COVID is (hopefully) waning-but CVA restrictions still in place

THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno July-August 2021

Summer is the time to see many great objects

Above-M17, the Swan Nebula, also known as the Omega Nebula(I've never quite understood why; it doesn't look anything like the Greek letter Omega) in the constellation Sagittarius. Image taken by CVA member Karlton Cruz.

The summer months are a good time to see many beautiful objects in Sagittarius, Scorpius, and other constellations. Besides M17, there are the nearby Trifid and Lagoon Nebulas, M20 and M8, a whole series of beautiful globulars such as M22, M28, and NGC 6638 as well as many other NGC globulars. In Scorpius, we have M4 and NGC 6744. In Virgo are the great cluster of galaxies, including M87 and M104, the famous Sombrero Galaxy. Lyra comes into view with the Ring Nebula and the often overlooked M56 globular cluster. And Cygnus, the Northern Cross, has not only the Veil Nebula, but a number of overlooked clusters like IC 1369 and NGC 6819 . And, of course, Cygnus has Alberio, the Eye of the Swan, a beautiful double star system that is blue and gold. I never get tired of looking at it.

So go to one spot in the summer sky and see how many objects you can find just in that area, then write them up and send to *The Observer.* Let's have a contest to see how many can be seen in, say, two hours of observing. I'll publish the objects and their observers in a future issue.

Quote of the month-

"Astronomy compels the soul to look upward, and leads us from this world to another…"

Plato, *The Republic*

In this Issue-

Profiles in Astronomy-Svein Rosseland

Star Stories-Markab

The Cmi Vrh Observatory

Russians and Chinese Agree to joint Lunar Base

Russians plan to build own space station

Commercial spaceflight literally takes off

The U.S., NASA and the Canadian connection

Apollo 12 and Surveyor 3

Great astroimages from CVA members

Central Valley Astronomers

Web address
www.cvafresno.org

Webmaster-Scott Davis

Officers and Board- 2021

President-
Ryan Ledak

1st Vice-President-
Steve Britton

2d Vice president-
Scott Davis

Secretary/Treasurer-
Steve Harness

Star Party Coordinator-
Brian Bellis

Historian/Observer Editor-
Larry Parmeter

Education Coordinator-
Scott Davis

Director- Warren Maguire

Director- Clarence Noell

Director-Hubert Cecotti

Director-Lynn Kleiwer

Larry Parmeter is the editor of *The Observer*

He can be contacted at 559-276-8753 or at lanpar362@gmail.com

The President's Report:

Dear Fellow Astronomers!

As this first half of the year comes to a close and we take a break from meetings, I would like to thank everyone for being good sports and attending our virtual Zoom meetings! They have been pretty well attended for the most part and have gone pretty smoothly. They do, however, leave me slightly conflicted, mainly having to trade seeing all of you in person for the convenience of not leaving my house. First world problems I guess.

As this new moon comes up and our deep sky observing time comes into focus, I hope we have some great weather going forward for the next two weeks. The Milky Way is in full force right now all night and a bunch of the most famous nebulae are up and ripe for observation or photography, whichever suits your fancy.

While I don't know where I'll be, I will be making a good effort to get out and see the Summer night sights. It's a great time to do some astronomy. Get out there and take a look!

Clear skies! -Ryan A. Ledak

Number of exoplanets found as of June 2021-4,768

How many more are out there?

Tens of thousands? Hundreds of thousands?

The CVA Sales Box

I have two telescopes for sale:
Orion Starseeker IV 150 mm. (6 in.) w/ GOTO
Includes solar filter, case, manual Asking $350

Orion XT8i 8 in. Dobsonian
Missing Intelliscope controller, 9x50 finderscope
Includes solar filter, case, manual, Telrad Asking $250
If you want specs, description see telescope.com
Jere Yost (559) 612-7513 Jereyost3@gmail.com

Profiles in Astronomy

Svein Rosseland 1894-1985

Rosseland was born and raised in Kvam, Hardanger, in Norway, the youngest of ten children. He was educated at local schools, then attended the University of Oslo, but stayed only three semesters before leaving to work at the Bergen School of Meteorology. Starting in 1920, he spent several years at the Neils Bohr Institute in Copenhagen, eventually returning to Oslo to earn a doctorate in astrophysics in 1927. Afterwards, he was a guest professor at Harvard from 1928 to 1930. In 1931, he became a professor at Oslo until the German invasion of Norway in 1941, when he fled from Norway and again came to the U.S. and taught at Princeton. From 1943 to 1945, he lived in London and helped develop radar for the British. After the war, he returned to the University of Oslo, where he remained for the rest of his life.

Rosseland 's main interests were in stellar and solar studies. He played a major role in the establishment of the Harestua Solar Observatory in the early 1950s and was also one of the founders of the Norwegian Academy of Technological Sciences. He was a theorist more than an observer, however, and wrote several books about the workings of the stars, most of which are still current and in use today. From his work and meeting many of the founders of quantum mechanics at Bohr's institute in the 1920s, he also wrote books about quantum theory. He won a number of awards for his work, and an asteroid and a lunar crater are named in his honor.

Star Stories

Markab

Markab, also known as Alpha Pegasi, is one of the four stars making up the asterism of the Great Square in the constellation Pegasus. It is the lower right star, the other three being Scheat, Alpheratz, and Algenib. It has two classifications: a B9 giant star and also a A0 sub-giant, with an apparent magnitude of 2.48 and an absolute magnitude of -.72. It is 133 light years from Earth. It has a surface temperature of 10,000 degrees K and is almost 200 time more luminous than the Sun. Even though it was classified by Bayer as the alpha star, it is actually only the third brightest star in Pegasus, after Scheat and Alpheratz.

Scientists believe that Markab has exhausted its hydrogen and is no longer on the main sequence. It is expanding its size and is now almost five times the diameter of our Sun, with three times the mass. They also believe that it will soon start to shed its gas layers and will end its life as a planetary nebula with a white dwarf star in the center. They do know that it is spinning very rapidly and as a result, has a slightly oblong shape.

The name Markab comes from the Arabic and means "the saddle of the horse." For many centuries, Markab was one of the main navigation stars in the Northern Hemisphere, used by many cultures.

What's New In Space

Russians and Chinese to Build a Moon Base

On March 7, RKA announced that it and the Chinese Space Agency have signed an agreement to establish and build a base at the south pole of the moon, possibly in the early 2030s. NASA and RKA have been in talks for several years over Russian participation in the Gateway lunar space station program, and also a joint American-Russian base on the moon, but the Russians were said to want a much larger role than NASA was apparently willing to offer. It may also be that Russian president Vladimir Putin wants RKA to lessen its ties with NASA due to American restrictions on Russia. At this time, Russia does not have a heavy lift rocket or a deep-space craft to send its cosmonauts to the moon; its next generation crewed spacecraft, and the successor to Soyuz, named Federation, has been repeatedly delayed by engineering problems and lack of funding. China's moon goals are still vague, but indications are that, using its newly developed Long March 5 heavy lift rocket and its second-generation crewed spacecraft, it will probably attempt moon landings by the end of 2020s.(One of the reasons for the Trump Administration's goal of putting Americans back on the moon by the end of 2024 was intelligence reports that China was planning moon landings by 2025 or 2026. However, indications are that the Chinese have had numerous problems with the Long March 5, leading to delays.).

Russia also Announces its Own Space Station

In May 2021, the Russian Space Agency also announced that it will be ending its participation in the International Space Station program after 2024 and will soon begin building its own national space station, which it plans to have fully operational by the late 2020s. This was not totally unexpected, since the Russians have been hinting about leaving ISS for some time. Like the decision to partner with China on an eventual moon base, many Russia experts believe that the space station decision came from President Vladimir Putin's office and is meant to reduce ties with the U.S. due to increasing political tensions between the two countries over the last several years. Also, Russian space officials believe that ISS will soon reach the point where it is no longer safe to inhabit after almost 25 years in orbit. They especially look at the main Russian module, Zvezda, which was actually built in the late 1980s, and see it as well past its expected orbital lifetime of 15 to 20 years. No details have been given on the proposed Russian space station, but speculation is that it will look similar to the Mir space station of the 1980s and 90s. The Russians also did not comment on whether or not they will allow other nations to use the new space station.

The Commercial Spaceflight Market Revs Up

With the so far success of Space-x's Crew Dragon, commercial and private spaceflights have suddenly accelerated, with several missions being planned for the next few years. Space-X has already scheduled two private commercial missions within the next year. One will be the Inspiration4 spaceflight led by entrepreneur-billionaire Jared Isaacman, which will be launched for a three day flight in December of this year carrying a crew of four, followed by an eight day private mission to ISS, sponsored by Axiom Aerospace, which will have four private commercial astronauts aboard. Axiom's flight is now scheduled for February 2022. A second Axiom mission is tentatively scheduled to be launched in the Fall of

2022; it will be the result of a reality show entitled "Who Wants to be an Astronaut," in which contestants will undergo the same kind of training that NASA's astronauts do. At the end, a winner will be chosen and fly to ISS aboard a Crew Dragon mission. According to reports, Peggy Witson, a veteran NASA astronaut who now works for Axiom, will be the commander of the flight. Meanwhile, the Russian Space Agency has announced that Soyuz MS19, dcheduled for launch in September 2021, will be a private commercial flight with a cosmonaut commander, a TV director, and an actress, who will shoot scenes in space for a TV show about cosmonauts being rescued. Soyuz MS20, in December 2021 will carry Japanese fashion billionaire Yusaku Maezawa and one of his colleagues for a ten day stay aboard ISS. Maezuawa is planning to use the Soyuz-ISS flight to gain experience for an eventual circumlunar mission with eight colleagues aboard Space-X's Starship as early as 2024.

Closer to home, Jeff Bezos' Blue Origin announced in May that its New Shepard suborbital spacecraft will make its first crewed spaceflight on July 20, 2021, carrying Bezos and his brother Mark, a pilot and a fourth person who has been chosen in an auction. This will be a "mortar lob" flight, with the crew experiencing about five minutes of weightlessness at the peak of the arc. Also, in May, Virgin Galactic's VSS Unity completed another spaceflight with two pilots, and announced that the next test spaceflight will carry five people, possibly including Richard Branson and Dick Rutan, as early as August.

Bringing Home the Pork, Part 2

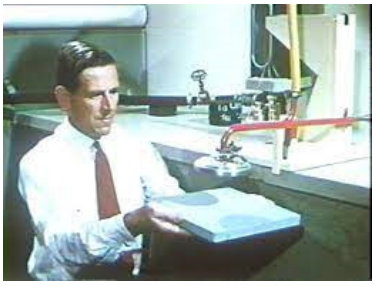
A few issues ago, this column focused on the fact that Senator Richard Shelby of Alabama has essentially held NASA hostage by demanding that it use the SLS, even though it's way over budget and years behind schedule. Now, the same thing is happening on the other side of the Senate floor. Democratic senator Maria Cantell of Washington, the new head of the Senate Space Committee, has attached an amendment to the Endless Frontier Act, which sets NASA's budget for 2022-23. by demanding that NASA scrap its decision to award the Artemis lunar lander to Space-X and go back to having two finalists for further consideration, as was the original proposal in 2019. Why? Because Jeff Bezos' Blue Origin moon lander lost out to Space-X, and Blue Origin is based in Washington near Seattle. Cantell is threatening to cut NASA's lunar lander budget unless it considers Blue Origin for the Artemis program. The amendment still has to pass the full Senate and then go to the House. Cantell claims that she's only trying to make the decision process fair, but it's really about protecting jobs and bringing money to her home state(NASA has explained that Space-X will be used only in the initial Artemis landings, and Blue Origin and Dynetics, the other aerospace company in the competition, will be considered for landings after that, but that's not good enough for Cantell). As a result, the Artemis moon program falls farther and farther behind.

A followup on this-The House Committee on Space, Technology, and Science is currently holding hearings on NASA's plans to land on the moon in 2024. Several Democratic House members are concerned that Space-X has been chosen to provide the moon lander for the initial Artemis landing missions. It boils down to 1) they don't like private commercial companies providing NASA with hardware because the government doesn't have total say over the program, and 2) they don't get to make sure that the funding goes to their districts. As such, they want to hold up the program until they can pass legislation to completely control it. Isn't politics wonderful?

Spaceflight Short-When it was launched on April 9, 2021, Soyuz MS18 was named the "Yuri Gagarin" in honor of the 60th anniversary, the next day, of Gagarin's historic spaceflight. It was the first time a Soviet/Russian crewed spacecraft had ever been given a personalized name.

The United States, NASA, and the Canadian Connection-Part 1

Almost a year ago, during the Covid stay-in-place restrictions, I was surfing the internet one day and came across a BBC Online article entitled, "The Record-Breaking Jet that Still Haunts a Country." It told the story of the Arrow, built by Avro-Canada, an aviation company near Toronto, which was the most advanced fighter jet anywhere in the world in the late 1950s, and how it was cancelled by the Canadian government in 1959. This piqued my interest because I had previously read stories which mentioned Avro-Canada, and, in particular, a secretive Skunkworks-like division within it which designed and possibly built the world's most advanced aircraft and spacecraft, some of them under the sponsorship of the U.S. military. I had also read over the years, from astronaut biographies and space program histories, that many of NASA's top engineers in the 1960s were Canadians who had a profound influence on the American manned space program. Having a lot of time on my hands during the shut-down, I decided to look into this Canadian connection and eventually came up with a fascinating story of technology and massive brain power north of the U.S. border.
-the editor



Avro-Canada's and even the country of Canada, owes its aeronautical and aerospace reputation, which is quite extensive, mostly to one person-John "Jack" Frost, a British-born engineer, who, if stories are to be believed, designed and possibly built some of the most advanced and radical aircraft, and even spacecraft, in the world in the 1950s. If he and his team had been allowed to do everything they wanted, Canada today would be the most advanced aviation country anywhere, even more so than the U.S.

Frost was born in in England, near London, in 1915, and educated at St. Edward's School in Oxford(which is not connected to Oxford University), where he dazzled his professors with his innate knowledge of aircraft design and engineering. After graduation, he worked for several aviation companies, and in 1942 joined DeHaviland Aircraft, where he worked on fighter planes. After the war, he became heavily involved in the first generation of jet fighters and was the chief designer of the D.H. 108, known as the Swallow, a swept-winged tailless jet plane that was faster than any aircraft then known and almost beat the U.S. in the flight of a supersonic aircraft. In late 1946, Geoffery DeHaviland, the son of the company's founder and its chief test pilot, was killed when his D.H 108 disintegrated in midair while attempting to break the sound barrier.

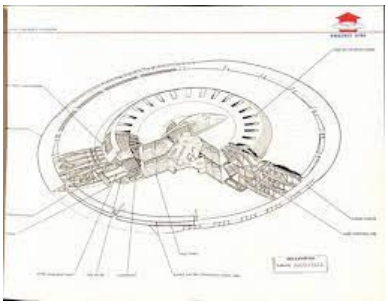
In 1948, Frost moved to Canada, where he went to work for Avro-Canada. Avro-Canada was established in 1945, an offshoot of Victory Aircraft, a company that had been set up in Canada during World War II by the British aviation company Hawker-Siddeley, which wanted a facility that was out of the reach of German bombers. After a few years at Avro-Canada, Frost persuaded its executives to establish a division known as the Special Projects Group(SPG), and recruited a cadre of independent and creative engineers to work with him. In time, the SPG would become a virtually autonomous organization. The group worked behind literally locked doors and said almost nothing about its projects. Even the top executives at Avro did not really know what the SPG was doing.

Starting in 1954, limited information on the SPG's activities began filtering out to the public. In short, it was designing and building a whole family of aircraft that had Vertical Takeoff and Landing (VTOL) capabilities. The one aircraft about which the most information was released was Project Y1, codenamed Manta, which was a spade-shaped wingless aircraft(right). According to the specs, the craft would have been able to fly at twice the speed of sound. Reports and historical stories say the U.S. Air Force and the U.S. Navy were initially interested in the Manta, but later decided not to become

involved in it. The Y1 Manta project, which was apparently cancelled around 1956, never got beyond the mockup stage.

Besides the Y1 Manta project, Frost's group also designed a disc-shaped craft which was known as Project 1794 and also Y2. This had the pilot's cockpit in the center and six conventional turbojet engines arranged in a hexagon around it. Vector nozzles directed the thrust to the outside of the disc to provide both vertical and horizontal motion. According to reports, this aircraft got as far as a prototype which was tested in a special rig at the Avro facility. The results of the tests were never revealed and apparently the program was cancelled around 1958.

Of more immediate interest to the U.S. military was the Avrocar(right), known as project VZ-9, which was first revealed in 1957. This was the SPG's response to a U.S. Army request to build a "flying Jeep" that could skim across battlefields providing ground support and reconnaissance. The Army sponsored and funded the Avrocar program. The first prototype was unveiled in 1959; it was a saucer-shaped craft that could carry two people, with a central rotor system powered by three small jet turbine engines. Eventually two Avrocars were built and tested in the United States. They were found to be underpowered(they could get barely three feet off the ground) and unstable, among many other problems. In 1961, the Army cancelled the program. One of the Avrocars was returned to Canada; the other one is in the U.S. Air Force Aviation Museum in Dayton, Ohio.



Some aviation experts, though, believe that the Avrocar may have been a cover for something far more ambitious. Around 1957, word leaked out of a Project Silverbug,* about which almost nothing was known for many years afterwards. Not until the 1990s, under the Freedom of Information Act, did information on it emerge, and even that was mixed in with UFO conspiracy theories, and, some believe, disinformation as to its design and purpose. If the FOIA information is valid, Silverbug was a radically different type of aircraft that the Special Projects Group designed for the U.S. Air Force. It was disc-shaped with the pilot's cockpit in the center and its power source was what was known as a radial-flow gas turbine(RFGT), also called a pancake engine.+ The turbine engine components were integrated into the entire frame and spun around the cockpit; thrust was expelled via nozzles placed around the edge of the disc. According to stories, the craft was capable of flying at speeds well above mach three and could literally turn on a dime. No one knows if the Silverbug was actually built and flown; while some reports say it was cancelled in the late 1950s, others claim that it disappeared into the U.S. Air Force's "Black World" of secret aircraft.

In 1962, Avro-Canada shut down completely and its engineers dispersed(which is the second part of this story). Frost himself moved to New Zealand, where he became an aviation consultant for Air New Zealand. He lived a very below-the-radar life and never talked about his work at Avro until his death in 1979.

End of Part 1.

*** Some accounts say that the Y1, Y2, and Silverbug programs were simply different versions of the same aircraft. Others, though, claim that they were three completely separate projects.**

+In an interview in the late 1980s, Frost's son said that his father traveled to Germany around 1949 for undisclosed reasons. Some aviation experts, though, believe that he went there to meet with German aeronautical engineers. For several years after WWII, persistent stories, which have never been verified, claimed that the Germans developed and possibly flew disc-shaped aircraft using RFGT technology near the end of the war. (Which leads to another story: when I was growing up in the 1960s, like many boys of my generation, I was very into model cars and aircraft. I distinctly remember, when visiting the hobby stores during that time, seeing a model; it might have been from Revell, of a disc-shaped– flying saucer like aircraft with World War II German Luftwaffe markings on it. Might this have been what the Germans developed and Frost was so interested in?-the editor)

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

Crni Vrh Observatory

The Crni Vrh Observatory is near the town of Crni Vth, in Idjria, in Slovenia. It was originally a site for amateur astronomers to starwatch, and in 1975 was responsible for the first images of Comet West. In 1985, mostly through the work of volunteers, a formal observatory building was constructed, and two telescopes were permanently placed at the site, which is at 2,400 feet above sea level. Since then, other telescopes have been used at the site as well. For many years, the graduate students and professors at the department of physics at the University of Ljubjana used it for their research projects, and some still do. However, amateur astronomers still constitute a major presence at the site, and have made several discoveries of comets, minor planets, and asteroids.

Today, the observatory has two permanent telescopes used for research. One is a 60cm reflector equipped with a high intensity CCD camera, which has made many discoveries. The other is a 19cm reflector, which has played a role in the discovery of two comets. The observatory also has an all-sky survey camera. As of this date, the observatory has been credited with the discovery of over 100 asteroids and minor planets.

Top right-the building holding the 60cm telescope; right-the 60 cm reflector

From *The Observer* Archives

Who Coughed on the Camera?

"A NASA report seems to imitate that a fellow who put a camera together in 1967 had Strep Throat when he assembled the unit. Apollo 12 astronauts brought back a camera from the moon that had been left there on a previous trip.* The camera was on the moon from April 1967 to November 1969. It was brought back under sterile conditions. It had been sent to the moon on an unmanned flight. When a bit of the foam from the insulation from the camera was placed on a growth medium a colony of *Streptococcus mitris* began streaming outward. The camera had been in outer space for two and a half years! And you wonder why that little rascal is so hard to get rid of when it is in your throat."

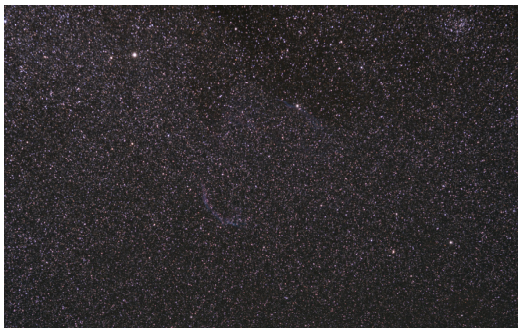
From the December 1982 *Observer*

***The camera was aboard Surveyor 3, which soft-landed on the moon on April 20, 1967. Landing near it was the main goal of the Apollo 12 mission, which touched down about 500 feet away on November 19, 1969. In a visit to the Surveyor spacecraft, astronauts Pete Conrad and Alan Bean detached the camera, some struts, and the soil scoop, and brought them back to Earth for study by scientists and engineers.**

Contributions by CVA Members







Images by Ryan Ledak-
Top left-M81, M82, and NGC 3077
Top center– M101
Top right-Iris Nebula
Bottom left-Hercules asterism
Bottom right-Cygnus loop


Two images of the Lunar eclipse on June 12, 2021 by George Silva

Astronomy(bad) Jokes

Einstein developed a theory about space, and it was about time too!
I'm reading a book about anti-gravity. It's impossible to put down.

From Astronomytrek.com