May-June 2015
2015
Volume 63
Issue 3

The Observer

The Newsletter of Central Valley Astronomers of Fresno

In this Issue:

Observer Image of the Month

Hubble-25 Years in Space

In April 1990, the Hubble Space Telescope was eased out of the cargo bay of the Space Shuttle Discovery, and began its decades-long mission im age and explore the universe. At first there were a few setbacks, but the instrument has long since redeemed itself, and forever changed the way that humanity looks at the universe. Originally developed to last only 15 years, Hubble celebrated its 25th year in space in April 2015, It has taken over 1 million images, and is still going strong, arguably the most successful space project ever. It is now expected to continue its mission until at least 2020, and perhaps longer.

HST images by NASA

Astronomy Quote of the Month

"The moving Moon went up the sky
And nowhere did abide
Softly she was going up
And a star or two beside..."

From Samuel Taylor Coleridge
The Rime of the Ancient Mariner

Central Valley Astronomers
Web Address:
www.cvafresno.org

Webmaster
Scott Davis 559-392-1365
scodavis@hotmail.com

Officers and Directors for 2015

President
Chad Quant
chad_quant@hotmail.com

Vice-president
Steve Britton 559-897-4529
sbritton@cvip.net

2d Vice-president
Fred Lusk
Fred.Lusk@LuskEngr.com

Secretary-Treasurer
Steve Harness 559-292-2753
sharness@sbcglobal.net

Historian
Larry Parmeter 559-276-8753
lanparmeter3@hotmail.com

Star Party Corrdinator
Brian Bellis
pandb91@comcast.net

Director
Lynn Kliewer 559-251-3656
lelliottk@att.net

Director
Joe Griffen
559-270-4214

Director
Dave Artis 559-658-8016
Dave.artis@direcpc.com

Director
Warren Maguire 559-294-7444
slicker1948@yahoo.com

The Observer is the newsletter of the
Central Valley Astronomers
of Fresno
Larry Parmeter is the editor of
The Observer
phone # 559-276-8753
e-mail-lanparmeter3@hotmail.com

CVA's Glacier Point Weekend
June 26, 27, and 28, 2015
For reservations, contact Dave Dutton at 658-7642
Or at twodocs@sti.com

Be sure to leave your name, address, phone number, and e-mail address
Also, mention the number of people in your group

CVA 2015

Riverpark Journal April 25

This was a day of rain and heavy clouds-unusual for late April in the Fresno area, but welcome, given the state's water problems. No one sure if the public starwatch at Riverpark would go off or not. Still worth the try. At 7:15 eight telescopes in the open area down from the Edwards Theater. Cloudy skies, with the half Moon drifting in and out. This is prom night for several local high schools, and a number of young people in their spring finery are walking around. The sky not only looks, but feels crisp and sharp. Explanation to people wanting to view through the telescopes that a clear night after a rain is the best time for stargazing: all the dust and pollution has been washed away. As it gets darker, lots of young couples with children are showing up, the kids holding paper cups of ice cream. A young woman says to her mother, "I know some of this from when I took astronomy at City College." The astronomer say, "Under Mr. Weimer?" "Yes." "He's right over there with his telescope." For a while, only the Moon is visible, and people looking through the telescopes are exclaiming, "Wow!" Sometimes the comment, "I've never looked through a telescope before," come through. And of course, the ever-present, "Who are you and why are you out here?" is heard. Patiently, the explanation, "We're with Central Valley Astronomers of Fresno..," for the umpteenth time. Telescopes switch to Jupiter as it comes into view above the Moon. More "Ohs." The crowd is growing. Older people now, and young teen and college couples on Saturday night dates. Steve Harness is explaining the deadly greenhouse atmosphere of Venus to a collection of wide-eyed patrons. The skies have finally cleared, and the few objects that survive the light pollution shine in the night. Children are becoming more and more excited when seeing Jupiter's bands and the Galilean moons for the first time. They run off and grab their parents and drag them over to the telescope. "This is so neat." an older man says "I should have gotten into this hobby when I was younger." The astronomer replies "Even if you're eighty it's not too late." A woman comments, "My son is so interested in astronomy at age twelve." It beats spending hours playing video games. Warren McGuire has a large crowd, children, young people, older people looking at Jupiter. At a table not ten feet away, five women are absorbed in their smart phones, and occasionally looking up to make a comment, otherwise oblivious each other and the happenings around them. Clarence Nowell is showing a young woman how to set up and use a small Newtonian reflector. Children of all ages and sizes are still around eagerly wanting to see the Moon again, or Jupiter, or anything that can be viewed through the eyepiece. This is their night of wonder and imagination, something that they'll remember, and something that they'll to come back to.

And so it goes, Saturday night at Riverpark...

Number of extra-solar planets found as of April 2015-1,915

How many more are out there?

Tens of thousands? Hundreds of thousands?

Important Dates During May and June

May 5-Cinco de Mayo in Mexico

May 10-Mother's Day

May 21- Cosmic Background Radiation discovered by Arno Penzias and Robert Wilson, 1965

May 25-Memorial Day

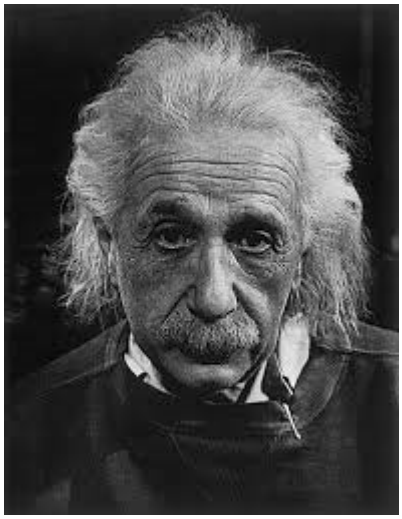
May 29-Einstein's Theory of General Relativity tested and verified by Arthur Eddington during a solar eclipse, 1919

June 4-Debut of the 200" Hale Telescope at Palomar, 1948

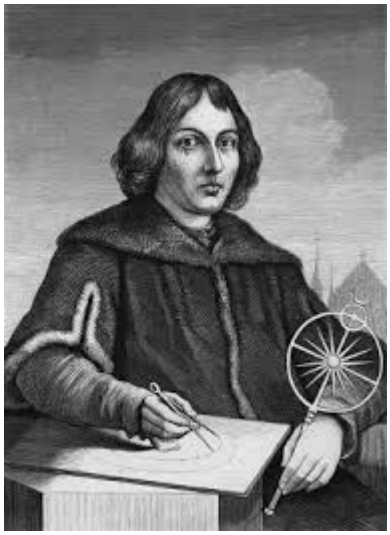
June 18-Ramadam begins

June 21-Summer Solstice; Father's Day

June 30-Tunguska Event in Siberia, 1908



Profiles in Astronomy



Georg Joachim Rhaeticus 1514-1576

Rhaeticus, whose original family name was Iserin, was born and raised in Feldkirch, in what is today Austria. His father was a doctor who was executed after being convicted of theft and abuse of trust. As a result, the family lost its surname, and afterwards, went by the name of de Porris. While a student at the University of Wittenburg, young Georg took the surname of Rheticus, which was the ancient Roman name for his home area. He graduated from Wittenburg in 1536.

Upon graduation, Rhaeticus became a professor of mathematics at Wittenburg, but his interests gravitated towards astronomy, and in 1538, he traveled to Nuremberg. There, he studied mathematics and astronomy, then went to Ingolstadt and Tubingen for further studies. He returned to Wittenburg in 1542, and taught there for many years. In his later years, he also taught at Liepzig, at Krakaw in Poland, and at Kosice in Hungary, where he died.

Rhaeticus' reputation as a mathematician is based on his interests and calculations in triangles, for use in both navigation and astronomy. Although the term did not exist at his time, he made important contributions to the science of trigonometry as we know it today. He wrote two tracts on trigonometry and was compiling a table of trigonometric functions when he died in 1574. The work was eventually finished and published by one of his students in 1596. Rhaeticus' table of functions was widely used in astronomical calculations, and were a standard in mathematics up to the 20th century.

Rhaeticus is also known as the only student that Copernicus ever had. As a student in mathematics at Wittenburg, Rhaeticus became interested in Copernicus' theory on the heliocentric solar system, versions of which had been floating around European academic circles for many years. In 1539, during his wandering studies, Rhaeticus traveled to Frauenberg, in Austria, where he studied under and worked with Copernicus for two years. With his own background in trigonometry, it is widely believed that he verified Copernicus' calculations showing that the planets orbited around the Sun, and not the Earth. He became convinced that Copernicus was correct, and urged him to publish his results. Rhaeticus, in fact, tried to get *de Revolutionibus* published in 1541, but was sidetracked by other projects and commitments. Eventually, the book was published in 1543, the year of Copernicus' death. For years after the publication of *de Revolutionibus*, Rhaeticus was one of its strongest supporters. In 1651, many years after his death, Rhaeticus' *Epistolae de Terrae Motu* was published, in which he tried to reconcile Copernicus' heliocentric universe with Biblical tradition.

A crater on the Moon, Rhaeticus, is named after him.

Source-"Rhaeticus, Georg Joachim," *Wikipedia*

CVA and Friends Honor Marty Roberts

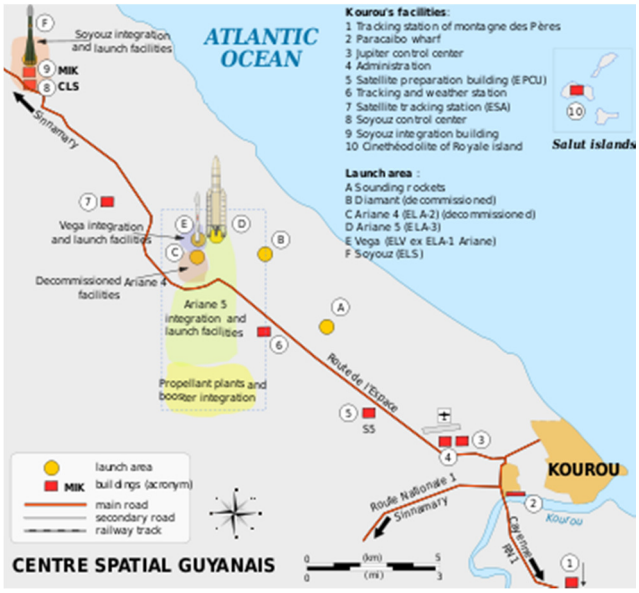
On March 21, a number of CVA members, along with family and friends, gathered at Dave Dutton's house in Yosemite Lakes Parks for a memorial service for Martin "Marty" Roberts, long time CVA member who died from cancer on March 7. Marty, who had been a member of CVA since the 1980s, was 73 at the time of his death. Several people spoken of Marty's sense of humor and his skill as a professional painter. All lauded his dedication to amateur astronomy and his consideration and helpfulness in getting many people interested in the nighttime skies. Marty will be greatly missed by his family and friends, and also the astronomical community.

Right-Randy Steiner talks about Marty Roberts on March 21

What's New in Space

The French Guiana Space Center

Most people familiar with the space program know of two major space launch centers: The Kennedy Space Center/Cape Canerval Launch Center in Florida, and the Baikonur Spaceport(sometimes called Tyuratam), which is run by Russia, but is now in the independent nation of Khazkastan. But a third major international space center exists as well, and that is the French Guiana Space Center, also known as *Centre Spatial Guyanais* or more commonly. Kourou, in French Guiana on the northeast coast of South America. It is here that CNES, the French Space Agency, and also the European Space Agency, launches its unmanned rockets and satellites into Earth orbit and to the other planets. Below right-a layout of the Kourou Launch Center



Kourou, as it is commonly known, was chosen as a space launch site over fourteen other possible sites by France in 1964, shortly after the Space Age began. France, at that time headed by Charles DeGualle, had major dreams of becoming a space power equal to the of the U.S. and the then Soviet Union. Kourou was chosen because it was part of a French colony; was relatively uninhabited and faced eastward into the Atlantic Ocean; and was also close to the equator, a major advantage in launching payloads into low Earth orbit. The first launch at Kourou was a sub-orbital sounding rocket named Veronique, on April 9, 1968. The first orbital mission occurred on March 10, 1970, when a Diamant-B rocket launched two satellites into Earth orbit. In 1973, the Ariane program was initiated, and the first Ariane-1 launch occurred at Kourou on December 24, 1979. Within a few years, the Ariane 2 and 3 rocket series were being launched regularly, and on June 15, 1988, the first Ariane-4 rocket was successfully launched. The Ariane-4 program was not ended unti 2004, when it was succeeded by the heavy life Ariane-5, which is still in use today. In addition, ESA became a partner at Kourou in 1975, and launches almost all of its unmanned Earth orbit and planetary satellites from the space center. In addition, Russia signed an agreement with CNES and EAS in 2007to launch unmanned Soyuz 2 payload rockets from Kourou; the first Russian launch took place on October 21, 2011, from a launch complex known as ELS, specifically designed and built to handle the Russian rockets

Today, Kourou consists of three separate operational complexes, all of which are managed by Arianespace, a semi-private company contracted by the French government and ESA. The first is the ELA-1(also known as the CECLE/ELV-1)center, which was originally built to launch the Ariane 1 and 2 rockets in the 1970s and 80s. It was closed down at the end of the Ariane 2 program, but was reactivated and modified to launch the Vega rockets starting in 2012. The second complex is the ELA -3 center, which became operational in 1996, and is used to launch the Ariane-5 rockets. The ESA Hermes manned mini-space shuttle, had it not been cancelled in the mid 1990s, would have been launched from this complex.(ELA-2 was used to launch the Ariane 4 rockets, but was deactivated with the end of the program in 2003). Then there is the ELS center, used for the Soyuz rockets. A total of four operational launch pads are currently in use, with 10-12 launches a year. About 1,200 people work at the space complex full time. CNES, ESA, and Arianespace see Kourou as a major spacecenter heading into the decades of the 21st century. Above-an Ariane 5 rocket launched in 2013. Right-The Soyuz 2 ELA launch facility at Kourou

Sources: Wikipedia, French Guiana/CNES Space Center website, ESA website

Images from ISS

So much(and justifiably so) has been published concerning the Hubble Space Telescope that the equally beautiful images from the International Space Station have been overlooked. Here is a menagerie from the last ten years or so, showing our Earth, "The bBue Dot," in all its wonder.

Left-Earth in the background as the space station, with an attached Soyuz craft, orbits the planet

Right-the "Copola," which gives out-of-this world views of the Earth from space -

Left-Typhoon Nabi in 2005

Right-Mt. Cleveland, an active volcano in the Aleutian Islands, erupting, also in 2005

Right-the Aurora Borealis, taken in 2012

Above-a planton bloom in the Black Sea-taken in 2013

All images from NASA

From NASA's Space Place

Where Do Old Satellites Go When they Die?

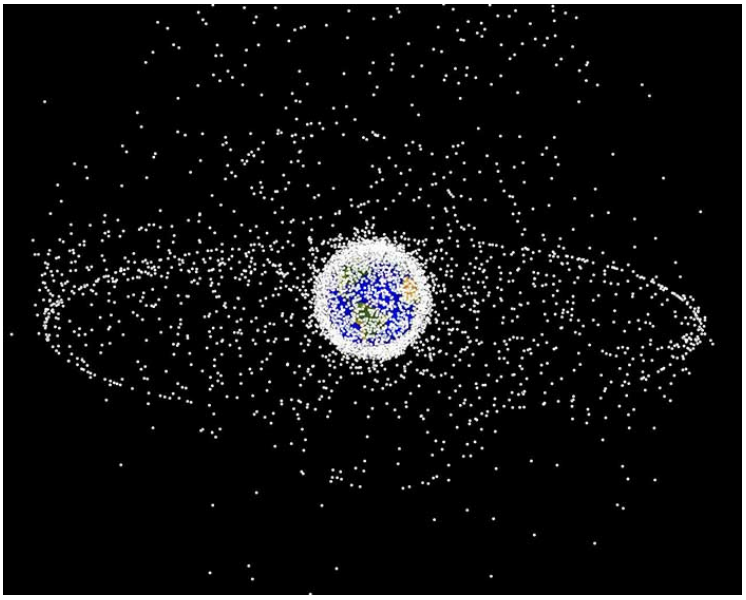
Like every other machine, satellites do not last forever. Whether their job is to observe weather, measure greenhouse gases in the atmosphere, or point away from Earth to study the stars, eventually all satellites grow old, wear out, and die, just like old washing machines and vacuum cleaners

So what happens when a trusty satellite's time has come? These days there are two choices, depending on how high the satellite is. For the closer satellites, engineers will use its last bit of fuel to slow it down. That way, it will fall out of orbit and burn up in the atmosphere.

The second choice is to send the satellite even farther away from Earth. It can take a lot of fuel for a satellite to slow down enough to fall back into the atmosphere. That is especially true if a satellite is in a very high orbit. For many of these high satellites, it takes less fuel to blast it farther into space than to send it back to Earth. Getting rid of the smaller satellites in low orbits is simple. The heat from the friction of the air burns up the satellite as it falls toward Earth at thousands of miles per hour. Ta-da! No more satellite.

What about bigger things like space stations and larger spacecraft in low orbit? These objects might not entirely burn up before reaching the ground. There is a solution—spacecraft operators can plan for the final destination of their old satellites to make sure that any debris falls into a remote area. This place even has a nickname—the Spacecraft Cemetery! It's in the Pacific Ocean and is pretty much the farthest place from any human civilization you can find. What about those higher satellites we blast farther away? Those we send into a "graveyard orbit." This is an orbit almost 200 miles farther away from Earth than the farthest active satellites. And it's a whopping 22,400 miles above Earth!

So is that the end of it for these far-away satellites? As far as you and I are concerned it is! However, some of these satellites will remain in orbit for a very, very long time. Perhaps someday in the future, humans may need to send "space garbage trucks" to clean these up. But for now, at least, they will be out of the way.



Left-a computer depicted image of man-made objects in orbit around the Earth. The best estimate is that there are about 8,000 artificial satellites orbiting the Earth at present. Some 95% of them are old rocket boosters, pieces of rockets or no longer used or operating satellites. The U.S. Air Force keeps track of all objects in space through its NORAD command facility in Colorado Springs, Colorado

Right-the satellite "cemetery" in the South Pacific Ocean. It is as far as possible from human habitation.

Text and images from NASA's Space Place