THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno September-October 2019

2019 CVA Summer Star Parties Attract Large Crowds

This year, CVA has had larger than usual crowds at its public starwatches. Due to local media coverage and community bulletin boards, events such as the Millerton Lake public starwatches(above) in June , July, and August attracted hundreds of people. Similarly, the public starwatches at Riverpark on Saturday nights during the summer have also garnered large groups of people. What is especially encouraging is that many of them are young people with interests in astronomy and related areas. CVA is helping to propel new generations into a star studded future.

Observer Quote of the Month

"Palomar would be a great place if it weren't for the astronomers..."

-Byron Hill, chief engineer and superintendent at the Palomar Observatory from the 1940s to the 1960s. During his tenure, Palomar's unofficial name was "Byron's Hill."

In this Issue-

Central Valley Astronomers

Web address
www.cvafresno.org

Webmaster-Scott Davis

Officers and Board- 2019

President-
Scott Davis

1st Vice-President-
Steve Britton

2d Vice president-
Lynn Kleiwer

Secretary/Treasurer-
Steve Harness

Star Party Coordinator-
Brian Bellis

Historian/Observer Editor-
Larry Parmeter

Director-
Warren Maguire

Director-
Clarence Noell

Director-
Joe Griffin

Some more Millerton Lake Summer 2019 images

Larry Parmeter is the editor of *The Observer*

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

Number of exoplanets found as August 2019- 4,107

How many more are out there?

Tens of thousands? Hundreds of thousands?

CVA Board Meeting August 17, 2019

The CVA board met on August 17 in room 191 the East Engineering Building at Fresno State. The meeting started at 7:10pm. Present were Scott Davis, Fred Lusk, Steve Harness, Steve Britton, Lynn Klewier, and Larry Parmeter. The first order of business was to make what would be an August meeting (the club generally does not schedule meetings in July and August) into the annual board meeting, and was unanimously approved. Next was the 2020 calendar, picking dates for club meetings, and Eastman Lake, Courtright Reservoir, Big Stump, Riverpark, and Millerton Lake starwatchers. It was noted that the club will be at Glacier Point during Labor Day weekend, along with the Stockton astronomy group, and this may be the last time for awhile, since Glacier Point Road will be closed starting next year for repairs and resurfacing. Also, Fred Lusk is now the coordinator for the Glacier Point starwatches; Dave Dutton did it for many years, and a vote of thanks to him for doing so. The 2020 calendar will be the same size and format as previous ones. The club still has a few 2019 calendars; they will be given away at the annual Dark Sky Festival at Sequoia National Park in September.

Scott brought up the Young Astronomers program. There were no applicants for the first year, and the board debated whether or not to open it up for another year. It was agreed to do so, since several young people who have come to recent Riverpark events have expressed an interest in it. Applications will be taken starting September 7 and will run through October 31 for the 2020 observing year. As part of the promotion for the YAP, the local media will be invited to the September 7 Riverpark event, and the program will be played up to attract more interest.

Scott reported that the paperwork and filings for non-profit status on both the state and federal level have been completed, and the club is officially a non-profit organization again. The board will make sure that the club's non-profit status does not lapse again. Steve Harness will notify the bank that the club's finances are non-profit. Steve also reported that the club has about $5,500 in its treasury, a result of several organizations and groups giving generous donations for club star parties. It was also reported that the club's membership has risen to almost 50 paid up-to-date members. The new computerized membership software is doing a good job of tracking members and reviewing their status.

Scott also brought up the idea of having board members announce their resignations in advance, so that when elections occur during the December regular meeting, nominations can go much smoother. This was approved by majority vote.

One final item on the agenda concerned pictures from former members. In the past, several CVA members, including a couple of past presidents, were deeply involved in astrophotography, and the club wants to contact them to get permission to use their images for its website and Facebook pages. Board members will do this over the next few months.

Open discussion was mostly about filling speaker positions for the September, October, and November meetings.

The meeting adjourned at 8:30pm.

Astronomy Short-

Contrary to popular belief, Galileo did not invent the refractor telescope in 1609. Other scientists were using refractor telescopes as early as 1604. Galileo's first telescope was originally a sailor's spy glass that had been made by a Dutch optician a few years earlier. Galileo modified it for astronomical viewing, and when it proved successful, he went into business, building and selling copies of it. His first telescope was about 10 power; later versions went as high as 20 power. That's not much compared to telescopes today, but it was enough to study the Moon and the planets and discover, first, three moons around Jupiter, then a few days later, a fourth.

Big Crowds and Big Scopes at Big Stump

By Scott Davis

On the weekend of August 23 and 24, the Sequoia Parks Conservancy held their annual Dark Sky Festival, dedicated to showing visitors the many wonders of the dark night sky. This year we held a public star party at the Big Stump parking lot on the night of Saturday, August 24. In several different ways, I was awestruck at the results.

First, the scopes. I counted 22 telescopes in our part of the parking lot prior to dark. The scopes ranged from 3 inches to 18 inches in size, and began showing visitors objects in the sky as soon as it was dark enough to see anything. I overheard our club members giving detailed information on what people were observing, and answering their questions with knowledge and friendliness. I have never participated in *any* star party with this many telescopes in one place.

Second, the staff. We had three staff members from the Sequoia Parks Conservancy at Big Stump with us, led by Scott Reinhardt, Programs Manager. He and his two employees, Keith Merritt and another, were extremely professional and helpful. They were joined by two employees of the National Park Service. Their hands were full for over two hours, expertly managing the flow of traffic and people so that the event ran smoothly. The star party went off without a hitch, thanks to their efforts. It was a pleasure to work with them and I hope we continue to have the opportunity to do so.

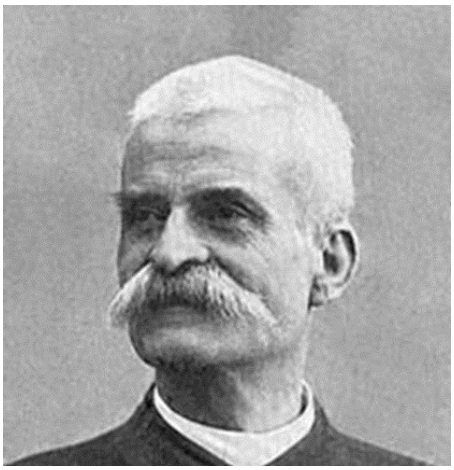
Finally, the visitors. This is, by far, the most well-attended public star party in a dark location I have ever attended or participated in. Scott Reinhardt and I estimated that we had between 400 and 500 people. More than just the quantity, however, was the quality. The visitors, kids included, were very polite and interested, and asked very good questions. We saw visitors from as far away as Russia, Germany, and France. Many came to Kings Canyon National Park and Big Stump specifically for the star party; others just happened to be in the area and decided to see what all the fuss was about.

A big part of our club's mission is outreach – educating the public about what is observable in the sky with the aid of a telescope. On August 24, we were able to take it a step further, showing them the difference it makes when one gets away from the city lights and observes from nice dark skies, which are becoming rarer and rarer. Perhaps we can work to preserve the dark areas that exist today and, maybe, improve the ones that are already polluted with unnecessary light.

A big thank you to those members that brought their scopes to share with others, and the employees at Sequoia Parks Conservancy and National Park Service that made it possible!

Profiles in Astronomy

Antonio Abetti 1846-1928



Abetti was born and raised in San Pietro de Gorizia in Italy. He was educated in mathematics and engineering at the University of Padua, where Galileo once taught, and later studied physics and astronomy. Eventually, he became a professor at the University of Florence, and also the director of the Arcetri Observatory, which he completely modernized. He died at Acretri at age 81 while still doing astronomical studies.

Abetti is best known for his discoveries and observations of asteroids, comets, and minor planets. He discovered a number of them during his many years at Arcetri. In 1874, he was part of an expedition to study the transit of Venus; his specialty on this trip was the spectroscope, one of the first times it was used for an astronomical event. Abetti also became an excellent celestial mapmaker, precisely determining the positions of thousands of objects in the sky. Some of his celestial maps are still in use today. His son Georgio also became a well known astronomer. A minor planet and a crater on the Moon are named in his honor.

Star Stories

Altair

Altair is the alpha star(a Aquilae) in the constellation Aquila, and is one of the three stars making up the Summer Triangle(along with Deneb and Vega). It is classified as an A7 star, with an apparent magnitude of .77 and an absolute magnitude of 2.22, making it the twelfth brightest star in the sky. Part of its brightness comes from the fact that it is close to the Earth, only 16 light years away. Altair is a little bit less than twice the size of our Sun, but is almost ten times brighter. It is part of a nebular complex known as the G Cloud.

Altair is interesting to scientists in that it has a very high rotation rate, making one complete revolution every nine hours. As such, it is stretched out at its equator, giving it an oblate shape, rather than a true sphere. Scientists are still not quite sure why it rotates so fast. Researchers have also recently learned that Altair has a slight variability to its brightness, and have designated it as a Delta Scuti Variable, a class of stars that have miniscule variations in their luminosity, possibly due to irregular convection on their surfaces.

Altair was well known to the ancients, who called it "the Eagle Star." Its name was given by the Arabs as *an-nasr-at-tair*-the "flying eagle." The Medieval people of Western Europe also referred to the star as an eagle. The ancient Chinese called it *Nu Lang Xing*, the "cowherd star," in reference to a myth about it. The Maori people of New Zealand referred to it as *Poutu-te-rangi,* the "Pillar of Heaven."

Source for both articles-Wikipedia

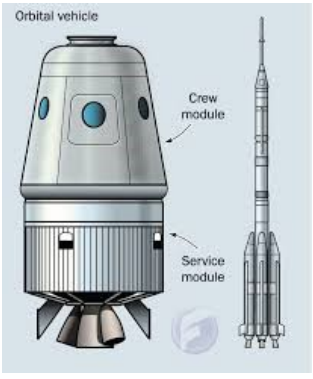
What's New in Space

NASA Announces Crew Space Launchings and First Orion mission

In June, NASA announced the tentative schedule for its first crewed space launchings since the end of the space shuttle program in 2011. Space X's Dragon V2 will be launched with two people aboard in November 2019, and Boeing's Starliner, with a crew of three, will be launched in November 2019. Both of these dates, though, are dependent on further testing; in Dragon's case, a solution to the "anomaly" that destroyed the craft in May, and in Boeing's, a successful unmanned mission to ISS in August. Some NASA insiders said that the crewed launchings may not actually take place until early 2020, which would put both spacecraft almost three years behind schedule.

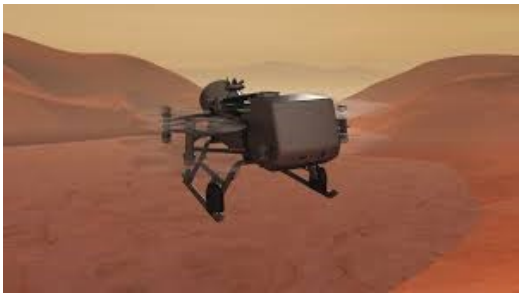
Also, NASA is pushing for a fall 2020 launch of the first mission, uncrewed, of the Orion-MPCV and the SLS rocket. Although the SLS is also almost three years behind schedule, Boeing, the prime contractors, insists that it will be ready for launch by the summer of 2020. The first Orion-SLS mission will last almost 25 days, and will do several circumlunar flybys between the Moon and the Earth. If it goes well, the second Orion-SLS flight, which is part of the Artemis Program and will be crewed, will take place in the summer of 2022, and will be a lunar orbital flight. The third mission is now scheduled, to be a lunar landing flight in 2024. NASA is currently contracting with several aerospace firms to come up with a lunar lander that will hold at least two, and possibly three, people. NASA has already announced that at least one of the crewmembers on the first lunar landing mission will be a woman. In August 2019, NASA administrator James Brindenstine announced that the Marshall Space Flight Center in Huntsville, Alabama, will be the prime site for the Artemis Program.

India Prepares for its First Manned Spaceflight



In May 2019, the Indian military announced that its country's first manned spaceflight will take place in late 2020 or early 2021. It will use the Ganganyaan (right) spacecraft, with has been under development since 2014, will have a crew of three, and will last for seven days. A select group of pilots from the Indian military has been training for the mission since 2017. Although the announcement did not say anything beyond this first flight, indications are that it will be the beginning of a regular series of crewed flights during the 2020s, leading to a possible semi-permanent space station by 2027.

The Dragonfly Mission to Titan

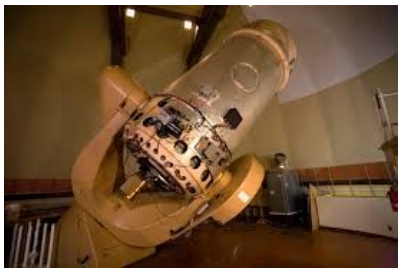


Another announcement that NASA made in June was the Dragonfly mission to Saturn's moon Titan. Dragonfly will be a semi-autonomous drone craft which will be able to fly over the moon's surface, taking images and gathering data for several scientific experiments. Dragonfly is the second spacecraft in the New Horizons program, which is meant to explore the outer Solar System. NASA is looking at a tentative launch date of 2025, and an arrival at Titan in 2029

Part of a continuing series on astronomical observatories throughout the world

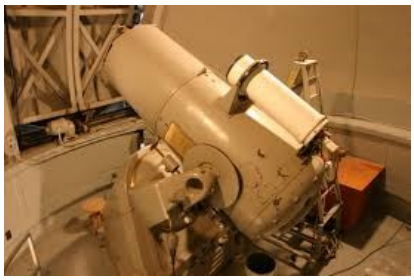
The Palomar Observatory-The Other Telescopes

Although writing on this seems like a no-brainer, the Palomar Observatory is actually much more than just the famous 200″ Hale telescope. At one time, no less than six telescopes were operational on the mountain, and although there are only three now, the two other than the Hale have played important roles in astronomy and space sciences research.



Palomar's history begins with George Ellery Hale, the founder and director of the Mount Wilson Observatory, who, in 1924, was awarded a grant from the Rockefeller Foundation to build a 200″ telescope(Hale originally planned a 300″ telescope, but came to realize that the technology to build it did not exist at the time) in Southern California. After two years of scouting out locations, he came across Palomar Mountain, about 90 miles south of downtown Los Angeles. At exactly a mile above sea level and far from the light and air pollution of the Los Angeles basin, he saw it as the ideal place for an observatory. He surveyed the top of the mountain, then went back to Los Angeles and bought the land for his big new telescope. According to biographers, he never visited Palomar again, and died in 1938.

During the 1930s, work on the 200″ progressed on Palomar Mountain. But it was not the first operational telescope there. An 18″ Schmidt Camera was built not far from the 200″, and saw first light in 1936. It was used extensively by Cal Tech and Mount Wilson astronomers, especially Fritz Zwicky, who made major discoveries with it. From 1941 to 1945, all work was stopped on the mountain for the duration of World War II. After the war, construction resumed. While the 200″ was being finished in the late 1940s, a 48″ Schmidt camera was also being built at Palomar. This was Walter Baade's pet project; he helped design it and he supervised its construction. Both the 48″ Schmidt camera and the 200″ Hale telescope were completed at about the same time in 1948. In the 1960s, another telescope, a 60″ reflector, was built, and saw first light in 1970. This is known as the Oscar Meyer Telescope, named after the founder of the hotdog company, whose family financed it.



In 1995, the Palomar Testbed Interferometer became operational on the mountain. It functioned until 2008, taking measurements and positions of thousands of stars. From 2003 to 2009, the Palomar Planet Search Telescope, a .1m transit telescope, operated along with telescopes on the Canary Islands and at Lowell Observatory.

Today, three telescopes are operational on Palomar Mountain: the 200″ Hale; the 48″ Schmidt Camera, now called the Samul Oschin Telescope; and the 60″ Oscar Meyer Telescope. The 18″ Schmidt camera was shut down in 1993 due to its age, and also because of water damage(its dome leaked during every rainstorm). Its last major achievement was the discovery of Comet Shoemaker-Levy 3.

For many years, the Palomar Observatory was a joint collaboration between the Mount Wilson Observatory and Cal Tech. However, in 1978, Cal Tech took over the facilities and telescopes. Today, Cal Tech runs it in conjunction with NASA's Jet Propulsion Laboratory and Cornell University.

Top right-the 200″ Hale Telescope; top left-the 60″ Oscar Meyer Telescope; bottom right-the 48″ Schmidt Camera; bottom left-the 18″ Schmidt Camera(no longer used)

Palomar Observatory's achievements, especially those of the 200" Hale, which was the largest telescope in the world for 46 years, are almost too numerous to mention, among them the discovery of quasars and the finding of the age and size of the universe. Even though several other observatories now have telescopes much larger than the 200," the telescopes at Palomar are still some of the most important astronomical instruments in the world, and with upgrades and modernizations, will continue to be so far into the future.

More About the Palomar Observatory

George Ellery Hale was awarded a grant to build the 200" by the Rockefeller Foundation in 1924. However, Hale was director of the Mount Wilson Observatory, which was funded by the Carnegie Institute, and the Rockefellers refused to give money to the Carnegies. So, Hale, who was also on the board of trustees of the California Institute of Technology, arranged for the grant to be given to Cal Tech, and worked out an agreement for the 200" telescope to be operated jointly by Cal Tech and Mount Wilson. This arrangement lasted until 1978, when Cal Tech took over complete control of Palomar. Right-Hale 1868-1938

Walter Baade had more than a passing interest in the Palomar Schmidt cameras. In the late 1920s, as a young astronomer at the Hamburg Observatory in Germany, he knew and worked with Bernhard Schmidt, who built telescopes at the observatory. In 1929, the observatory sent Baade and Schmidt to the Philippines to observe a solar eclipse, and it was on this trip that Schmidt told Baade about his idea for a new type of telescope, one that used a spherical mirror and a glass corrector plate to offset the aberration caused by the mirror. This design would give razor-sharp photographic images across the entire field of view, rather than just a small limited area as in other telescopes. After they returned to Germany, Baade urged Schmidt to build the new telescope; he did in 1930, and Baade was the first person after him to use it. When Baade came to the Mount Wilson Observatory in 1932, he told the Pasadena astronomers about Schmidt's telescope; they immediately petitioned that one be built, and in 1936 the 18" Schmidt camera saw first light on Palomar Mountain. In 1937, Baade pushed for another, larger, telescope, and funds were allocated for a 48" version(the Schmidt camera size is based on the diameter of the corrector plate, not the primary mirror. Also, Schmidt calculated that 48" was the maximum diameter that the corrector plate could be). Work began on it in 1938, but World War II halted construction until 1945. The 48" Schmidt Camera was completed in 1948, and has been in operation ever since. In 1987, it was renamed the Samuel Oschin Telescope.

Left-Baade 1893-1960 Right-Schmidt 1879-1935

from Richard Preston, *First Light,* 1987

From the Observer Archives

"Meeting-
When-September 4, 1982, 7:30pm
Where-The Discovery Center, 1944 North Winery
Who-Clarence Funk
What- Multi-media presentation(this is a fancy way of saying 'slides with tape presentation') of various space efforts and objects, whatever there is time for."

From the September 1982 *Observer*