey, but she came to the United States to attend college and graduate school, first at Brandeis University and then at the University of Virginia. She returned to Turkey to earn her doctorate in astronomy at Ege University, then came back to the U.S. and spent the rest of her life there. She worked at the observatory of the University of Virginia for a time, then at the Maria Mitchell Observatory in Massachusetts for many years. Eventually, she became a U.S. citizen.

Akyuz Mattei is best known as the long-time director of the American Association of Variable Star Observers. She took an interest in variable stars as a student at Virginia and made their study her life's work. When Margaret Mayall retired as direction of the AAVSO in 1973, Akyuz Mattei was asked to take her position. She held it for almost thirty years, bringing the oldest astronomy organization in the U.S. into the modern world. She pioneered satellite research of variable stars, computerized the massive database of variables, and trained two generations of young astronomers to study and love variable stars. She was heavily involved in the Hubble Space Telescope program and was instrumental in originating and pushing through a program for amateur astronomers to have observing time on Hubble. Her own specialty was cataclysmic variables and she studied them for many years, almost up to the time of her death from cancer in 2004. At her passing, she was eulogized as one of the finest, friendliest, most helpful, and enthusiastic people in modern astronomy.

Akyuz Mattei received many honors for her work, including the gold medal of the Royal Astronomical Society and the Centennial Medal from the Societe Astronomique de France. An asteroid, 11695 Mattei, is named in her honor. Source-Wikipedia

CVA's Young Astronomer Program sees its First Graduates

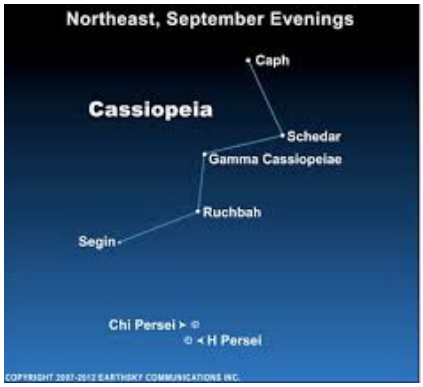
Sofia Kochkina and John Baptista, who were the first students in CVA's Young Astronomer Program, successfully completed their course work at the end of 2020 and will soon receive 6" Dobsonian telescopes for their efforts. The Young Astronomers Program was initiated in 2019 to promote astronomy and space sciences among students aged 13 to 23. Sofia and John were the first two to apply and started their coursework in January, Sofia being mentored by Debi and Fred Lusk, and John's mentors being Lynn Kliewer and Larry Parmeter. Their program consisted of a mixture of both academic knowledge of astronomy and practical hand-on methods and observation. For example, they had to know how to assemble and use a Dobsonian telescope, and use it to find objects such as galaxies, nebulas, and star clusters. They also had to identify constellations during different times of the year. Sofia and John as well had to research and know about several famous astronomers and their achievements and also learn about the life cycle of stars and the nature of black holes, among many other academic topics. When the COVID pandemic hit in March, their studies became even more difficult, but through Zoom sessions with their mentors and special social distancing starwatches, they were able to complete all the requirements by the end of the year. The final exam, so to say, was giving a talk on a topic of astronomical interest to CVA members. Sofia gave hers at the CVA Zoom meeting in November; John finished up with his at the December Zoom meeting. Congratulations to both Sofia and John for their efforts, diligence, and commitment to advance astronomy. It is CVA's hope that they will stay with the group for many years to come and spread their enthusiasm to other young people as well.

Star Stories

Schedar

Schedar, which has also been spelled Shedir, Shadar, and Shadir, is known as Alpha Cassiopeiae, the brightest star in the constellation Cassiopeia. In Bayer's catalogue it was listed as both alpha and beta, but scientists now know that it is clearly the alpha, with an apparent magnitude of 2.24 and an absolute magnitude of -2.01. It is identified as a type K0-IIIa red giant star with an orangish color, in its last stage of evolution. It has about five times the mass of the sun and is almost forty times the size or our star, and has been accurately measured to be 228 light years from Earth. In 2016, the International Astronomical Union, in its review of stellar names, officially recognized the spelling of the star as Schedar.

The confusion over Schedar's magnitude is that it was once thought to be a variable star, and up until the late 1800s, scientists who studied it noted occasional variability in its brightness. However, no such dimming and brightening has been observed since about 1900. Also, at one time it was thought to have three small companion stars, but, again, modern observations have not detected any such objects, and they may have been simply optical illusions, stars appearing to be closer to Schedar than they really were.



The word Schedar comes from the Arabic *Sadr*, meaning "breast," and is an allusion to its place as part of the anatomy of Cassiopoeia, the queen whom the constellation depicts. The Arabs also referred to it as *Al Dhat al Kursiyy,* "the lady in the chair," again, a reference to Cassiopoeia sitting on her throne.

Two Spacecraft return to Earth with Samples of the Solar System

In December, spacecraft from Japan and China successfully recovered soil and rock samples from different parts of the solar system and returned them to Earth for study. In December 2014, the Japanese Space Agency launched the Hayabusa 2 spacecraft that took almost four years to reach asteroid Ryugu. It landed two small rovers on the asteroid and spent fourteen months studying it and swooping down to take soil and rock samples. It then left the asteroid in November 2019 to travel back to Earth. On December 5, 2020, a recovery vehicle containing the samples landed without incident in the desert area of western Australia. This is the second Japanese sample return mission; Hayabusa I successfully returned asteroid samples in 2010. upper right-an illustration of the Hayabasu craft landing on the asteroid's surface

On November 23, 2020, the Chinese Space Agency launched the Chang'e 5, a four part spacecraft, two of which softlanded on the moon on December 1. The craft spent several days performing scientific experiments and gathering soil and rock samples with a robotic arm and a drill. On December 4, the assent module lifted off the surface, rendezvoused and docked with the return module in lunar orbit, and transferred the sample container, containing 4.4 pounds of material, to it. The Chang'e 5 returned to Earth successfully on December 16, and China becomes the third country after the United State and Russia, to return moon rocks to the Earth. Above left-the Chang'e lander and assent module

The Artemis Team

On December 9, Vice-President Michael Pence and NASA announced the eighteen American astronauts who will fly aboard the initial Artemis missions, including the first lunar landing mission, now scheduled for late 2024. The group includes two space shuttle veterans, a number of Mir/ISS astronauts, and several astronaut candidates who have not yet flown. The oldest of the group, Scott Tingle, who has flown aboard ISS, is 55, and the youngest, Jessica Watkins, is 32. Half of the Artemis group comes from the most recent astronaut class, the class of 2017, all of whom qualified for spaceflight only about a year ago. The most experienced member of the Artemis Team is Stephanie Wilson, an aerospace engineer, who was selected as an astronaut in 1996 and flew aboard three space shuttle missions. Next after her is Joseph Acaba, a geologist and educator, who was chosen in 2004 and is a veteran of one shuttle and two Soyuz/ISS flights. Seven of the group are military test pilots and three are medical doctors. Here, then are the Americans who will fly the initial Artemis missions: Joseph Acaba, Kayla Barron, Raja Chari, Matthew Dominick, Victor Glover, Warren Hoberg, Jonny Kim, Christina Koch, Kjell Lindgren, Nicole Mann, Annie McClain, Jessica Meir, Jasmin Moghbeli, Katherine Rubins, Frank Rubio, Scott Tingle, Jessica Watkins, and Stephanie Wilson. NASA also announced that, at a later date, several astronauts from other countries will be chosen to be part of the Artemis Team. They will come from organizations that already have partnerships with NASA, such as the European Space Agency, the Japanese Space Agency, and the Canadian Space Agency. Even though, RKA, The Russian Space Agency, is not officially involved in the Artemis program, Russian cosmonauts may be chosen for the Artemis Team as well (on December 15, NASA head Jim Brindenstine announced that Brazil had signed on to the Artemis program; as such, astronauts from Brazil will eventually be members of the Artemis Team).

NASA's current plans call for the first moon mission, known as Artemis-1, to be launched in November 2021. It will be an unmanned circumlunar flight to test the SLS-Orion-MPCV system. The second mission, Artemis-2, is scheduled to be launched in the summer of 2023 with a crew of four for a lunar orbiting mission(On December 16, NASA and the Canadian Space Agency announced that a Canadian astronaut will be one of the crew members aboard Artemis-2). Artemis-3, the first lunar landing mission, is now scheduled to be launched in the fall of 2024, again with a crew of four, and will land near the moon's south pole. If all goes well, Artemis-4 will also land near the moon's south pole as early as the summer of 2025. Subsequent Artemis missions will work on both the Gateway lunar space station and a permanent moon base at the south pole which may be continuously occupied, much like ISS, by 2030. The proposed crewed mission to Mars, now scheduled for 2033, will be an extension of the Artemis program, and the Artemis Team members will be involved in it as well.

From The Observer Archives-

"If any of you own a Schmidt-Cassegrain from Meade or Celestron, don't rush out to buy vibration suppression pads. Take some old fruitcake and wrap it in duct tape and place it under the tripod legs. Not only will the vibrations disappear, but you'll finally have a good use for the cake. Who invented these cakes anyway?"

A good way to use some unwanted Christmas gifts!

From the February 1991 *Observer*

What's New in Space

Incoming Biden Administration Likely to Change NASA's Priorities

Sources close to the incoming Biden Administration say that he will make major changes in NASA's goals and objectives. Donald Trump is a big advocate for returning to the moon and going to Mars, but Joe Biden is said to be much less enthusiastic. Indications are that he wants NASA's main focus to be on using space and satellite technology to monitor climate change and environmental trends from Earth orbit(actually, NASA has already been doing this for many years) and make deep space missions, both manned and unmanned, a much lower priority. This may have a marked effect on the upcoming Artemis moon landing program and also eventual Mars program. In addition, in 2020, NASA asked Congress for $150 million to continue the Artemis program, and received only $15 million. As a result, many space experts say that the Artemis moon landing missions may be delayed until at least 2025 or even to 2027(see previous story about the Artemis Team selections). Meanwhile, NASA chief administrator Jim Brindenstine announced in early December that he will leave the space agency at the end of January; speculation is that Biden wants to name a woman as chief administrator, and his top choice for the position is said to be Pamela Melroy, a former space shuttle pilot and now an aerospace executive and consultant.

Legendary Test Pilot Chuck Yeager Dies 1923-2020

Charles E. "Chuck" Yeager, perhaps the most famous person in aviation history, died at his home in Grass Valley, California, on December 7, 2020, at the age of 97. He is best known for "breaking the sound barrier" in 1947, but also held numerous aviation speed and endurance records during a career that spanned 70 years.

Yeager was born and raised in a small town in West Virginia, and, after high school, joined the Army Air Corps in 1942. Even though he was an enlisted man, his natural piloting ability quickly gained notice, he was made a flight officer, and ended up shooting down thirteen German planes during World War II. After the war, he was assigned to what was then called Muroc Air Field in the high desert of southern California, where on October 24, 1947, he flew the Bell rocket-powered X-1, named "Glamorous Glennis,"(after his wife) to a speed of Mach 1.05, the first person to fly faster than sound. Over the next fifteen years, Yeager broke several more records in rocket-powered aircraft, then commanded Air Force fighter squadrons before becoming, in 1962, the first director of the Advanced Research Pilots' School, essentially a prep school for astronauts, at Edwards Air Force Base(which Muroc was renamed). Yeager, though, never applied to be an astronaut himself, even with all of his skills and experience; officially, he was not eligible because he did not have a college degree; unofficially, he said he wasn't interested in NASA's manned space program as it was in the 1960s(But many years later he hinted that he would like to have flown the Space Shuttle).

In 1969, Yeager was made a general, and retired from the Air Force in 1974. For many years afterwards, though, he served as a consultant and test pilot for aviation companies, continued to fly high-performance jets, and set a number of aviation records in private aircraft. He flew regularly until he was almost 90, and even then continued to attend air shows and keep up with the latest flying trends. In the eyes of many aviation historians and pilots, he was the epitome of the "Right Stuff," in Tom Wolfe's words, that characterized the best pilots and later the astronauts.

Crew Dragon's First Operational Flight

Space-X's Crew Dragon was successfully launched on November 15, with a four person crew aboard, and docked with ISS the next day. The four; Michael Hopkins, Victor Glover, Shannon Walker, and Soichi Noguchi, will spend the next six months aboard the space station. This is the first of six operational Crew Dragon flights that NASA has contracted with Space-X over the next three years. When Boeing's Starliner is approved for human spaceflight, it, too will fly several missions to ISS as part of another contract, then NASA will decide which of the two to use for the rest of ISS's mission, which is now funded up through 2024(and hopefully will be extended to 2028).

The day after the launch, while on the way to ISS, the astronauts participated in a tradition: Crew Dragon commander Hopkins gave Glover, who is the only space rookie on the mission, his gold pin signifying his first flight in space. Also, with the arrival of the four astronauts, ISS's personnel complement is seven people, which will be the standard from now on. Since the U.S.'s module has sleeping spaces for only four people, and those will be occupied by three Americans and one Japanese, Hopkins announced that his sleeping quarters will be in the Crew Dragon capsule, in the commander's seat, continuing another tradition from space shuttle days when the mission commander usually slept in the cockpit while the rest of the crew snoozed in the mid-deck work area.

NASA and Boeing Prepare for Second Starliner Test Flight

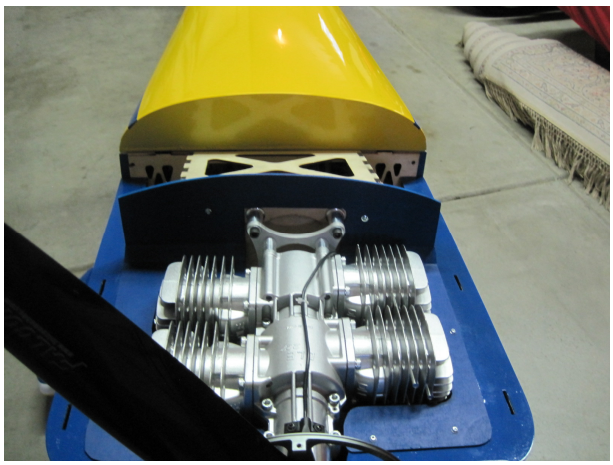
NASA and Boeing announced on December 11 that the launch of the second unmanned Starliner test mission will take place on March 29, 2021. This will be almost fifteen months after the first test mission, in December 2019, in which, due to a software glitch, the Starliner used up all of its fuel and had to return to Earth after only one day. An investigation showed even more problems with the already troubled-plagued spacecraft, which is now over three years behind schedule. Boeing says that the craft is ready to fly again, after a series of successful test parachute landings in the Southwestern desert. The second mission, known as OFT(for Orbital Flight Test)-2, will be an eight day flight, including a docking and stay at the International Space Station. If it is successful, the first crewed test mission, OFT-3, with a crew of three, will take place in July or August 2021, and the first operational mission, again with a crew of three, will be launched in January 2022, to spend six months aboard ISS. It will be the first of six operational flights that NASA has contracted with Boeing.

Astronomy Short

James Lick(1796-1876) led an eccentric and enterprising life. He started as a carpenter and piano maker, lived in South America and Europe for several years, then moved to California and made millions in real estate during the 1849 gold rush. Before he died, he gave away his fortune(he never married) to science endeavors. Part of it went to the establishment of an observatory on Mount Hamilton, in the hills above his estate in San Jose, California. When the main telescope, a 36" refractor, was built in the 1880s, Lick's body was reburied under its support mount, where it still resides today. Many years later, the San Jose School District built a high school near the site of his estate and named it James Lick High School. Appropriately, its athletic teams are called The Comets.

CVA Member Profile

CVA member George Silva reports that, between the virus and generally poor viewing conditions where he lives, he hasn't been able to do much astronomy work this year. Instead, he's been active in his other major interest: building and flying large scale model remote control airplanes. He says that, like so many any other events, the scale model competitions were cancelled in 2020. But he has filled up the time working on his latest aeronautical creation, images of which are shown here.



Once in Several Lifetimes-The Jupiter-Saturn Conjunction

On December 21, 2020, the winter solstice, Jupiter and Saturn appeared the closest to each other in almost 800 years(of course, it's an illusion; they're still over 500 million miles apart). But still nice to see them less than one arc second from each other. Here are some images taken of that event. Left– by Vasanth, friend of CVA members Nikita and Shailesh Shetty. Right-by Larry Parmeter

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

The Rosemary Hill Observatory

The Rosemary Hill Observatory is located in Bronson, Florida, about thirty miles west of Gainesville, Florida, and is one of the observatories used and managed by the astronomy and physics department of the University of Florida. Besides the Rosemary Hill Observatory, the University also has astronomical observing facilities and equipment in the Canary Islands, in Australia, at Kitt Peak in Arizona, and on the UF campus itself. The Rosemary Hill observatory is used by professors at the university as well as graduate and undergraduate students, and also as serving as a public outreach and amateur astronomer facility.

The Rosemary Hill Observatory was established in 1967 through a grant from the National Science Foundation and also a large land donation by a supporter. It currently sits on about 80 acres of very remote hillside, and consists of two domes, a dormitory, a research center, and a few support buildings. Two telescopes are currently at the site; the largest is a .7m(30″) cassegrain reflector. The other telescope is a .4m(18″) Richey-Chretien reflector. In recent years, both instruments have been used to study galaxy evolution and structure, binary and variable stars, exoplanets, asteroids, and stellar composition. An upgrade to the facilities in the 1990s allowed even more details and extensive work to be done.

Left-the 30″ Cassegrain at Rosemary Hill; right-the 30″ Dome

Astronomy in History

Several thousand years ago, a meteorite, now known to be composed mostly of iron, fell to Earth in northwestern Greenland, breaking into several fragments before crashing into the ground. For centuries, the indigenous Inuit people used pieces of the fragments to make spearpoints, arrowheads, and fishing hooks, among many other things. Although Western explorers learned about this meteorite as early as 1818, it was not until 1894 when the Arctic explorer Robert E. Peary found the largest piece with the help of Inuit guides; it was eleven feet by seven feet by five feet and weighed thirty-four tons. The native Inuits called it *Innaanganeq* and *Saviksoah*("Great Iron;" Peary renamed it *Ahnighito,* "the tent"- after his daughter, Marie Ahnighito Peary, who was born in Greenland in 1893) It was also called the Cape York meteorite, after the area in which it was found. He brought it back to the United States, where it is now on display(above right) at the Museum of Natural History in New York City.

Since then, seven other major pieces and a number of smaller ones have been found; most are in museums in the United States and Europe. Together, they comprise the largest meteorite ever found. (An interesting related historical fact is that several Viking-era weapons, found in Norway and made of iron, have been linked to the Ahnighito meteorite, showing that the Vikings, or Norse, traveled at least as far as northwestern Greenland during their sea voyages from the eleventh to the fourteenth centuries). Left-Peary with the Ahnighito meteorite From Wikipedia