July-August 2014
Volume 62
Issue 4

The Observer

The Newsletter of Central Valley Astronomers of Fresno

In this Issue:

CVA Calendar

(No monthly meetings in July and August)

July 5-Public star party at Riverpark

July 19-Star party at Millerton Lake

July 26-Star parties at Courtright Reservior and Eastman Lake

August 2-Public star party at Riverpark

August 16-Star party at Millerton Lake

August 23-Star parties at Courtright and Eastman Lake

August 29, 30-Star party at Glacier Point

Astronomical Object of the Month

The Hubble Space Telescope(what else could take such awe-inspiring images) took this visage of the ring galaxy NGC 3081 in Hydra earlier this year. 3081 is interesting to scientists because of its regions of star formation and bright barred nucleus. It is about 80 million light years from Earth.(Note the other galaxies around it)
Image-ESA/NASA/HST

Quote of the Month-

"A black hole has no hair"

-John Wheeler

○ Full Moon-July 12 ● New Moon July 26 ○ Full Moon August 10 ● New Moon-August 25

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The Observer is the newsletter of the Central Valley Astronomers of Fresno

The President's Message-

This is summer, and prime time for starwatching. CVA has a number of events over the next two months, culminating with the annual Glacier Point starwatch at Yosemite, on Labor Day weekend. Every additional scope is helpful at each event, so don't be afraid to come out and contribute.

There will not be any monthly meetings in July and August. The next monthly meeting will be September 6, at the usual place-East Engineering Building at CSU Fresno at 7pm. But remember all those other CVA events.

An article of interest was in the July 1 issue of the Fresno Bee, which has some relevance to what we do in CVA. It talked about the fact that Fresno is 90th out of 100 cities in the country in terms of STEM(Science, Technology, Engineering, and Mathematics) jobs and opportunities. Part of this dismal position is related to the economics of the area-primarily agricultural, with only a scattering of heavy industry and next to no high tech. Part of it, though, is also a mentality that occurs throughout the country, if not the world-most people are afraid of math and science; they think it's too hard, or too scary, or too mysterious. One of our goals with CVA outreach at places like Riverpark or Millerton is to get people to realize that science, in this case, astronomy, can be fun and enlightening. We are doing our part to help break down that fear and make people realize that science is worthwhile, as well as necessary. Amateur science groups like ours play vital roles in moving the world ahead to better and more rewarding times, and maybe even encourage a few more bright-eyed kids take up science or math as a major and career.

Enjoy the summer. Hope to see you at one or more of the many CVA summer activities.

-Fred

M108, one of the lesser known, and often overlooked, objects in the Messier catalogue. It can be found in the Big Dipper, near the lower right of the "cup." Make it a target for this summer's starwatching.

Image-NOAO-Kitt Peak

Profiles in Astronomy

Guillermo Haro 1913-1988

Haro was born and raised in Mexico City, and attended the National Autonomous University of Mexico, where he originally studied philosophy. But he also had an interest in astronomy, and in 1943, was hired as an assistant at the newly established Observatorio Astrofiscio de Tonantzintla. The observatory subsequently sent him to study at the Harvard Observatory for two years. Returning to Mexico in late 1945, he directed the building of a 24" Schmidt camera at the observatory, and used it extensively to study stellar populations. In 1947, he became a staff member of the Observatorio de Tacubaya, where he would stay the rest of his career, although he continued to use the Schmidt camera at Tonantzintla.

Haro did extensive research in a number of different areas. He studied planetary nebulas, and catalogued over one hundred of them. He discovered areas of gas condensation in high density clouds near regions of star formation, now called Haro-Harbig objects, along with George Harbig, who independently discovered them at about the same time. Haro also discovered flare stars (variable stars that show major brightness increases in a very short time period), first in the Orion Nebula, and later in other nebulas as well. He would study flare stars for much of his career.

Haro is well known for his two major catalogues. The first was of almost 9,000 blue stars, which was first published in 1961, in collaboration with W. J. Luyten. Many of these stars eventually turned out to be quasars. The second was a listing of 44 "blue" galaxies, those with very young stars and stars still in formation, in 1956. Haro also discovered a number of T Tauri stars, several supernovas, and a comet which bears his name.

Haro did much to advance astronomy in Mexico, and was the first person from a developing third world country to be elected to England's prestigious Royal Society.

Source and image-Wikipedia

CVA Glacier Point Weekend –August 29 and 30, 2014

Contact Dave Dutton for reservations
559-658-7642
or 559-973-0333
or at twodocs@sti.net

Be sure to give name, address, phone number, and e-mail address

CVA Calendar July-August 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Cassini orbits Saturn-2004	2	3	4 Independence Day Chinese scientists observe the Crab Nebula supernova-1054	5 CVA public star party at Riverpark
6	7	8	9	10	11	12 Full Moon 
13	14 Mariner 4 flies by Mars-1965	15	16 Comet Shoemaker -Levy crashes into Jupiter-1994	17	18	19 CVA public star party at Millerton Lake
20 Apollo 11 astronauts land on the Moon-1969	21	22	23	24	25 CVA star party at Courtright	26 CVA star party at Courtright CVA Ssar party at Eastman Lake New Moon 
27	28	29	30	31	August 1	2 CVA public star party at Riverpark
3	4	5	6	7	8	9
10 Full Moon 	11	12	13	14	15	16 CVA public star party at Millerton Lake
17 Martian moons Deimos and Phobos found by Asaph Hall-1877	18	19	20	21	22 CVA star party at Courtright	23 CVA star party at Courtright CVA star party at Eastman Lake
24	25 New Moon 	26	27	28	29 Begin Glacier Point Weekend	30 CVA public star party at Riverpark Glacier Point star party
31	September 1 Labor Day	2	3	4	5	6

What's New in Space

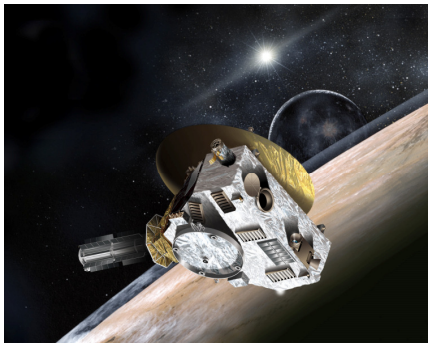
Space-X unveils the Dragon-V2

On May 28, 2014, Space-X announced its next generation spacecraft, the manned version of the Dragon capsule, which is now known as Dragon-V2. From the outside, it looks similar to the current unmanned Falcon, which has already made three cargo flights to ISS, but inside, it has room for up to seven people, who will be able to live aboard it for several days at a time while in space. Also, in a major difference from the unmanned version, the V2 will employ landing rockets as well as parachutes for pinpoint land returns, rather than using only parachutes for ocean splashdowns. this, according to Space-X officials, will allow for quicker "turnaround" times to ready the reusable craft for the next spaceflight. Space-X plans to have the first unmanned test flights in 2015, and, if all goes well, the first manned flights in mid-2016.

Given the political tensions between the U.S. and Russia over the situation in the Ukraine, and the Russian threat not to extend NASA's contract for Soyuz missions past 2018, the space agency is pushing the three major commercial companies: Space-X, Boeing, and Sierra-Nevada, to have their manned spacecraft operational by early 2017 to take Americans to and from ISS.

NASA Gets Ready for the Next Step

The first Multipurpose Crew Vehicle(MPCV) service module is expected to be delivered to NASA in early 2017. NASA also outlined launch dates for the Orion -MPVC program. In November 2014, it plans to launch an unmanned Orion atop a Delta 4 heavy lift rocket, and send it 3,900 miles above the Earth for tests of the heat shield and other systems. Another unmanned test above Earth orbit may come in 2015. In December 2017, with the ESA built service module, the complete Orion MPCV system will be launched for an unmanned seven day circumlunar mission that will test all its systems. Its booster rocket will be a modified version of the SLS heavy lift booster. NASA also announced that it originally intended for the first manned circumlunar mission, with a crew of four, to be in 2021, but may be able to launch it as early as 2019 if all goes well.



New Horizons Prepares for Pluto Flyby

NASA's New Horizons spacecraft, which was launched in 2006(that long ago?), is now getting ready to fly by Pluto in July 2015. Even though it's still over a year away, scientists are powering up and maneuvering the craft for maximum coverage of the (ex!) planet, especially in light of recent speculation that it may have evidence of water or water vapor. After Pluto, NH will continue into the Kuiper Belt to locate and image other so-called "Dwarf Planets," which is what Pluto has now been downgraded to.

Another Space Pioneer Leaves the Scene: John Houbolt 1919-2014

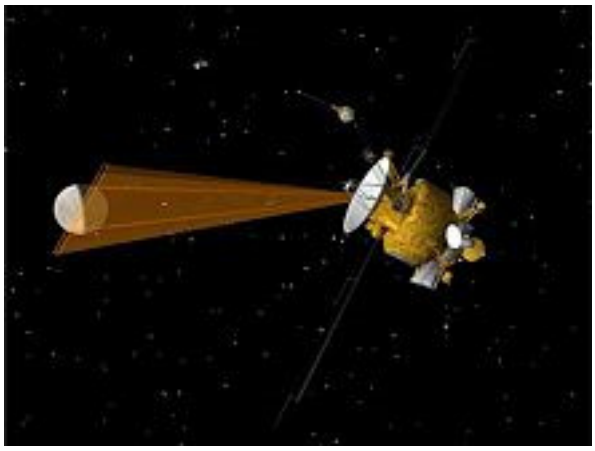
John Houbolt, a NASA engineer who, in the early 1960s, led the fight to adopt LOR(Lunar Orbit Rendevous) as the method to get to the Moon by the end of the 1960s, died on April 15, 2014, at the age of 95.

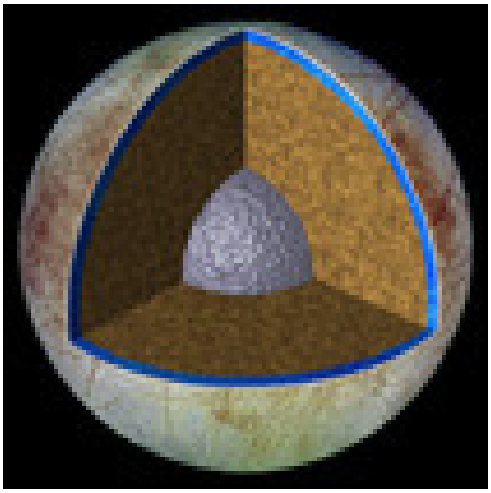
Houbolt was born in Iowa, but raised in Joliet, Illinois, near Chicago. He majored in engineering at the University of Illinois, and later earned a doctorate in technical sciences from the University of Zurich. In 1942, he went to work for the NACA(National Advisory Committee for Aeronautics), which in 1958 turned into NASA. Houbolt spent most of his career at NASA's Langley Research Center in Virginia, and it was there that he led a group of aerospace engineers in 1961 and 1962 to campaign for LOR as the preferred way of getting to the Moon. Contrary to popular belief, Houbolt did not invent the LOR concept. It had been around since the early 1900s; among others, Hermann Obereth, Wernher Von Braun's mentor, worked on it in the 1920s. In 1961, Von Braun initially recommended the Direct Assent method, using a huge multistage rocket, the Nova, to fly directly to the Moon. However, the Nova would have taken 12-15 years to build and perfect, and when Houbolt's group pressed for LOR, Von Braun designed a scaled-down version of the Nova, known as the Saturn 5, which could both accommodate the LOR method and be quickly built and tested. With Von Braun's support, Houbolt and his group won out over the Direct Assent and also the EOR(Earth Orbit Rendezvous) methods in 1963. A number of other engineers both within and outside of NASA predicted disaster using LOR, but Houbolt was vindicated when every Apollo Moon landing mission went off without a hitch.

Houbolt eventually won many honors for his work, and was lauded as the Man who Got America to the Moon. He stayed with NASA until he retired in 1985, but continued to be active in the space program. Late in life, he developed Parkinson's Disease, and was living in retirement in Maine when he died.

The Europa Missions in the Works

Ever since the 1980s, when the Voyager missions indicated that, underneath the ice covered surface of Jupiter's moon Europa might lay a life filled ocean of water, NASA has been dreaming of sending a spacecraft specifically to look for possible life on the . Now, 2014, the space agency is working on such a craft. It has been given the name of Europa Clipper, and may be launched as early as 2022. Europa Clipper will look similar to the Saturn Cassini spacecraft, and will carry instruments designed to both map the moon and detect possible life activities. At the moment, scientists are considering two possible launch courses for Clipper. One is by using an Atlas 5 rocket and putting the craft into a "slingshot" trajectory that would take it about six years to get to Europa. The other is by using the not yet built giant SLS rocket(which NASA hopes to use to send manned missions to the Moon and later to an asteroid and Mars), whose engines could put the spacecraft into a direct trajectory to Europa, and have it be there in 2.5 years.





Beyond the Clipper, NASA is working on a spacecraft which could land on Europa's icy surface, employ a heat probe which would melt through the ice all the way down to liquid water (however far that is). Once there, a robotic submersive craft would propel itself through the water, looking for signs of life. This craft would probably not be launched until at least 2030, but already, scientists are working on it, and excited about what it might find beneath the icy surface.

All Images-NASA

A Glorious Gravitational Lens

By Dr. Ethan Siegel

As we look at the universe on larger and larger scales, from stars to galaxies to groups to the largest galaxy clusters, we become able to perceive objects that are significantly farther away. But as we consider these larger classes of objects, they don't merely emit increased amounts of light, but they *also* contain increased amounts of mass. Under the best of circumstances, these gravitational clumps can open up a window to the distant universe well beyond what any astronomer could hope to see otherwise.

The oldest style of telescope is the refractor, where light from an arbitrarily distant source is passed through a converging lens. The incoming light rays—initially spread over a large area—are brought together at a point on the opposite side of the lens, with light rays from significantly closer sources bent in characteristic ways as well. While the universe doesn't consist of large optical lenses, mass itself is capable of bending light in accord with Einstein's theory of General Relativity, and acts as a *gravitational* lens!

The first prediction that real-life galaxy clusters would behave as such lenses came from Fritz Zwicky in 1937. These foreground masses would lead to multiple images and distorted arcs of the same lensed background object, all of which would be magnified as well. It wasn't until 1979, however, that this process was confirmed with the observation of the Twin Quasar: QSO 0957+561. Gravitational lensing requires a serendipitous alignment of a massive foreground galaxy cluster with a background galaxy (or cluster) in the right location to be seen by an observer at our location, but the universe is kind enough to provide us with many such examples of this good fortune, including one accessible to astrophotographers with 11" scopes and larger: Abell 2218.

Located in the Constellation of Draco at position (J2000): R.A. 16h 35m 54s, Dec. +66° 13' 00" (about 2° North of the star 18 Draconis), Abell 2218 is an extremely massive cluster of about 10,000 galaxies located 2 billion light years away, but it's *also* located quite close to the zenith for northern hemisphere observers, making it a great target for deep-sky astrophotography. Multiple images and sweeping arcs abound between magnitudes 17 and 20, and include galaxies at a variety of redshifts ranging from z=0.7 all the way up to z=2.5, with farther ones at even fainter magnitudes unveiled by Hubble. For those looking for an astronomical challenge this summer, take a shot at Abell 2218, a cluster responsible for perhaps the most glorious gravitational lens visible from Earth!

Article courtesy of NASA's Space Place and Dr. Laura Lincoln
Image from NASA-HST

Number of extra-solar planets found as of June 2014-1,795
Including 460 multiple planet systems
How many more are out there-
Thousands? Tens of thousands?

New Findings on Star Formation from Chandra X-Ray Telescope

Using data from NASA's Chandra X-ray Observatory and infrared telescopes, astronomers have made an important advance in the understanding of how clusters of stars come into being.The data show early notions of how star clusters are formed cannot be correct. The simplest idea is stars form into clusters when a giant cloud of gas and dust condenses. The center of the cloud pulls in material from its surroundings until it becomes dense enough to trigger star formation. This process occurs in the center of the cloud first, implying that the stars in the middle of the cluster form first and, therefore, are the oldest.

However, the latest data from Chandra suggest something else is happening. Researchers studied two clusters where sun-like stars currently are forming – NGC 2024, located in the center of the Flame Nebula, and the Orion Nebula Cluster. From this study, they discovered the stars on the outskirts of the clusters actually are the oldest.

"Our findings are counterintuitive," said Konstantin Getman of Penn State University, who led the study. "It means we need to think harder and come up with more ideas of how stars like our sun are formed."Getman and his colleagues developed a new two-step approach that led to this discovery. First, they used Chandra data on the brightness of the stars in X-rays to determine their masses. Then they determined how bright these stars were in infrared light using ground-based telescopes and data from NASA's Spitzer Space Telescope. By combining this information with theoretical models, the ages of the stars throughout the two clusters were estimated.

The results were contrary to what the basic model predicted. At the center of NGC 2024, the stars were about 200,000 years old, while those on the outskirts were about 1.5 million years in age. In the Orion Nebula, star ages ranged from 1.2 million years in the middle of the cluster to almost 2 million years near the edges."A key conclusion from our study is we can reject the basic model where clusters form from the inside out," said co-author Eric Feigelson, also of Penn State. "So we need to consider more complex models that are now emerging from star formation studies."

Explanations for the new findings can be grouped into three broad notions. The first is star formation continues to occur in the inner regions because the gas in the inner regions of a star-forming cloud is denser -- contains more material from which to build stars -- than the more diffuse outer regions. Over time, if the density falls below a threshold where it can no longer collapse to form stars, star formation will cease in the outer regions, whereas stars will continue to form in the inner regions, leading to a concentration of younger stars there.

Another idea is old stars have had more time to drift away from the center of the cluster, or be kicked outward by interactions with other stars. One final notion is the observations could be explained if young stars are formed in massive filaments of gas that fall toward the center of the cluster.

Previous studies of the Orion Nebula Cluster revealed hints of this reversed age spread, but these earlier efforts were based on limited or biased star samples. This latest research provides the first evidence of such age differences in the Flame Nebula."The next steps will be to see if we find this same age range in other young clusters," said Penn State graduate student Michael Kuhn, who also worked on the study.

Right-NGC 2025

Article and image from NASA.gov

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Deadline for articles submission for the July-August 2014 issue

August 20

Please submit articles in Microsoft Word format

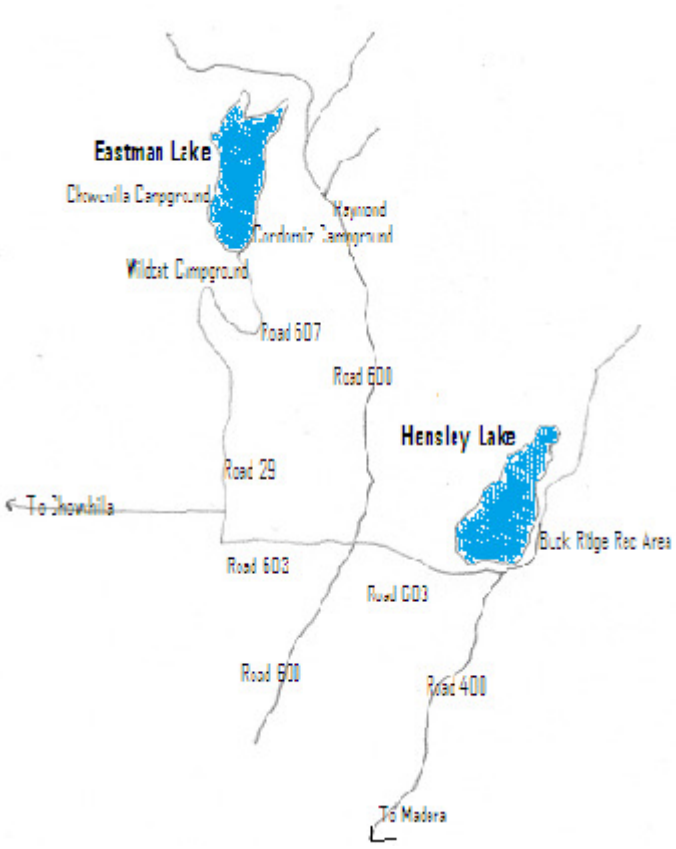
Haute-Provence Observatory

Part of a continuing series on lesser known-but still important -observatories throughout the world

Haute Provence Observatory, also known as St. Michel Observatory, which is located in in Provence in southern France near the town of St. Michel, is considered one of the best low altitude(at 2,200 feet above sea level) observatories in the world. It was established as an astrophysics research facility in 1937, but over the years has expanded to include studies in planetary and stellar astronomy, galaxy research, and comet and asteroid findings. One of its specialties is spectroscopic studies; it has also done groundbreaking work in radial velocities of stars.

The observatory has four main telescopes, and several smaller ones. The largest telescope is a 1.93m (76") reflector, which was built and first used in 1958. The 1.2m(47") reflector was the first one at the observatory, in 1943, and has been used extensively for planetary and comet studies. A 1.5m(60"), reflector, installed in 1967, is used primarily for spectrographic research, and a .8m(32") reflector, which is used mostly by graduate astronomy students for their researches. Three smaller telescopes are also at the observatory. They are a 1m(39") reflector run by the Geneva Observatory, a .5m(20") reflector used by the French Space Agency to track satellites, and a .2m(8") reflector which is used to study suspected exoplanet transits across nearby stars.

In addition, the observatory has a geophysics division, which studies the upper atmosphere using lasers and LIDAR research equipment.



To Hensley and Eastman Lakes-Star party sites. The Eastman Lake starwatching site is at the boat ramp at the end of Road 29, just past the Cardinez campground.

The 1.93m(76") reflector telescope, the largest at the Haute -Provence Observatory
Information and image from Wikipedia