THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno January-February 2017

The Last True American Hero

John H. Glenn, Jr.

1921-2016

John Glenn, the last of the original Mercury astronauts, passes away at age 95

"Godspeed, John Glenn…"

Scott Carpenter to John Glenn aboard Friendship 7, February 20, 1962

In This Issue

Central Valley Astronomers

Web address
www.cvafresno.org

Webmaster-Scott Davis

Officers and Board- 2017

President-
Lynn Kliewer

1st Vice-President-
Steve Britton

2d Vice president-
Fred Lusk

Secretary/Treasurer-
Steve Harness

Star Party Coordinator-
Brian Bellis

Historian/Observer Editor-
Larry Parmeter

Director-
Warren Maguire

Director-
Clarence Nowell

Director-
Joe Griffin

To All CVA members-

If you haven't already noticed, *The Observer* has a new look. I had been thinking about changing the format and font styles for some time, just to keep things from getting stale, and also to make the newsletter more accessible and readable. So, earlier this fall, I played around with a couple of different format templates, and tried out a number of fonts, to see which combination would be the best and most pleasing to the eye. This is the result. The font style is Microsoft New Tai Lou, and the format comes from MS Publisher. Hopefully, it'll will work out with CVA members. If anyone wants to send me a critique of it, feel free to do so.

Having said that, I will return to a request, or plea, that I usually make at least once a year: I would really like articles and/or image contributions from members. I know that some people have in fact submitted articles and images over the years, and I appreciate it. But I could always use more. This issue is nothing new. Over the past several months, I've been browsing through old copies of *The Observer,* dating back to the 1970s, and finding that CVA presidents and newsletter editors 30-40 years ago had the same complaint: members were not contributing to the club in general, and specifically to the newsletter. I will repeat what I have mentioned many times: If you're afraid that your syntax and grammar are lousy, don't worry. Send it to me anyway; I can correct it. I make my living writing and teaching writing. I can edit and make comprehensible even the most convoluted gibberish (After all, I graded student essays for 34 years, and if I could make sense out of those, I can probably handle anything). So, send your articles in and help the rest of us learn something new.

Clear Skies and Happy New Eclipse Year-

Larry Parmeter-editor
lwparmeter@aol.com
559-276-8753

Number of extra-solar planets found as of December 2016-3,544

How many more are out there-Tens of thousands?

Hundreds of thousands?

John Glenn Remembered

by Larry Parmeter, *Observer* editor

I was nine years old in 1962, a fourth grader in a new and unfamiliar setting. The previous summer my family had moved from the Bay Area to St. Louis, Missouri. My father worked for Monsanto, the big chemical company, and it transferred him to one of its St. Louis facilities. Like most kids who have undergone such changes, I was a bit lost and disoriented 2,000 miles from settings I had known from birth. But I was also old enough and interested in space enough to know that McDonald Aircraft(before mergers with Douglass and Boeing) was only a few miles away building the Mercury and Gemini spacecraft. As such, an air of excitement ran through the St. Louis area as Glenn's flight approached. On February 20, we did little in school but watch Glenn's flight on then black-and-white TV. Our teacher told us, with a tinge of awe, that this was something historic. At the end, as the commentator announced that Friendship 7 had been recovered safely and Glenn was aboard a Navy warship, we all cheered; the mission reinforced my love affair with the space program and gave me someone to idolize. At the same time, little did my classmates and I know how historic and momentous that day would actually be.

It wasn't until years later, when I was studying history in high school that I learned about the Space Race, and how the Soviet Union shocked the world with the launch of Sputnik 1 in 1957. Everyone assumed that the U.S. would be the first to put satellites into orbit during the International Geophysical Year in 1958. But the Soviets, under Sergei Korolev, launched not only Sputnik 1, but Sputnik 2, containing a dog, before this country put Explorer 1 up in January 1958. The U.S. was behind, the U.S. was second rate when it came to science and technology. The same thing happened a few years later: everyone expected the U.S. to put the first person into space, as early as December 1960, but schedules slipped, and before they could be corrected, Yuri Gagarin went into space on April 11, 1961. Alan Shepherd's sub-orbital flight in May, and Gus Grissom's in July meant nothing when Gherman Titov spent a full day in orbit in August. America was in a crisis not only of technology, but confidence and spirit as well. Thus, it came down to John Glenn.

Glenn wanted to be the first American in space. But he was beaten out, and settled for third. He was originally scheduled to fly a sub-orbital mission like the previous two, but Titov's flight ended that. He was now expected to get into a phone booth sized capsule on top of a rocket that had a history of blowing up, ride it into orbit, and then come back safely. And he did it, making it look easy. Confident, disciplined, enthusiastic, modest, polite and gracious to a fault, religious, family oriented, the "Clean Marine," he was everything that Americans expected their heroes to be. And when he pulled it off, the confidence was back, the spirit was restored, and it remained so to the day that Neil Armstrong walked on the Moon and beyond. John Glenn symbolized what was best about America. And in case people forget, he not only did it once, but twice. In October 1998, 36 years

later, at age 77, he climbed aboard space shuttle Discovery with a crew that was young enough to be his children, and spent nine more days orbiting the Earth. Officially, his job was to be a test subject investigating the effects of aging in space, but in reality, it was a renewal of the spirit of discovery and wonder that is inherent in the American psyche. And it worked. The crowds watching the liftoff of STS-96 were the largest since, well, the early days of the Mercury program. The old warrior-sage once again showed his people the true meaning of challenging the unknown.

So, I, like millions of others, mourn the passing of John Glenn. They are all gone, the seven who carried the banner of America into space; and Glenn, who was the last survivor, was the best of them. Now, he is being placed with Lewis and Clark and the Wright Brothers and Perry as an indelible American icon. He was my hero for so many years, and he will continue to be the exemplar of everything that is good and right about this country. We will not see his like again for a long long time to come.

"A hero ventures forth from the world of common day into a region of supernatural wonder: fabulous forces are encountered there and a decisive victory is won: the hero comes back from this mysterious adventure with the power to bestow boons on his fellow man."

-Joseph Campbell, *The Hero with a Thousand Faces*

2017 CVA Calendar Available

The 2017 CVA calendar, which was introduced at the December 2016 general meeting, is now for sale. The 2017 version marks the fifteenth edition of the calendar, which began in 2003 and had been a major hit since then. According to calendar creator Fred Lusk, other astronomy groups are envious of CVA being able to put out such a high quality piece of material. It's become a tradition that the club hopes to continue far into the future.

Like its predecessors, the newest calendar features a variety of very high quality images taken by CVA members. It also contains important astronomical events and coordinates, dates of CVA events and times, and national and state holidays. Additional special days, such as Fresno State Vintage Days and the Riverside Telescope Makers' Conference are also included. Since 2017 will be a big year for the solar eclipse(August 21), that date is prominently marked. And, oh yes, the day that everyone loves to remember-Tax Day(April 15).

At the December meeting, Fred could only hand out CD copies of the calendar, since the hard copy ones were not yet ready from the printer. So, come to the January 2017 meeting and get yours for only $20.

Many thanks to Fred, for all the work and effort he puts into the calendar, making it better every year.

Dark Sky Festival at Sequoia National Park July 21-23, 2017

By Steve Harness

The night sky in Sequoia and Kings Canyon National Parks is nationally recognized. Our darkness not only adds to the aesthetic qualities of the wilderness, but is important to the health of our wildlife. As most of the world is faced with the effects of artificial light pollution, the Dark Sky Festival aims to educate visitors about the importance of this park resource and inspire them to take action in their own community. We hope you join us in the summer of 2017 for the fourth annual Dark Sky Festival and share your passion for the night sky and astronomy. Sequoia National Park has invited the Central Valley Astronomers to their Annual Dark Sky Festival. Events will be held throughout the day and evening at Giant Forest, Lodgepole, Grant Grove, and Cedar Grove. Last year the Park had over 6000 people attend the event.

Members from the Kern and Riverside astronomy clubs will also be participating.

Lodging is available at Cedar Grove Lodge or Wushachi Lodge. You need to make your reservations early because they fill fast. Cedar Grove Lodge has fourteen units with a rustic setting and a simple grill/snack bar for food. , Wusachi Lodge at Lodgepole is the full hotel style with a restaurant. It is about 1.5 hours away from Cedar Grove. There is also Grant Grove Cabin tent camping. They are completely rebuilding the restaurant so it should be done. Several vending trucks are set up in the meantime with a wide variety of good food. Astronomers will receive free admission, a discount on our food, and other "perks."

The Park service will be having shirts made for all participants.

For the CVA Participants: We will be camping at one of the Cedar Grove Campgrounds and setting up at a spot near Trail's End. There is automobile access so we can easily unload and set up. The park service will block guest traffic and only allow the astronomers to drive up. The place is an easy walk from a public parking lot and is handicap accessible.

If anyone wants to make a presentation there is a proposal form to be filled out.

We need to send them a list of the number of club members participating by March so that they can order shirts and reserve the campground sites.

Here is the link to the website-

http://www.exploresequoiakingscanyon.com/dark-sky-festival.html

Four New Elements Are Given Names

On December 2, the Union of Pure and Applied Chemistry officially approved formal names for four "superheavy" elements created in laboratories: atomic numbers 113, 115, 117, and 118. Element 113, which was first discovered at Japan's RIKE Nishima Center for Accelerator-Based Science, was given the name of Nihonium, which is an offshoot of Nihon, the traditional name for Japan. Elements 115 and 117 were discovered independently at the Joint Institute for Nuclear Research at Dubna, Russia; the Oak Ridge National Laboratory in Tennessee; and the Lawrence Livermore National Laboratory in California. 115 was named Moscovium, after the capital city of Russia, and 117 was named Tennessine, after Oak Ridge's home state. Element 118, also discovered at Dubna, was given the name of Organesson, honoring Yuri Organessian, the director of the Dubna facility.

The namings are the latest in filling in the periodic table; in 2011, elements 114 and 116 were given the names of Flerovium and Livermorium respectively.

CVA Members Speak

With this issue, a new continuing series appears, this one on CVA members' views on astronomy and related topics.

This first article asks-"What is your favorite astronomical/dark sky object?"

M42...because there's so much detail to look at -Dan Del Campo

The Double Cluster in Perseus. It was the first object shown to me at a star party, and I never tire of seeing it -Scott Davis

M13-It has been described as diamonds spread on a velvet cloth -Debi Lusk

Sombrero Galaxy -Louis Mendoza

The Ring Nebula was the first deep sky object I found by myself through a telescope. M57 still ranks as my favorite of all time -Brian Bellis

M42, because it is bright and impressive, even in a small telescope -Warren Maguire

Everything! -Abi Mikow

Profiles in Astronomy

Vera Rubin

1928-2016

Vera Rubin's death on December 25, 2016, brought to an end the life and career of one of the foremost astronomers of the 20th century. She was also a tireless advocate for the inclusion of women and minorities in science.

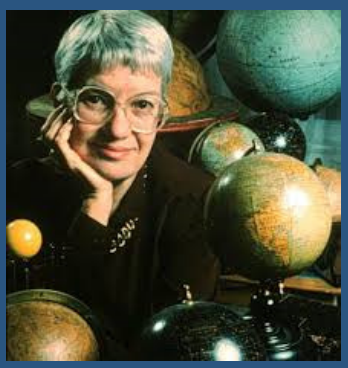
Rubin was born in Philadelphia and raised in Washington, D.C., and did her undergraduate studies at Vassar College. For graduate school, after being rejected by Princeton because of her gender, she enrolled at Cornell, where one of her professors was the legendary physicist Richard Feynman, who encouraged her astronomical interests. She took a master's degree at Cornell, then went to Georgetown, where she earned her doctorate in astrophysics under George Gamow, another scientific giant. She spent almost her entire professional career at the Carnegie Institute for Science in Washington, D.C.

Rubin specialized in the characteristics of galaxies, especially spiral galaxies, and in the late 1960s, she and Kent Ford, another Carnegie Institute scientist, began to study their rotation properties. They discovered that spirals were rotating much too fast in relationship to their mass. By any physical measurement, they should have broken apart and stars flung into space long ago. To solve this mystery, she and Ford went back to still another legendary, as well as eccentric, scientist, Fritz Zwicky of CalTech, who theorized in the 1930s that the universe had what he called "missing mass," seemingly invisible mass that could not be detected by conventional means. Very few scientists at the time took Zwicky seriously, but Rubin and Ford found evidence that he was probably right. By the late 1970s, their studies showed that the only explanation for the discrepancies in galaxy rotation was Zwicky's missing mass, which was eventually named "dark matter." Further studies in the 1980s showed that dark matter could make up a majority of all the mass in the universe, and could not be detected except by its gravitational influence. By the late 1980s, dark matter was confirmed by a number of institutions, and was acknowledged as one of the preeminent scientific discoveries of the 20th century.

Rubin won many honors for her work, including the National Medal of Science, the Bruce Medal of the Astronomical Society of the Pacific, and the Gold Medal of the Royal Astronomical Society (which had previously been given to only one other woman: Caroline Herschel). She was often mentioned as a potential Nobel Prize winner, but never received it. The galaxy rotation-mass correlation is now called the Rubin-Ford Effect, and an asteroid is named after her.

Sources-
NationalGeographic.com

Wikipedia.com



Above- Rubin with her collection of antique globes

What's New in Space

The Moon, Mars, and More in the Trump Era

With the election of Donald Trump to the presidency, America's space program may see some major shifts in priorities and vision. According to reports, those who are close to Mr. Trump say that he is in favor of the U.S. going back to the Moon almost 50 years after the Apollo landings. The Constellation Program, started by President George W. Bush after the Columbia tragedy in 2003, had as one of its goals manned Moon landings by 2020. That was cancelled by President Obama shortly after he came to office in 2009. His rationale was, "We've already done that; we don't need to do it again," and instead ordered NASA to use the Constellation hardware for the(still somewhat vague) goal of orbiting and eventually landing on an asteroid sometime in the 2020s. The massively powerful SLS rocket will not be ready for launch until 2021(until then, NASA will use the Delta 4 heavy lift rocket for Orion-MPCV launches), so any major manned flights will have to wait until then. But, as supporters of the Moon landing scenario point out, two of the three components for such a mission, the Orion-MPCV and the SLS, should be operational by 2022. The only thing needed would be a lunar lander, and if it is approved by the end of 2017, could be ready for use by 2024. Right now, planners, working from the original Constellation designs, envision a lander along the lines of a larger version of the Lunar Module of the 1960s, one capable of holding four people and being able to stay on the lunar surface for up to a month. Experts believe that if such a program is approved, it will be an international mission, NASA partnering up with other nations, who would supply some of the hardware and bear some of the costs. Already, the Orion-MPCV is a joint endeavor between NASA and ESA, the latter building the service module in return for European astronauts participating in future deep space missions.

As for manned U.S. flights to Mars, regardless of Elon Musk's pledge to send humans by 2025(which many think will never get off the ground), NASA has repeatedly said that it wants manned missions to the Red Planet as early as 2030, and has told, in so many words, the candidates for the astronaut class of 2017, that they may be the first group to go. However, some in NASA, and outside it as well, claim that that is highly wishful thinking. They say

(continued on next page)

that there are just too many hurdles to overcome: the physical and psychological effects of a two to three year space trip; the technology needed to get there and then live on the planet's surface for months at a time; the food, water, oxygen, and other supplies, and so on. In their view, the U.S., and other nations as well, will probably not send humans to Mars until at least 2040. Others say, though, that if the U.S. made a firm commitment to a manned Mars mission in the next few years, it could be launched by 2033 or 2034.

In addition, those who know Trump well say that he will give private commercial space-flight companies, such as Space-X, Sierra-Nevada, and Orbital Systems, a much more prominent role in the U.S. space program. This is, according to them, in keeping with his philosophy that private enterprise can get things done much faster and more efficiently than bureaucratically burdened government agencies. Critics, on the other hand, claim that they might bypass safety and quality as well, even though NASA already has very high design standards.

What is known is that the new Trump Administration will put its own people in NASA leadership positions to direct the future of the space agency. Former astronaut and Marine Corps general Charles Bolden, the current head of NASA, is expected to resign in the next few months, as are several other top officials. There has been no indication as to who Trump will choose to take their places, although the president-elect and his advisors are said to be talking about possible candidates.

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

The National Observatory of Athens

The NOA, as it is called, has had a long and illustrious history. It was established in 1842 through a grant by Baron Georgios Sinas, then the Greek ambassador to Austria. The first director of the observatory was Georg Bouria, a well-known physicist and astronomer. Bouris oversaw the building of the observatory's main facility (right)on a hill just below the Acropolis in Athens, which was dedicated and opened in 1846. It originally held six telescopes, the largest being a 6.25" refractor that was mostly used to study variable stars. Five smaller telescopes were used to hunt comets, and a transit device was employed for sidereal timekeeping. The observatory was also used for meteorology observations and weather forecasting. As well, since Greece is subject to many earthquakes, the observatory played (and continues to play) an important role in seismic studies.

Throughout the 20th century, the observatory grew, established branch sites, and also began research in astrophysics and cosmology. Today, administered by the University of Athens, it consists of five departments: The Institute for Astrophysics and Astronomy; the Institute for Environmental Research and Sustainable Development; the Institute for Geodynamics; and the Institute for Space Applications and Remote Sensing. In 2003, the fifth department was added: the Institute for Astroparticle Physics.

The original facility in Athens is still used as the observatory's administrative offices, and three other locations serve as observing sites. The Penteli Astronomical Station, just outside of Athens, houses a 62.5 cm refractor, which today is used mostly for public outreach.

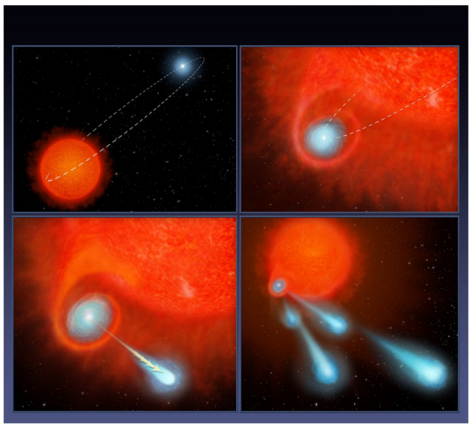
The Kryonreri Astronomical Station is in the northern mountainous part of the country; it houses a 1.2m Cassegrain reflector which is used for both planetary and deep space research. The Chelmos Observatory, also in the northern mountains, has a 2.3m reflector that is used mostly for deep space studies.
Source and image: Wikipedia

Dimming Stars, Erupting Plasma, and Beautiful Nebulae

By Marcus Woo From NASA's Space Place

Boasting intricate patterns and translucent colors, planetary nebulae are among the most beautiful sights in the universe. How they got their shapes is complicated, but astronomers think they've solved part of the mystery—with giant blobs of plasma shooting through space at half a million miles per hour. Planetary nebulae are shells of gas and dust blown off from a dying, giant star. Most nebulae aren't spherical, but can have multiple lobes extending from opposite sides—possibly generated by powerful jets erupting from the star.

Using the Hubble Space Telescope, astronomers discovered blobs of plasma that could form some of these lobes. "We're quite excited about this," says Raghvendra Sahai, an astronomer at NASA's Jet Propulsion Laboratory. "Nobody has really been able to come up with a good argument for why we have multipolar nebulae." Sahai and his team discovered blobs launching from a red giant star 1,200 light years away, called V Hydrae. The plasma is 17,000 degrees Fahrenheit and spans 40 astronomical units—roughly the distance between the sun and Pluto. The blobs don't erupt continuously, but once every 8.5 years.



The launching pad of these blobs, the researchers propose, is a smaller, unseen star orbiting V Hydrae. The highly elliptical orbit brings the companion star through the outer layers of the red giant at closest approach. The companion's gravity pulls plasma from the red giant. The material settles into a disk as it spirals into the companion star, whose magnetic field channels the plasma out from its poles, hurling it into space. This happens once per orbit—every 8.5 years—at closest approach. When the red giant exhausts its fuel, it will shrink and get very hot, producing ultraviolet radiation that will excite the shell of gas blown off from it in the past. This shell, with cavities carved in it by the cannon-balls that continue to be launched every 8.5 years, will thus become visible as a beautiful bipolar or multipolar planetary nebula.

The astronomers also discovered that the companion's disk appears to wobble, flinging the cannonballs in one direction during one orbit, and a slightly different one in the next. As a result, every other orbit, the flying blobs block starlight from the red giant, which explains why V Hydrae dims every 17 years. For decades, amateur astronomers have been monitoring this variability, making V Hydrae one of the most well-studied stars. Because the star fires plasma in the same few directions repeatedly, the blobs would create multiple lobes in the nebula—and a pretty sight for future astronomers.

Article and image courtesy of NASA's Space Place