

May-June 2014
Volume 62
Issue 3

The Observer

The Newsletter of Central Valley Astronomers of Fresno

In this Issue:

Profiles in Astronomy:
Heber Curtis

ISS, Putin, and the Ukraine

The Sun as a mighty Powerhouse

Space-X, Sierra-Nevada,
and Boeing all Gear Up for
Commercial Spaceflight

Gravity Waves Possibly
found

The Carter Observatory in
New Zealand

CVA Calendar

May 3-CVA public starparty
at Riverpark

May 17-CVA monthly meeting
at CSUF-7pm

May 24-CVA starparty at
Eastman Lake

May 31-CVA starparty at
Eastman Lake

June 7-CVA public starparty
at Riverpark

June 14-CVA monthly
meeting at CSUF 7pm

June 21-CVA starparty at
Millerton Lake

June 28-CVA starparty at
Eastman Lake



CVA-Glacier Point Weekend- August 29-30, 2014

The best viewing anywhere at anytime!
See details inside on reserving a spot

Quote of the Month-

A broad and ample road whose dust is gold,
And pavement stars, as stars to thee appear
Seen in the galaxy, that milky way
Which nightly as a circling zone thou seest
Powder'd with stars...

John Milton, *Paradise Lost*, Book VII



Full Moon-May 14



New Moon May 28



Full Moon June 13



New Moon-June 27

Central Valley Astronomers
Web Address:
www.cvfresno.org

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

Officers and Directors for 2014

President and
Star Pary Coordinator
Fred Lusk 559-436-1833
fel3@pacbell.net

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

2d Vice-president
Randy Steiner

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

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

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

Director
Clarence Noell 559-271-9304
xmasenn@sbcglobal.net

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

Director
Greg Morgan 559-348-1160
gmorgan@oldstarlight.com

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

The Observer May-June 2014

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

The President's Message

Summer is coming and that means good skies for the CVA family. This year, we have a number of events going on: the Eastman Lake starwatches, the Riverpark public starwatches, weekends at Courtright, and the annual Glacier Point-Yosemite starwatch at the end of August. There's lots for everyone to do, so get your scopes ready for the summer and enjoy the viewing.

Speaking of Glacier Point, many thanks to Dave Dutton for leading it up again this year. Dave has been doing a wonderful job for many year now, and we all owe him major kudos for his role in ensuring good weekends at Yosemite every time.

The space program lost another pioneer recently-John Houbolt, the genius behind the LOR (Lunar Orbit Rendezvous) system that eventually was used to put Apollo on the Moon in the 1960s, died recently. A future issue of the Observer will have an article about him and his unsung achievements. As in so many other areas, the old guard at NASA is fading away.

This will be short and will end with one of the great summer objects-The great globular in Hercules, M13-always an exciting thing to see during the middle of the year-May you view it many times along with all the other wonderful summer objects.

Always have clear skies-Fred

Image-NASA



Number of extra-solar planets found as of April 2014-1,783
Including 460 multiple planet systems
How many more are out there-
Thousands? Tens of thousands?

Profiles in Astronomy

Heber Doust Curtis 1872-1942

Curtis was born and raised in Michigan, and attended the University of Michigan, where he majored in classical languages, becoming fluent in Latin, Greek, Hebrew, Sanskrit, and Assyrian. After graduation and graduate school, he settled into a career teaching Greek and Latin, which he assumed he would do for the rest of his life. However, when he was in his thirties, a relative gave him a small telescope as a gift, and he became interested in astronomy. He returned to graduate school at the University of Virginia, and eventually earned a doctorate in astronomy.

James Keeler, the director of Lick Observatory, died in 1901, and Curtis was hired in 1902 to take his place. Curtis continued Keeler's research into the so-called "spiral nebulae," and, over the next fifteen years, amassed huge amounts of data on them, including the idea that they were not part of the Milky Way, as most astronomers thought, but were beyond it, "island universes" all their own. He even found evidence of Cepheid Variables in the spiral nebulae, especially in M31, the Great Nebula in Andromeda. Harlow Shapley, the leading astronomer of the time, then at Mt. Wilson Observatory, disputed this view, and contended that all the spiral nebulae, as well as everything else in the universe, was part of a vastly huge Milky Way, over 300,000 light years in diameter. In 1920, the Smithsonian Institution in Washington, D.C. sponsored a debate, actually a reading of papers by the two men, outlining their views on the spiral nebulae controversy. The consensus afterwards was that Shapley had all the right data, but was wrong; and Curtis had flawed data, but turned out to be right, when in 1925, Edwin Hubble announced that Cepheid Variables in Andromeda, probably the same ones that Curtis had found years before, proved that the nebulae was actually far outside the Milky Way and a galaxy "island universe" all its own. It marked the beginning of a revolution in astronomy, one that has continued to this day.

Shortly after the "debate" with Shapley, Curtis left Lick and became director of the Allegheny Observatory in Pittsburg, Pennsylvania, the same position that his mentor Keeler held for many years. Why he would leave one of the foremost observatories in the world for a second rate institution with obsolete third rate equipment surprised many, but, with a growing family, he did it mostly for the money. After almost ten years in Pittsburg, frustrated by the poor viewing due to pollution and the lack of good telescopes, his old alma mater, the University of Michigan, offered him the position of director at its observatory, and he took it. One of his first goals was to raise money to build a huge reflector telescope comparable to the giant scopes at Mt. Wilson and Lick, but the coming of the Great Depression dried up his funding sources. Nevertheless, he stayed at Michigan until his death in 1942. Many in astronomy believe that if he had been more forceful in announcing and publishing his research on the spiral nebulae, he, and not Hubble, would have been hailed as the discoverer of a universe far beyond the Milky Way.

Source-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



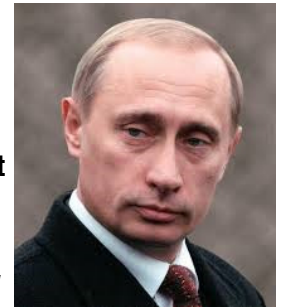
CVA Calendar May-June 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				May 1	2	3 CVA Public star party at Riverpark
4	5 Cinco de Mayo Astronomy Week begins	6	7	8 VE Day in Europe	9	10
11 Mother's Day	12	13	14 Full Moon 	15	16	17 Armed Forces Day CVA monthly meeting at CSUF 7pm
18	19	20	21 Cosmic background radiation discovered-1965	22 Riverside Telescope Maker's Conference begins	23	24 CVA star party at Eastman Lake
25	26 Memorial Day	27	28 New Moon 	29 Einstein's Theory of Relativity tested during solar eclipse of 1919	30	31 CVA star party at Eastman Lake
June 1	2	3	4 First light for the 200" at Polamar-1948 Shavuot begins	5	6	7 CVA public star party at Riverpark
8	9	10	11	12	13 Full Moon 	14 Flag Day CVA monthly meeting at CSUF 7pm
15 Father's Day	16	17	18	19	20	21 Summer solistic CVA public star party at Millerton Lake
22	23	24	25	26	27 New Moon 	28 CVA star party at Eastman Lake CVA star party weekend at Courtright Lake
29 Ramadam begins	30 Tungusta explosion in 1908	July 1	2	3	4	5

What's New in Space

ISS, the Ukraine, and Soyuz

In the wake of Russian attempts to influence the situation in the Ukraine, and possibly take over it, NASA, among other U.S. government agencies, has cut back on its dealings with the country. This includes agreements for rocket engines and other space hardware, as well as educational and scientific studies and software and computer programs. The space agency announced, though, that the ISS program will not be a part of the boycott to force the Russians to end their interest in the Ukraine. However, many in the aerospace community fear that Russian President Vladimir Putin will use ISS as a political weapon, especially since the U.S. is dependent on Soyuz flights to carry astronauts to and from the space station. Many believe that, if the situation between the U.S. and Russia worsens, Putin may threaten to cut off American



participation in the Soyuz program, even though NASA currently has a contract with RKA, the Russian Space Agency, to carry five-six Americans a year to ISS through 2017. This would leave Russia effectively in control of the space station. Such a scenario would not go over too well in the U.S., since this country has provided about 75% of the funding to build and maintain ISS. A number of prominent people in the space program, including many former astronauts, feared that this might happen once the U.S. ended the Space Shuttle program in 2011 and started relying on Russian spacecraft. If nothing else, the situation may well spur a speedup in commercial manned spacecraft, some of which may be ready as early as next year.

LC-39 Back in Business, and Other Activity in the Commercial Spaceflight World

Space-X has announced that it will use the Kennedy Space Center's launch pad 39-A for the first test flight of its heavy lift Falcon rocket in early 2015. It will be the first launching from the LC 39 complex since the end of the Space Shuttle almost three years ago. Space-X is currently taking the Falcon LH rocket through ground tests, and hopes to have it ready by the end of the year. In the meantime, the company announced that the manned version of its Dragon spacecraft will have its first launch in 2016. Given the current situation with the Russians, it may come even sooner.

In the meantime, Sierra-Nevada will also have the first test flight of its Dreamchaser spacecraft in 2016. The firm announced that the mini-shuttle will be launched from the Kennedy Space Center on November 1, 2016, will make a one day unmanned flight, and then land in southern California. Eventually, Sierra-Nevada plans for the Dreamchaser to both be launched and land at the Florida space center, and use the old Space Shuttle facilities for its pre-launch and post-landing activities. It now plans for the first manned flight to take place in 2017.



Boeing has previously announced that its manned spacecraft, currently known as the CST-100, may have its first manned flight as early as July 2015. The craft is now in the testing stages, and pilots are currently being trained to fly it. The first flight will carry a crew of two and will dock with ISS.



What May be the Scientific Story of the Year-Evidence of Gravity Waves and Inflation Found

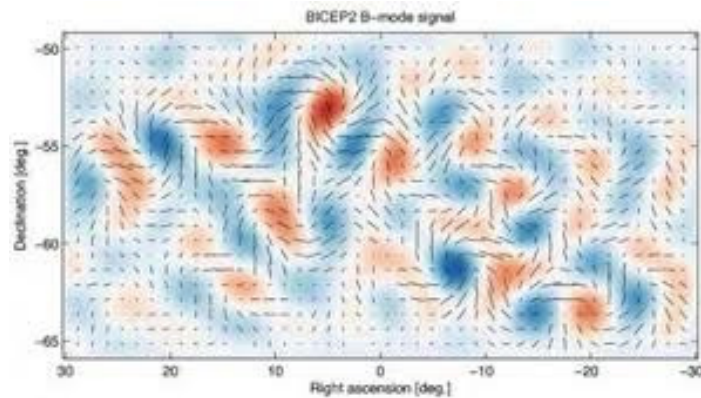
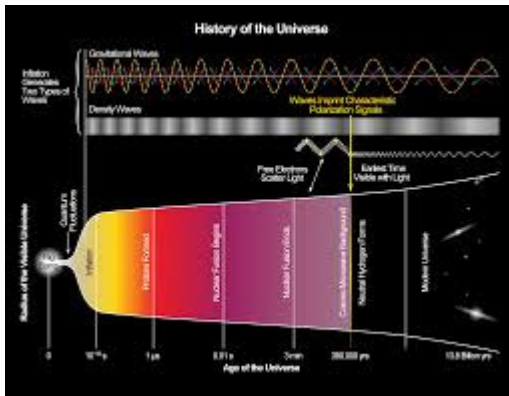
On March 16, scientists from the Harvard-Smithsonian Center for Astrophysics in Boston and the California Institute of Technology in Pasadena announced that surveys of the sky taken with their telescopes at the South Pole have found evidence of gravity waves -one of the "holy grails" of modern cosmology. First postulated in Einstein's theory of relativity, gravity waves have been sought as a confirmation of the inflation theory of how the universe began, and also as a possible explanation of the large scale structure that includes galaxies and even galaxy groups.



Using ultra sensitive telescopes in the high altitude and very clear and dark air at the Aumonton-Scott South Pole Station, researchers involved in what is called the BICEP2 project searched for what are called B-modes, which are certain patterns in the polarized light of the cosmic microwave background. They explored the universe when it first became transparent to light, approximately 380,000 years after it is generally believed to have begun. There, they found a number of instances of B-modes, leading to a general conclusion that the universe underwent a period of hyperactive expansion in its first microseconds, possibly confirming the widely regarded inflation concept, first proposed in 1979. At the same time, the findings also indicated that gravity waves were formed from this outburst, of which remnants are probably still at large throughout the

universe.

Momentous as the announcement is, it still needs to be confirmed by other scientists and facilities, many of which are still looking for gravity waves. In fact, one group of scientists said that although the finding is important, without further evidence, it might not be the final explanation for either gravity waves or inflation. And such is the way of science-support but verify.



If any of our CVA members took images of the lunar eclipse on April 21-22-send them to me I will include them in the next issue of *The Observer*.



The Power of the Sun's Engines

By Dr. Ethan Siegel

Here on Earth, the sun provides us with the vast majority of our energy, striking the top of the atmosphere with up to 1,000 Watts of power per square meter, albeit highly dependent on the sunlight's angle-of-incidence. But remember that the sun is a whopping 150 million kilometers away, and sends an equal amount of radiation in all directions; the Earth-facing direction is nothing special. Even considering sunspots, solar flares, and long-and-short term variations in solar irradiance, the sun's energy output is always constant to about one-part-in-1,000. All told, our parent star consistently outputs an estimated 4×10^{26} Watts of power; one *second* of the sun's emissions could power all the world's energy needs for over 700,000 years.

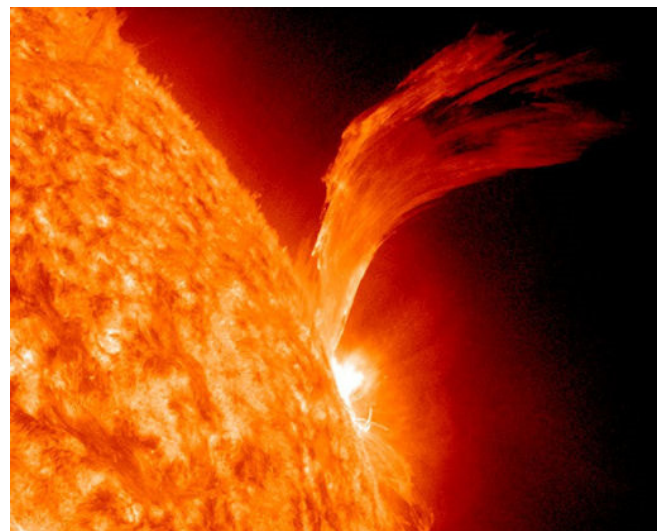
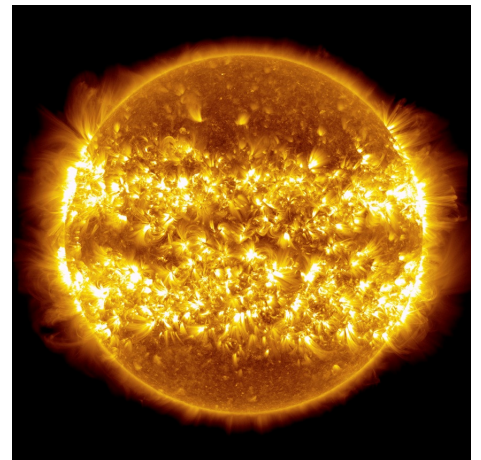
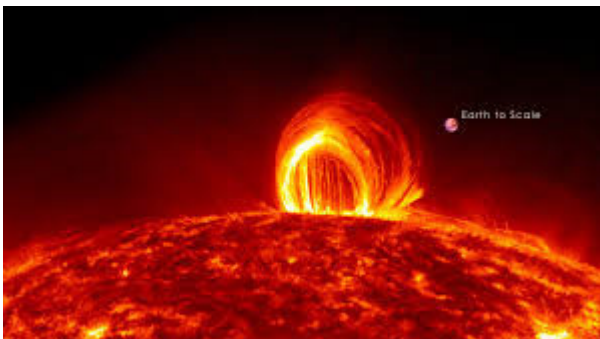
That's a literally astronomical amount of energy, and it comes about thanks to the hugeness of the sun. With a radius of 700,000 kilometers, it would take 109 Earths, lined up from end-to-end, just to go across the diameter of the sun once. Unlike our Earth, however, the sun is made up of around 70% hydrogen by mass, and it's the individual protons — or the nuclei of hydrogen atoms — that fuse together, eventually becoming helium-4 and releasing a tremendous amount of energy. All told, for every four protons that wind up becoming helium-4, a tiny bit of mass — just 0.7% of the original amount — gets converted into energy by $E=mc^2$, and that's where the sun's power originates.

You'd be correct in thinking that fusing $\sim 4 \times 10^{38}$ protons-per-second gives off a tremendous amount of energy, but remember that nuclear fusion occurs in a *huge* region of the sun: about the innermost quarter (in radius) is where 99% of it is actively taking place. So there might be 4×10^{26} Watts of power put out, but that's spread out over 2.2×10^{25} cubic meters, meaning the sun's energy output *per-unit-volume* is just $18 \text{ W} / \text{m}^3$. Compare this to the average human being, whose basal metabolic rate is equivalent to around 100 Watts, yet takes up just 0.06 cubic meters of space. In other words, you emit 100 times as much energy-per-unit-volume as the sun! It's only because the sun is so large and massive that its power is so great.

It's this slow process, releasing huge amounts of energy *per reaction* over an incredibly large volume, that has powered life on our world throughout its entire history. It may not appear so impressive if you look at just a tiny region, but — at least for our sun — that huge size really adds up!

This article is used courtesy of NASA's Space Place
Many thanks to Laura Lincoln and the Space Place crew

Images from NASA-Solar Dynamics Observatory



Larry Parmeter is the editor of
The Observer

phone # 559-276-8753

E-mail parmeter3@yahoo.com

Deadline for articles submission for the
July-August 2014 issue
July 20

Please submit articles in Microsoft Word format

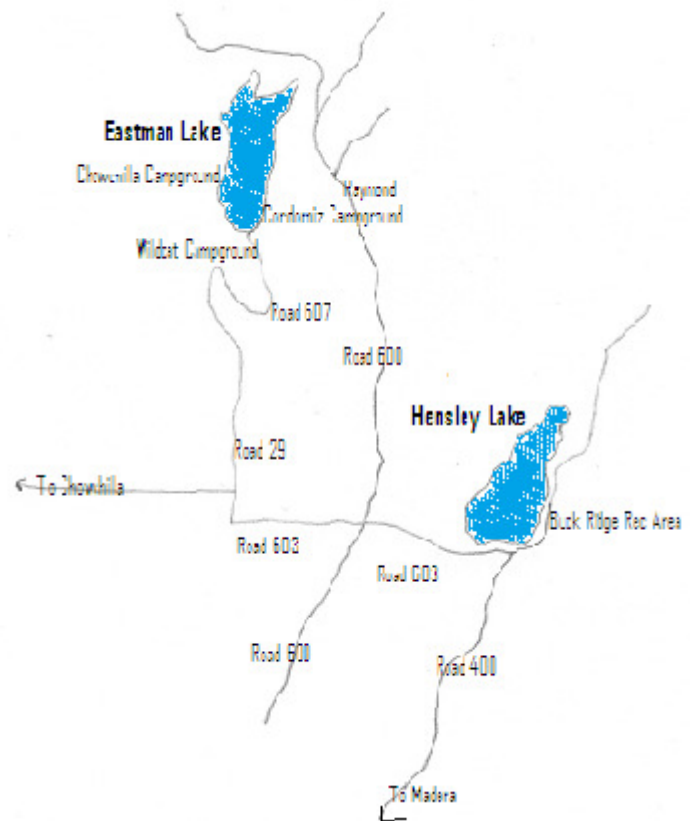
The Carter Observatory

The latest in a continuing series on lesser known-but still important-observatories around the world

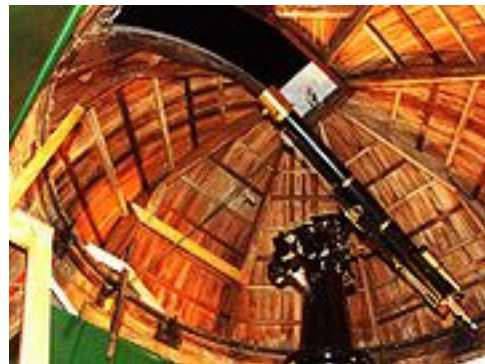
The Carter Observatory is the national observatory of New Zealand, which was established in Wellington in 1937, although the actual facility did not open until 1941, due to World War II. It was named after Charles Carter, a wealthy New Zealand businessman who willed funding to establish the Royal Society of New Zealand when he died in 1898. Part of the bequest specified the construction of an astronomical observatory in or near Wellington for both professional and general public use. The observatory has two telescopes at the main facility, and a third nearby. The Thomas Cooke Telescope, a 9.75" refractor, and the Ruth Crisp Telescope, a 16" Cassegrain reflector, are used at the main building. The Thomas King Observatory outside of Wellington is run by the Carter administration, and hosts a 5" refractor, which is used mostly for public viewing.

The Carter Observatory has a strong program of public education, especially assisting amateur astronomers, as well as a staff of professional astronomers who conduct studies of variable stars, comets, galaxies, and asteroids. The observatory was closed for a time in the early 2000s, but reopened in 2010 after a \$5 million upgrade and modernization program.

Right-The Ruth Crisp 16" telescope at the Carter Observatory. This is the main telescope for professional use.



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.



(above)-The 9.75" Thomas Cooke refractor

