

March-April
2015
Volume 63
Issue 2

The Observer

The Newsletter of Central Valley Astronomers of Fresno

In this Issue:

New, more streamlined
Observer

Profiles in Astronomy-
Christopher Scheiner, Gal-
ileo's nemesis

Mars Beagle Found after 13
Years

2020 Mars Rover May Car-
ry a Drone

New Horizons Gets Ready
for Pluto

Everyone wonders what
China Is Up To

Byurakan Observatory

Merging Black Holes

CVA's New Website

Hubble turns 25

2017 Eclipse is Closer
than you Think



Observer Image of the Month

No matter how many times it's seen, the Great Galaxy in Andromeda, M31, is still a wonderful sight. According to many, it is the most distant object that can be seen with the unaided eye. About three million light years away, and almost twice as large as the Milky Way, Andromeda is strongly blueshifted, and will crash into our galaxy...in about two billion years, creating a huge elliptical galaxy. Not to worry about it anytime soon.

Image from NASA

CVA members-

Now is the time to get your telescopes ready for summer work-star parties at River Park, Miller-ton Lake, Courtright Reservoir, Glacier Point, and Eastman Lake

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@sbcglobo.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@direpc.com

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

The Observer March-April 2015

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

To all CVA members-

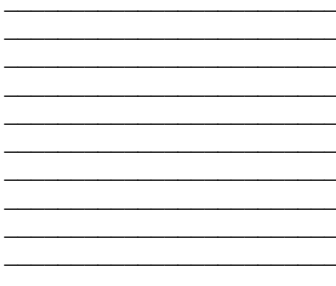
You may notice that the Observer is a little bit different now. That's not your imagination, nor is it intentional laziness on my part(although some may say, perhaps with reason, that I'm becoming forgetful in my old age, or maybe just downright goofy). At the January 2015 CVA meeting, the officers and members had a long talk about the Observer, discussing some concerns that I have had for some time now-that, with the CVA website, and also a Facebook page, do we need to change the Observer, and perhaps more concisely, do we even need it anymore? Some of what I have included in the Observer over the years, like the monthly calendar, the star party information, public viewings, and so forth, are already duplicated on the CVA website. It was agreed that there was really no need for that information in the newsletter, so that has been cut. But everyone agreed that the newsletter needs to be continued for the foreseeable future. Members wanted to continue seeing features such as the astronomy profiles, the "What's New in Space" series, the world's observatories, and other regular articles.

In addition, there was a general consensus that more news about local CVA happenings would help, as well as a focus on CVA members and their achievements. To this end, I am going to start, with the next issue, of profiling a CVA member on a regular basis from now on. This was something that was done years ago. Also, I am asking for more articles from CVA members; each of us has expertise within astronomy/space science area; my own happens to be the space program and related fields; others, I know, range from astrophotography to cosmology to stellar and planetary studies. I welcome articles from all areas of astronomy, and will include them in the newsletter. Don't worry about spelling or grammar; I'm a writer by profession, and also teach writing for a living. I can clean up almost anything in print, and make it look and sound good.

Another thing-once summer comes, and I have more time on my hands, I'm going to undertake a major study of CVA's history. I joined the organization in 1992, and I know pretty much about it from there on, but not a lot before. Louis Mendoza, who has been in the club for over 35 years, recently gave me a box full of old *Observers* dating back to the late 1970s, so I'm going to be studying them. In addition, only a few days ago, I received a call from Neil Stockton, who was one of the original CVA members when the club was founded in 1952. He now lives in Arizona, but will be in Fresno later this Spring, and is more than willing to share his recollections of the club's early days. I thank him for the opportunity and look forward to hearing what he has to say.

I hope that all of you have a great 2015, and that CVA continues to serve your imagination and spirit in the vastness that is beyond our Earth.

Many thanks-Larry



An Update from the Webmaster

Scott Davis

I launched the new design of the Central Valley Astronomers website on January 2. This new website was presented at the January club meeting and was very well-received. Additionally, I began documenting the hit counter as I wanted to see how many hits it was getting. This is what I have found so far:

January 2, 2015	18,836 hits
February 28, 2015	19,733 hits
Difference	897 hits

During that 56-day period, we received a total of 897 hits. Doing a simple math problem reveals an average of 16 hits per day. Of course, I have no way of knowing what percentage of those hits are club members or visitors, but the fact remains that our website is getting traffic – a very good thing!

This month, I started a new feature that is designed to get more attention to our club meetings – in the announcement section is a preview of the main presentation at the March 7 club meeting. After March 7 passes, it will automatically change to preview the April meeting presentation. Because this feature relies on me knowing what the presentation will be, it is very important that I be kept informed of the speaker/presentation schedule. It is my hope that a visitor to the website will see the preview, have their interests piqued, and join us at the meeting. At present, the meeting presentations for the rest of the year look something like this:

March	Larry Parmeter – “Mars – the Past, Present, and Future”
April	Scott Davis – “Apollo – the Landings”
May	Steve Harness – <i>Title Unknown</i>
June	<i>Unassigned</i>
September	Scott Davis – “Fun With Star Trails”
October	<i>Unassigned</i>
November	<i>Unassigned</i>
December	Scott Davis – Astrophotography Presentation; Title Unknown

If you are interested in giving a presentation for one of the unassigned club meetings, please get in touch with Chad Quandt or myself. A presentation is a great way to take a topic that interests you, learn a lot through research, and share that knowledge with members of the club.

Looking forward to seeing you at the next club meeting!

Hubble Turns 25!

On April 29, 1990, the Hubble Space Telescope was put into orbit by the crew of the space shuttle Discovery. Unfortunately, two months later, it was found that, due to a calibrating error, the primary mirror was flawed and unable to do much of its work. But a shuttle service mission in 1993 fixed that problem, and since then, Hubble has astounded the world with its images, and forever changed the way that we look at the universe. In particular, the now iconic “Pillars of Creation,” image of the Eagle Nebula has captured the world’s imagination, and become one of the most talked about images of the 20th century. So, here’s to Hubble on its 25th Anniversary, and may it keep us in wonder and awe.



Dates Worth Noting in March and April

March 5-Voyager 1 flies by Jupiter, 1979

March 5-Purim Begins

March 8-Daylight Savings Time Begins

March 14-Pi Day (3-14)

March 15-The Ides of March(Julius Caesar killed in 44BC)

March 17-St. Patrick's Day-in Ireland and elsewhere

March 18-First spacewalk by Alexi Leonov aboard Voshkod 2, 1965

March 20-Spring Equinox

March 29-Mariner 10 flies by Mercury, 1974

April 1-April Fools' Day

April 3-Good Friday, First Day of Passover

April 5-Easter Sunday

April 12(11 in the West)-Yuri Gagarin becomes first person in space, 1961

April 12-First space shuttle launch, Columbia, 1981

April 22-Earth Day

April 29-Hubble Space Telescope deployed into orbit from space shuttle Discovery, 1990



π
3.14159
265358979
32384626433
83279502884197
169399375105820974
94459230781640628620899
86280348253421170679821480865
1328230664709384460955058223172535940
832681119462941611275194231185066482728405483
887644880979849314375218612763194416360128000150
8647968725242463924161502842861532842169249482
842170679821480865



Profiles in Astronomy

Christopher Scheiner 1575-1650



Christopher Scheiner was born and raised near Mendelheim, in what was then Swabia, now a part of Germany. He studied at local schools, and in 1595, entered the Jesuit order, intending to become a Catholic priest. At the same time, he attended the University of Ingolstadt, studying philosophy and mathematics. He finished his studies at Ingolstadt in 1601, and became a teacher of Latin and the humanities. In 1603, he invented the pantograph, which could trace a drawing and reproduce it exactly on another piece of paper. This device brought him acclaim and attention from the leading intellectuals of Europe, and he became well known as a scientist and mathematician. In the meantime, he finished his religious studies and became a full member of the Jesuit order in 1609.

In 1611, Scheiner turned his interests to the Sun, and began a systematic study of sunspots, which he continued for the next 25 years. All the while, he was involved in many other projects. He studied the science of sight and wrote a book on optics and the eye; he invented an early version of the "camera obscura;" and he also developed an early solar telescope as to avoid damaging his eyes while observing. In 1624, he went to Rome, to the Vatican, where he would live for the rest of his life. There, he continued his solar studies, and wrote several more books dealing with the Sun.

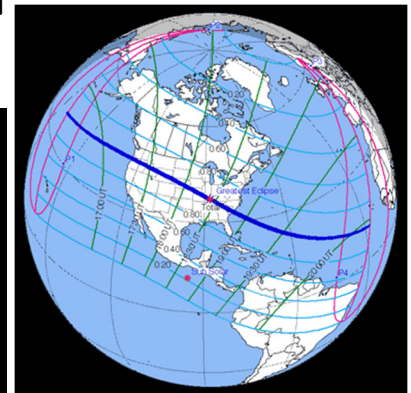
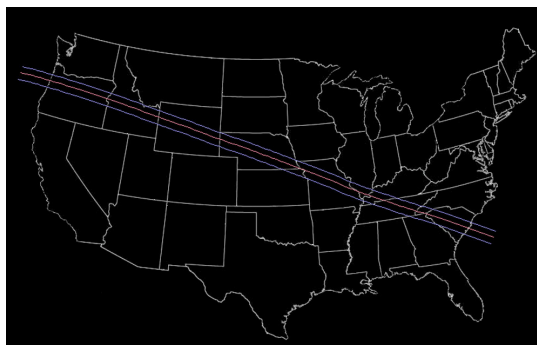
Scheiner's later years in Rome were his most controversial. Although his sunspot work was independent of other scientists of the time, apparently he saw them as plagiarizing his findings. In particular, he came out strongly opposed to Galileo. At Galileo's trial for heresy in the Vatican in 1633, Scheiner is believed to have been one of his accusers, for allegedly stealing his ideas about the sun and sunspots. In addition, Scheiner strongly defended the geocentric model of the solar system against Galileo's acceptance of the Copernican heliocentric system. The official Vatican records are vague, but Scheiner probably also played a role in the eventual condemning of Galileo and his sentence of house arrest until his death in 1642. It was not until 1994, over 360 years later that a Vatican committee established by Pope John Paul II, acknowledged that the Church was wrong in finding Galileo guilty.

After Galileo, Scheiner continued his sunspot studies, and eventually wrote a major work, *Rosa Urania*, on his studies and observations of sunspots. It came out in four volumes, the last of which was not published until 1651, a year after his death. A crater on the Moon is named after him, as are several schools in Germany.

Source—"Christopher Scheiner," *Wikipedia*

It's Not Too Early to Plan for the 2017 Solar Eclipse

August 21, 2017, is a day that solar astronomers and amateur enthusiasts have been waiting for for a long time—the first total solar eclipse across the U.S. in almost 50 years. Totality will start in the north Pacific Ocean, enter the U.S. in northern Oregon, race across Idaho, Wyoming, Nebraska, Missouri, Kentucky, and Tennessee, and finally exit to the Atlantic via South Carolina. Many cities and state parks in or near the totality zone are receiving reservations requests already for the Big Day, and are looking forward to major jumps in the local economies. Even though it's over two years away, hundreds of thousands of professional astronomers, amateurs, and plain interested folks are starting to stake out their favorite spots along the totality line. Even a year ahead might be too late for something that's been a long time coming.



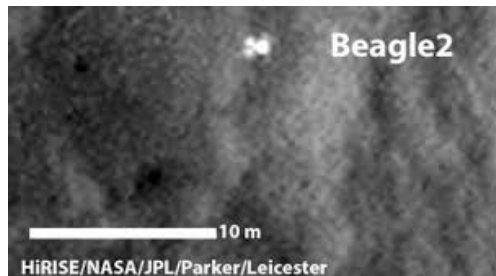
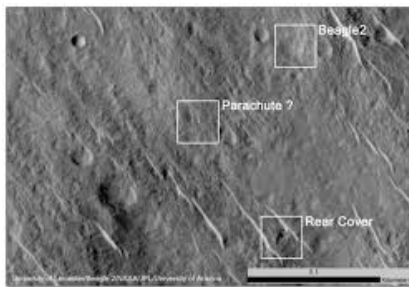
What's New in Space

Mars in the News

Beagle Found after 13 Years

On January 16, 2015, ESA and NASA jointly announced that the Beagle lander, which disappeared after separation from the Mars Express in 2002, has been found intact on the surface of Mars. The USA's Mars Reconnaissance Orbiter has been taking high resolution images of the area where the Beagle was supposed to land for several years now, and in November and December 2014 imaged an object on the surface that ESA officials are 99% certain is the lander. For many years it was supposed that the lander crashed on landing; more recently, the theory was that it landed in a deep crater far from its planned landing site. But the new images confirm that it did land in one piece in its intended landing area; the MRO images also showed its landing parachutes and its protective aeroshell on the surface as well.

According to the images, the lander is intact, but two of its four solar cell panels are not deployed, indicating that the lander made it to the surface safely, but was unable to function or send messages back to Earth. It is surmised that the failed panels blocked radio communications and other data. Now that the lander has been found, ESA officials will determine whether the failed panels were a result of flawed design during the construction of the lander, or whether they may have been damaged in some way because of the Mars Express flight or the landing.



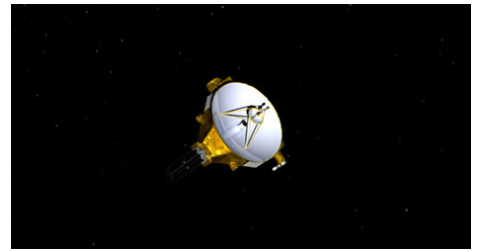
Next Mars Rover May Carry a Scout

NASA engineers and scientists are seriously looking into the possibility of the next Mars Rover carrying an autonomous helicopter-like drone, which will fly ahead of it and determine the best and safest route for it. The rover itself, which is now in the design stage and will look similar to the current Mars Curiosity rover, is scheduled to be launched in 2020 for a 2021 landing. The drone is being considered as a way to help the rover travel longer and faster than it does in current iterations, which are limited to about a quarter mile daily due to the fact that it has to send back images of its area every day for analysis by engineers on Earth, who then determine its route. The proposed drone would fly up to five miles ahead of the rover, while sending back information and images to Earth. As a result, the rover may be able to travel several miles a day. At the end of each day, the drone would return to the rover, resting and recharging its batteries on a landing pad on top of it. Scientists say that such a craft is feasible, but would have to be engineered to fly in the very thin Martian atmosphere. Prototypes of a possible drone have already been tested, and NASA officials are now determining which design would be best for the 2020 mission.



New Horizons Getting Ready for its Encounter with Pluto

The New Horizons spacecraft, which has been traveling through space for nine years, is preparing to fly by Pluto this coming summer. The grand piano sized spacecraft, which was put into "sleep mode" shortly after its launch in 2006, is waking up and testing its systems; so far, according to mission managers at the Jet Propulsion Laboratory in Pasadena, the craft is doing well, and should be in top form when it flies by the now "dwarf" planet on July 14. After its encounter with Pluto, New Horizons will continue through the outer solar system to the Kuiper Belt; the Hubble Space Telescope has been surveying the Belt to find interesting objects for the spacecraft to observe. So far, at least three other dwarf planet-like bodies may also be targets for New Horizons.



The Aerospace Community Wonders what China is Up To

It's been almost two years since China last launched a manned spacecraft, and space agencies and aerospace experts are wondering what it has been doing in the meantime. After the successful Shenzhou 10 mission in June 2011, there has been little information coming out about the next manned flight, what it will involve, how many people will be on it, or even when it will take place. Many believe that China is preparing to launch a second prototype space station next year, and then a third in 2020, which will be a jumping-off point for a manned mission to the Moon by 2022. It is widely believed that the next major event in China's manned space program will be the launch of Tiangong 2, a followup to the Tiangong 1 space station, scheduled for launch in 2016. Indications are that a third space station, Tiangong 3, will be the permanent space facility to be manned by up to five people, starting in 2020. So far, the Chinese have said nothing about their current space plans, only that they continue to progress towards ultimate space goals.

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

Byurakan Observatory

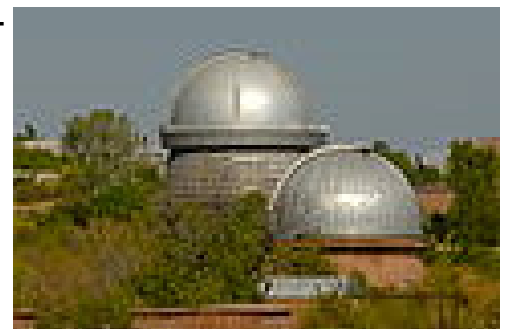
Byurakan Observatory was originally established by the USSR in 1946, right after World War II, and was the USSR Academy of Sciences' main astronomical facility in the post-war years. Located on the slopes of Mount Aragats in Armenia, it did important work for many years. However, it was eclipsed by larger facilities in the 1970s and 80s, and after the fall of the Soviet Union in 1991, passed into the hands of the Armenian government, which now owns and manages it.

The Byurakan Observatory consists of three large telescopes and two smaller ones. The largest is a 2.6m Cassegrain reflector, along with a 1m Schmidt camera, and a second .5m Schmidt camera. Two small reflectors are used for general astronomy and student research.

Byurakan Observatory has had a long and illustrious history in astronomical studies. It has done important research in star clusters, flare stars, supernovas, and galaxies. In addition, two major sky surveys using the Schmidt camera have been done; the first, starting in 1965, discovered over 1,500 galaxies with ultraviolet excess; they are now known as Markarian Galaxies, and go by the designation Mrk. A second ongoing survey is focusing on quasars and emission line galaxies.

Byurakan has also been the site of international conferences and meetings. Several conferences on stars and supernovas have been held there, as well as two SETI conferences. Unfortunately, for several years after the breakup of the old Soviet Union and the establishment of the nation of Armenia, the observatory went through financial hard times, but is now more economically stable and returning to its role as a leader in stellar and galactic astronomy.

Right-the domes of the 2.6m Cassegrain and the 1m Schmidt camera at Byurakan
Sources: "Byurakan Observatory," Wikipedia
Byurakan Observatory website-www.bao.am



From NASA's Space Place

Minor Mergers Have Massive Consequences for Black Holes

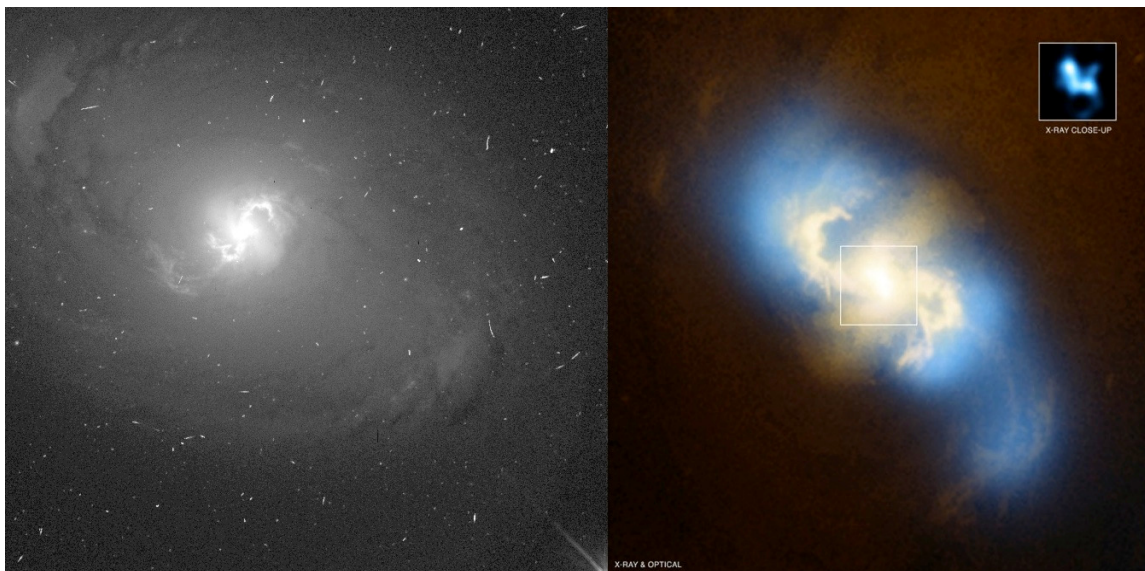
By Dr. Ethan Siegel

When you think of our sun, the nearest star to our world, you think of an isolated entity, with more than four light years separating it from its next nearest neighbor. But it wasn't always so: billions of years ago, when our sun was first created, it very likely formed in concert with thousands of other stars, when a giant molecular cloud containing perhaps a million times the mass of our solar system collapsed. While the vast majority of stars that the universe forms—some ninety-five percent—are the mass of our sun or smaller, a rare but significant fraction are ultra-massive, containing tens or even hundreds of times the mass our star contains. When these stars run out of fuel in their cores, they explode in a fantastic Type II supernova, where the star's core collapses. In the most massive cases, this forms a black hole.

Over time, many generations of stars—and hence, many black holes—form, with the majority eventually migrating towards the centers of their host galaxies and merging together. Our own galaxy, the Milky Way, houses a supermassive black hole that weighs in at about four million solar masses, while our big sister, Andromeda, has one nearly twenty times as massive. But even relatively isolated galaxies didn't simply form from the monolithic collapse of an isolated clump of matter, but by hierarchical mergers of smaller galaxies over tremendous timescales. If galaxies with large amounts of stars all have black holes at their centers, then we should be able to see some fraction of Milky Way-sized galaxies with not just one, but *multiple* supermassive black holes at their center!

It was only in the early 2000s that NASA's Chandra X-ray Observatory was able to find the first binary supermassive black hole in a galaxy, and that was in an ultra-luminous galaxy with a double core. Many other examples were discovered since, but for a decade they were all in ultra-massive, active galaxies. That all changed in 2011, with the discovery of two active, massive black holes at the center of the regular spiral galaxy NGC 3393, a galaxy that must have undergone only minor mergers no less than a billion years ago, where the black hole pair is separated by only 490 light years! It's only in the cores of active, X-ray emitting galaxies that we can detect binary black holes like this. Examples like NGC 3393 and IC 4970 are not only confirming our picture of galaxy growth and formation, but are teaching us that supermassive relics from ancient, minor mergers might persist as standalone entities for longer than we ever thought!

Below—NGC 3393 in visible light(left), and in x-ray light, taken by the Chandra X-ray Telescope, showing evidence of a binary black hole at its center. Images credit: NGC 3393 in the optical (L) by M. Malkan (UCLA), HST, NASA (L); NGC 3393 in the X-ray and optical (R), composite by NASA / CXO / SAO / G. Fabbiano et al. (X-ray) and NASA/STScI (optical).



Article and images courtesy of NASA's Space Place