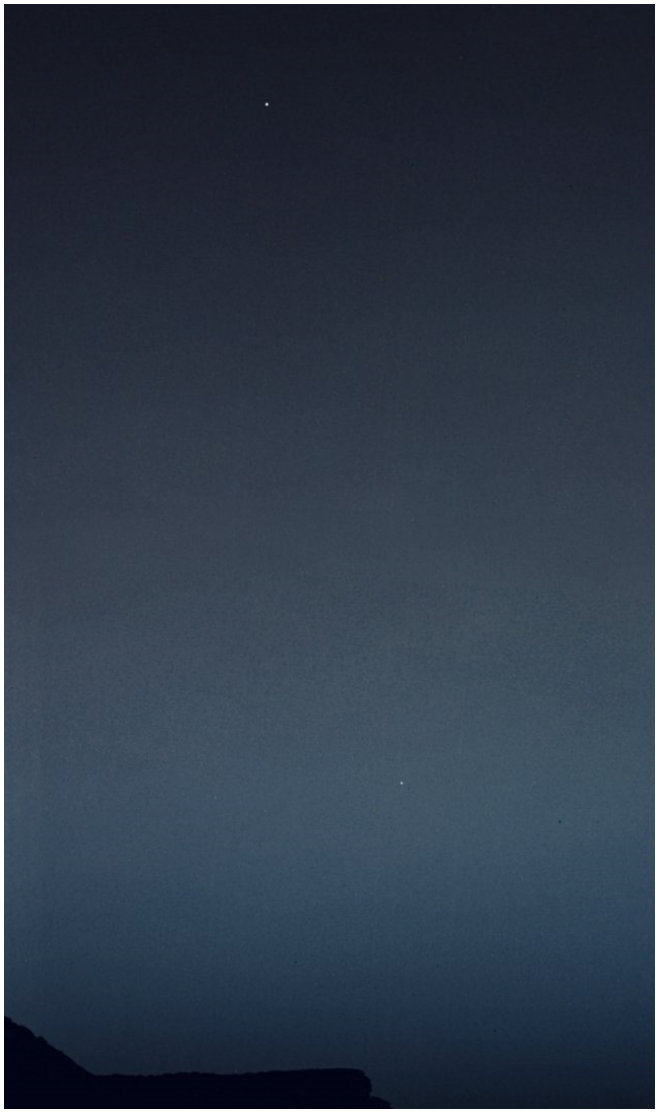
America is Finally Back in Space!

(It took long enough)

THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno July-August 2020



Curiosity Images Earth and Venus; Perseverance to Launch on July 22

This image, taken on June 17, 2020, from the surface of Mars, shows Earth, above left, and Venus, below right, in the Martian sky. In the meantime, Mars Perseverance is going through final checks and is scheduled to begin its journey to Mars on July 22, landing on the Red planet in February 2021.

"Keep the mice healthy…"

Apollo 11 astronaut Michael Collins, after entering the biological containment van following the spacecraft's return to Earth, July 1969

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Contributions from CVA members

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The President's Report:

Well, it has certainly been an interesting year!

Despite the difficulties we have all been working through, the club is doing well. Things could be going better, and nobody is disappointed more than I about the lack of outreach and regular club meetings. That being said, I think we're all trying to make the best of a bad situation and I just wanted to highlight some of the things that ARE happening!

Firstly, we had our first ever "virtual" club meeting back on 6th of June and I felt it went very well. We had around 14 people in attendance at the height of the event and it gave us the chance to discuss some important club business and just get to see each other's faces.

Speaking of each other's faces, people have been getting together to observe while retaining their social distance. I myself have been to Big Stump several times since it's reopening to get some photos as well as beat the heat and there have been many people up there joining me, so people are getting out. If you do have photos of yourself or your group getting together and doing some observing, I recommend at least posting them in the community section of our facebook page. It's a great way to let people know you've been out and let other members see what you've been up to!

As for our immediate future, our next meeting on August 29th is also supposed to be a virtual meeting and is set to be livestreamed on our Facebook page so the public can at least watch. Make sure your membership information is up to date as an invitation will probably be sent over email about this event. I heard of several club members not getting the invites to the last one, so make sure your email is up to date at the very least. As of this writing, all our events have been canceled, including the Glacier Point star party in Yosemite and the Dark Sky Festival in Sequoia/Kings Canyon National Park and our club star parties are still in a "restricted" status. Hopefully this whole mess is over sooner rather than later so we can get back to these important and exciting events.

Hopefully you are all doing well and are able to get out and do some observing and we look forward to seeing you at our next meeting! Clear skies!

-Ryan Ledak

Number of exoplanets found as June 2020-4,280

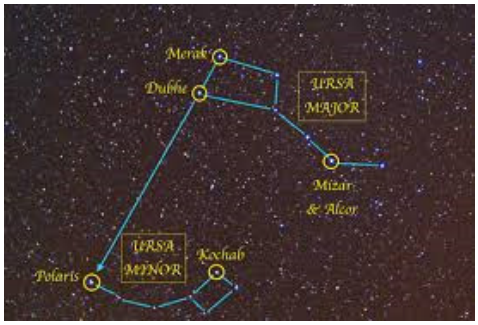
How many more are out there?

Tens of thousands? Hundreds of thousands?

Star Stories-Dubhe

Dubhe is also known as Alpha Ursae Majoris, even though it is not the brightest star in the constellation. It is actually the second brightest, due to a mixup in cataloguing the stars in the 1700s. The brightest is Alioth, but it is officially catalogued as Beta Ursae Majoris. Dubhe is one of the two "pointer stars," along with Merak, that point to Polaris, the North Star. In addition to being mislabeled, Dubhe is also a mystery in that unlike the six other stars that form the Big Dipper, it does not show the same proper motion as them and is not a part of them(scientists are now pretty certain that the other six, all A stars, were created at about the same time in the same gas cloud). In fact, scientists are not sure where Dubhe came from or even how old it is. Dubhe is 123 light years from Earth, has an apparent magnitude of 1.79, and an absolute magnitude of -1.1.

Dubhe is(so far) a spectroscopic binary system. The main star, known as Dubhe A, is a giant orange K0 type star with a mass of 4.25 times that of our Sun. Dubhe B is a white dwarf with a mass of about 1.5 times that of the Sun. It orbits around Dubhe A once every 44 years. A third star, informally known as Alpha Majoris C, is considered by some scientists to be part of the Dubhe system, but this star is in fact a good distance away from both Dubhe A and B, and some stellar listings give it its own designation of HD 95638. It is an F8 star with an apparent magnitude of 7. In another mystery, scientists are not sure how it fits into the Dubhe system, if it even does. Some scientists believe that several other very faint stars also make up the Dubhe system.



The name Dubhe originated with the Arabs. it was originally known as Dubb, coming from an Arabic phrase meaning the Back of the Great Bear, indicating its position in the constellation. To the ancient Chinese, Dubhe was known as Tian Shu, the Star of the Celestial Pivot. In Anglo-Saxon England, the Big Dipper was known as the Plough(plow), and Dubhe was one of the front points(or tines) of the plow.

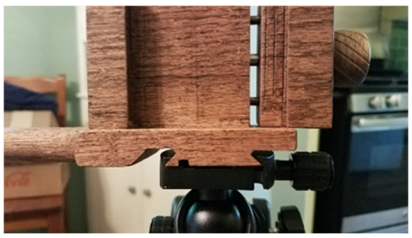
Profiles in Astronomy-Viktor Knorre 1840-1919

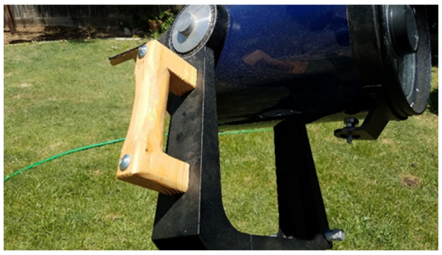
Knorre came from a long line of astronomers: his grandfather, Ernst Knorre, was director of the Dorpat Observatory in Tartu, Estonia, and also a professor of mathematics at Dorpat University; and his father, Karl Knorre, was director of the Nikolayev Observatory in the Ukraine, and later director of the Berlin Observatory. Viktor was born and raised in Nikolayev, Ukraine, and was educated at the University of Berlin; his professor was Wilhelm Foerster, one of the best known astronomers in Germany at the time. After graduating, Knorre worked at Pulkovo Observatory in Russia for a few years, and in 1871, moved back to Berlin, to the Berlin Observatory, where he would stay for the rest of his career. He was also a professor of astronomy at the University of Berlin.

While at Berlin, Knorre discovered four of what are today called minor planets: Koronis, Oenone, Hypatia, and Penthesilea. He also designed and built a new kind of equatorial mount, the Knorre and Heele Mount, which is still used today. Knorre was also a chess master who played in European and international tournaments. An asteroid is named after him.

Shelter-in-Place Telescope Projects by Brian Bellis

I've been using my time in quarantine to build some astronomy related items out of wood. One of my favorites has been this cellphone holder for my camera tripod. I made it from some red oak that was left over from a home flooring project we had done recently. The dovetail mounts into the star tracker device that I shared at our last gadget night. I designed it to clamp down onto my cellphone. The clamp rides on two fixed rods and is tightened by a long bolt with a hand knurled knob and an embedded nut in the body of the device. I also included a handle for ease of manipulation but in retrospect, I might have made it come out perpendicular to the clamp to make pointing easier.





The next item I made is extremely practical for carrying and mounting my Meade 8"SCT. I've needed a big comfortable handle for the longest time. It is made for a chunk of 2x4 and bolted right through the fork. What a difference this has made. Sometimes, very simple things can bring great joy.

The next bit in my list of homemade astronomy accoutrements is a mount for an old Orion red dot finder. It was not being used for any other scope but it didn't fit onto my Meade. The mount is made from another piece of that flooring I mentioned earlier. It took me a couple of tries to get the dovetail right but it seems to work just fine.

Most of you have probably seen this device I made for capturing cellphone imaging of the moon at River Park. I have no idea how many hundreds of people are using a lunar photo as their wallpaper on their cellphones taken while sitting on this chunk of 2x4.

By the way, that is Bella, the backyard astronomy dog helping me with this article.

I decided to make another one of these for my Orion 12" Dob. The problem is that my cellphone would always be vertical. I needed it to clamp in place. Taking what I learned from my previous builds, I made this monster. It is made primarily from Baltic birch plywood. It fits over an Orion DeepView 28mm 2" eyepiece that came bundled with the scope. I wanted to be able to adjust the position of the cellphone over the eyepiece more precisely, so I made left, right, and up adjustment screws. To limit the extraneous light, I mounted a rubber shroud so that the camera lens sits right over the hole in the rubber. I realize that it is a bit of overkill and that I could have purchased something that works as well, but where is the challenge in that? I have, after all, used it to image some deep sky objects from my back yard with a cellphone!

So how about some results? Here are some exposures of Ursa Major and Orion taken with my Samsung Galaxy cell phone mounted on a camera tripod, and also a gallery of moon and planet images taken through the eyepiece of my Meade 8" SCT.

And finally M13, M7, and M8 taken through the eyepiece of my 12" Orion Dobsonian.

What's New in Space

NASA and America Back in Space-Finally!

The first crewed American space mission in nine years lifted off successfully on May 30 with veteran NASA astronauts Douglass Hurley and Robert Behnken. The Space-X Dragon DM-2 crew docked with ISS on May 31. Shortly after the crew was in orbit, they announced that they had named their spacecraft Endeavour, after the space shuttle Endeavour, which both of them flew aboard. NASA has been quiet about how long the Endeavour Dragon DM-2 mission will take, but indications are that Hurley and Behnken will stay aboard ISS for at least six weeks and possibly longer. This is because ISS is shorthanded right now, with only three crew members who cannot fit in their scientific experiments and research, due to otherwise routine fixing and upgrades. The Dragon DM-2 crew will spend much of its time on repair work and maintenance, as well as some research. (On June 18, the director of NASA's commercial crew program said that Hurley and Behnken will return to Earth on or shortly after August 2-so, a mission of about eight-nine weeks).

During the NASA television programming on the Dragon DM-2 launch, a representative of Space-X said that the second crewed mission, tentatively known as OM(for Operational Mission)-1, will be launched about six weeks after the return of DM-2, carrying a crew of four: Michael Hopkins, Victor Glover, Shannon Walker, and Soichi Noguchi. This would put its launch date at mid-September of 2020. The OM-1 mission will last six months. Also, it was announced that the second operational mission, OM-2, will have a tentative launch date of February 2021 and will carry a crew of four, one of whom will be a Russian cosmonaut. It, too, will be a six month mission.

NASA also announced that Boeing's Starliner is going through final checks and will make a second unmanned demonstration flight as early as September 2020. If that goes well, the first crewed Starliner mission may take place in January or February of 2021. Starliner has been grounded since its first uncrewed flight December 2019 due to software problems.

"Space Tourism" Heats Up

Space-X announced that in the fall of 2021, Axiom Aerospace is sponsoring and paying for a completely private Crew Dragon mission, with an Axiom-trained astronaut commander-pilot and three paying "tourist" passengers for an eight day stay aboard an Axiom module attached to ISS. Each passenger will pay $55 million, and according to Space-X, one of the seats has already been bought.

In the meantime, RKA, the Russian Space Agency, announced that the Soyuz MS20 mission, scheduled for December 2021, will be reserved for two "space tourists," along with a cosmonaut commander, for a week-long stay aboard ISS. The mission is being arranged through Space Adventures, Inc., which has previously sponsored several Soyuz paying "tourist" missions. Indications are that one of the seats will be filled by Japanese businessman Satoshi Takamatsu, who was originally scheduled to take the place of British singer and actress Sarah Brightman after she cancelled her Soyuz seat in 2016. Sources say that RKA will probably fly space tourist missions regularly during the 2020s, to make up for the loss of U.S. funding due to the Crew Dragon and Starliner programs. NASA has one more paid Soyuz seat, aboard Soyuz MS18 in April 2021. Since 2011, NASA has been buying six seats a year aboard Soyuz, at $85 million per seat. RKA congratulated NASA and Space-X on a successful Crew Dragon launch in May, but indications are that it is now in turmoil because it will be deprived of a major source of revenue.

I'd like to start new section-CVA members sharing an astronomical experience that has had meaning or importance to them-Doesn't have to be long-a paragraph or two at the most will be fine-Send them in and I'll put them into future issues of **The Observer**

CVA members recall-

My interest in astronomy dates back to the mid 60s. Our family would travel to Park City Utah every summer to visit relatives. One or two times during the trip, my dad would take my cousin and me to camp out at Girl Scout Lake a couple of miles away. At such a high altitude and no lights around, the stars were plentiful and brilliant. We would lay on our backs in our sleeping bags and scan the sky for satellites passing overhead. There weren't many at the time, but when we found one, it was special. To this day, I still find myself scanning the sky for satellites. I often make time to look for the ISS when it has a flyover and wave at the astronauts.

-Gordon Tessman

As long as I can remember(right up to this morning) I wanted to be an astronaut. I constantly joke with my now grown children that anything is still possible. The kids are most certain that NASA/Space-X does not need an idiot, class-clown type on Mars. I've spent years off and on trying to get my kinds into astronomny and space exzploration research. Years ago, I finally got them onboard. All I did was eventually getting around to upgrading my old Tasco telescope to an Orion 12" Dob. It was so large, it was taller than the kids. So they naturally jumped in as soon as I showed them the Moon.

I had to sell the telescope several years back, the STS program ended, and the kids got older and lost interest in the subject. It was a dark time.

Thank you, Elon Musk!

I can hardly contain my renewed excitement for the space program and space exploration. My now adult children have rediscovered their love for space exploration and astronomy. They all laughed at me when I renewed my CVA membership a few months ago after many years' haitus, but when I told them last night that I included them in the membership when I renewed it-pure excitement!

We had a "launch party" for the Crew Dragon launch and we stayed up Friday night debating, re-searching, and watching the latest Starlink launch. We discussed ion engines, the space shuttle, future missions to deep space, i.e. manned missions to Saturn and Jupiter…loads of fun!

I let them in on a secret as well… I just purchased a Celestron CPC 1100-they lost their minds.

I'm looking forward to finally meeting everyone soon, excited to be a member again, and excited for what's to come with NASA and Space-X.

-Damon Israel

From the Observer Archives-

From a puzzle-How many Californians does it take to change a light bulb?

"Subscriber Janet Sagaser thinks it would take 100 Californians to change a light bulb-one to actually change it and 99 to do the feasibility study and environmental impact report."

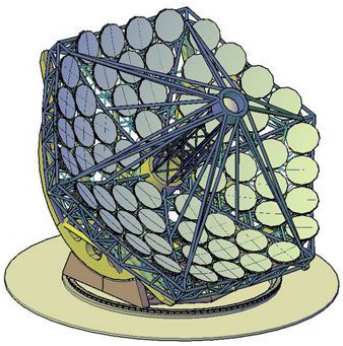
From *The Observer* December 1990

The New Generation of Giant Telescopes

In 1947, the 200″ Hale Telescope at Palomar was hailed as the largest in the world, and it would keep that record until 1994(in 1975, the Soviets announced that they had built the world's largest telescope, with a 240″primary mirror, at Zelenchuksky in the Caucasus Mountains of southern Russia. But it has never lived up to its potential due to poor mirror construction, a badly designed dome, and a far less than ideal location on the mountain. It is rarely mentioned in the annals of large telescopes today). But today, 2020, the 200″ is only the 20th largest, and in a few years will drop even lower. That doesn't mean, however, that its days are over; it still does very important and useful scientific work, and will do so far into the future. But in the past 25 years it's been eclipsed by a new generation of mind-boggling giant telescopes, and even larger ones are on the way.

In 1994, the Hale was shoved off the top by the 400″ Keck Telescope at Moana Kea. Keck was the first telescope to use segmented mirror technology; instead of one giant mirror, a number of smaller ones using computer assisted stabilization. In Keck's case 36 hexagonal mirrors controlled by computers to work as one 400″ mirror. In a few years, it was joined by the identical Keck 2. In 1998, the Hobby-Elerby Telescope, also with a 400″ segmented mirror, began operations at the McDonald Observatory in Texas.
At the same time that the segmented mirror technology was taking root, an optician at the University of Arizona, Roger Angel, developed a mirror-making oven that could spin, allowing mirrors of up to 8.5 meters to be made quickly, easily and efficiently. By the late 1990s, several telescopes with 8 meter or larger mirrors, in some cases multiple 8 meter plus telescopes were being built: the Large Binocular Telescope at Mount Graham in Arizona, the Gemini and Saburu Telscopes on Mauna Kea, the dual Magellan Telescopes in Chile, and the four 8 meter telescopes at the Southern European Very Large Telescope, also in Chile. At the same time, in the early 2000s, the Gran Telescopo Canarias(below, left), the world's largest single(segmented) mirror telescope with a primary mirror of 11 meters was built on the Canary Islands in the Atlantic Ocean, and the Southern African Large Telescope, with a 10.5 meter segmented mirror, was established in South Africa. And today, 2020, three more telescopes, each with segmented mirrors, are being built which will dwarf all of them. The 30 Meter Telescope (above, left) is now under construction on Mauna Kea and will be operational in 2027, the Giant Magellan Telescope with seven 8 meter mirrors is being built in Chile and will be operational in 2024, and the largest, the European Extremely Large Telescope(above, right), with a segmented primary mirror of 39.5 meters, will see first light in 2025.

That's not all, though. Two more telescopes, currently in the planning stages, will tower over even them. The Southern European 50 meter Telescope is currently projected to see first light around 2035. Then Colossus (right), sponsored by a consortium of U.S. organizations, with a segmented primary mirror of 74 meters, is now scheduled to begin construction in the late 2020s with first light by 2037. These telescopes are being designed to directly image exoplanets to look for life on them. And to go even further, NASA, ESA, and other space agencies are planning a huge telescope with a primary mirror of between 50 and 100 meters, to be built on the far side of the Moon, once a base is established there. This telescope will be built, not with materials brought from Earth, but with resources mined from the Moon itself and processed in Moon factories and technology centers.



Even bigger telescopes eventually? Don't bet against them.

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

The Fremont Peak Observatory

This facility is of particular interest to me because I played a(small) role in it during its early years. I was a member of the San Jose Astronomical Association from 1984 to 1989, met Kevin and Deni Medlock on occasion(but did not know them personally, and I doubt if they would remember me today), and made some minor contributions to the observatory's construction. After it opened, I was trained and certified on the 30", used it myself, and took my astronomy club students from Milpitas High School to it for starwatching sessions. In 1989, I left the Bay Area to move to Fresno, so I have not looked through the 30" in many years, but it was, and hopefully still remains, a beautiful instrument. - the editor

The Fremont Peak Observatory is at Fremont Peak State Park in the hills outside the town of San Juan Baptista in San Benito County, California, about forty miles south of San Jose. It is an amateur facility which has regular public starwatching nights and is also available for use by dedicated amateurs and organizations . The main telescope on the mountain is a 30" reflector which is now known as the Challenger Telescope.

Fremont Peak has been a favorite observing place for amateur astronomers in the Bay Area dating back to the 1960s, due to its remoteness from the lights of San Jose, and also its altitude, over 3,000 feet above sea level. The history of the 30" telescope itself begins around 1981, when several members of the San Jose Astronomical Association, led by Kevin and Deni Medlock, visited the Corning Glassworks in New York. While there, the company gave them what it apparently considered throwaway material-an unfinished piece of pyrex glass approximately 5' by 3'. The group got it back to California, then had it cut into three discs: one 30", one 16", and one 10". The Medlocks spent the next several years grinding and polishing the 30" disc, and also building the frame and the clock drive for it in the machine shop of one of the SJAA members(the 16" and 10" were also eventually made into fine telescopes). At the same time, they raised money for the 30" telescope structure and building and got approval from the California State Parks department to build a permanent observing facility on Fremont Peak. The telescope was completed and saw first light in 1986. At first the observatory was managed by the San Jose Astronomical Association, but it is now run by the Fremont Peak Observatory Association, a non-profit organization, in cooperation with the California State Parks Commission. In addition to its public starwatch schedule the observatory also participates in a number of astronomical programs, including a meteor shower mapping survey and a lunar impact program.

Science Joke-the last word

A neutrino walks into a bar . . . and keeps right on going.

From Cheap Thoughts www.angelo.edu