CVA is Still Limiting its Activities due to the COVID Virus Threat-Check the CVA Website and Facebook Page for any Possible Changes

THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno November-December 2020

Andromeda, the Queen of the Autumn Skies

The Great Galaxy in Andromeda, M31, is one of the most beautiful objects in the fall skies and always a sight to see. It is, of course, named after the mythological Greek maiden who was rescued from a serpent by Perseus(and the constellation Perseus is next to Andromeda). The Andromeda Galaxy figures prominently in modern astronomy as the object that scientists in the late 1800s and early 1900s most often used to find the size and age of the universe, the best known observer being Edwin Hubble. Andromeda also has the distinction of being, at 2.5 million light years away, the most distant object that can be seen with the unaided eye (although some say that the Triangulum Galaxy, M33, at three million light years, can viewed with the naked eye under the right circumstances). Andromeda is also blueshifted; it is headed towards Earth and will crash into the Milky Way-in about four billion years. So, no need to worry anytime soon.

Andromeda image by CVA president Ryan Ledek-taken at Quail Flat, Sequoia N.P. on October 13, 2020

Quote of the month-

"The laws of physics dictate that chocolate pudding disappears a lot faster than other flavors on ISS..."

Scott Kelly, from his book *Endurance: My Year aboard ISS and a Lifetime of Discovery*

In this Issue-

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The President's Message

Hello fellow astronomers!

I hope you are all doing well as we begin to move into the holiday season. Winter is probably when my favorite things to look at are up (I'm an Orion fanatic, what can I say?!). Whether you're taking photos or just observing, there is a huge buffet of large, bright things to look at this time of year, and this year especially... if you can get away from the smoke that is!

Speaking of smoke, it's been nice to have the smog beginning to clear more and more. Another member and I took advantage of a break in all the smog to get some shots of Mars during the opposition, and it was quite a sight to behold. Make sure to catch it as it's up all night long. In addition, make sure to catch Jupiter and Saturn as they make their last appearances for this year in the southwest at sunset! With so many planets (Venus in the early morning too!) as well as Andromeda, the Pleiades, the Double Cluster and the whole Orion area, just to name a few, parading across the sky right now, you could easily stay up all night and not get bored. There has been a silver lining for me as far as the smoke is concerned and it was that it made me look for alternative observing sights away from the sierras. I made a trip out to the west side of the valley, in the Panoche area and there are a lot of intriguing possibilities out there.

I hope everyone is being safe and able to observe whenever the conditions will allow. I look forward to getting back to normal as soon as possible and being able to get out and spread the joy of astronomy with the public as soon as it's safe to do so. But until then, I think we'll all manage.

Clear Skies-
Ryan

Number of exoplanets found as October

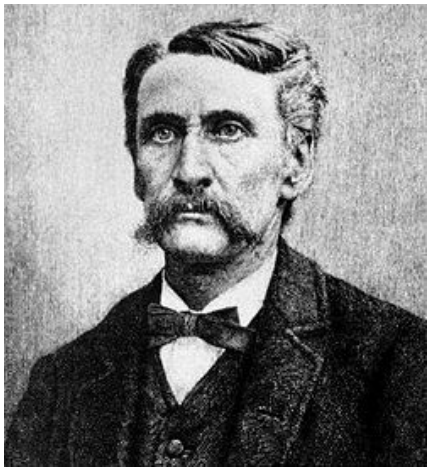
2020-4,368

How many more are out there?

Tens of thousands? Hundreds of thousands?

Profiles in Astronomy

Sherbourne Wesley Burnham 1838-1921



Burnham was born and raised in Thetford, Vermont. He attended the local academy there, and after he graduated, that was the extent of his formal education. In 1858, he moved to New York City and worked as a court reporter. During the Civil War, he was a newspaper correspondent for the Union Army, and afterwards moved to Chicago and went back to court reporting, a position he would hold for over twenty more years. In 1888, he left his job and moved to California, where he worked at the Lick Observatory, but then in 1892, moved back to Chicago and resumed his court reporting job. He finally retired from the court in 1897, and became a staff astronomer at the Yerkes Observatory, a position he held almost until just a few years before his death.

Burnham is best known for his studies of double and binary stars. During the Civil War, when he was stationed in New Orleans, he read a book, *Geography of the Heavens*, which stimulated his interest in astronomy. During the years that he lived and worked in Chicago, he was also a dedicated amateur astronomer and discovered over 400 double and binary stars, which he eventually put into a catalogue in 1874. In succeeding years, he expanded in his catalogue, which began to get him noticed by major observatories, and led to his hiring at Lick Observatory. He continued to add to it over the years, and eventually, in 1906, he published the *Burnham Double Star Catalogue*, which contained over 13,000 double stars. By this time, he was at Yerkes as a full-time professional astronomer and had won a number of awards for his stellar work, among them the Gold Medal of the Royal Astronomical Society and the Lalande Medal from the French Academy of Sciences. A crater on the moon and an asteroid are named for him.

Source-Wikipedia

Two Great Mars Images by CVA members

Mars has been prominent in the nighttime skies the last few months on its closest approach to Earth in several years. The image on the left was taken by CVA president Ryan Ledak; the one on the right was by CVA member Kane Sjoberg. Both were taken in October 2020.

What's New in Space

Heading into the 2020s-NASA Gears up for more Space Station Missions

Even with the COVID virus, NASA is still planning for a full schedule of crewed missions to ISS over the next two years. Now that the Crew Dragon has been approved for human spaceflight, NASA and ESA astronauts will use it to go to and from the space station every six months, and possibly more often, from now on. A crew of four will be launched in November, to be followed by another four person crew in April 2021, and still another ISS crew in October. In the meantime, if all goes well with a second unmanned Boeing Starliner mission in December, the spacecraft will have its first crewed launch in May or June of 2021, followed by an operational mission as early as December of 2021. That crew, consisting of Sunita Williams, Josh Cassada, and Jeanette Epps, will spend six months on ISS. After that, crew rotation flights to and from ISS will alternate between Crew Dragon and Starliner through 2022 and into 2023. With the advent of operational flights by Crew Dragon and Starliner to ISS, the, the long term crew capacity aboard the space station will rise from six to seven.

On October 7, Christopher Ferguson, a veteran of three space shuttle flights, announced that he is stepping down as commander of the first crewed Starliner mission, citing personal and family reasons. He will still remain in his position as Boeing's project manager for the Starliner program and will see it though its initial crewed flights. NASA announced that another veteran shuttle pilot, Barry Wilmore, will take his place. The other two crewmembers for the first Starliner mission are Michael Fincke and Nicole Mann.

More Private Paying Flights to ISS-Capitalism in Orbit

In the meantime, both the U.S. and Russia will start paying "tourist" flights to the space station. In November 2021, Axion Areospace will sponsor a private passenger paying mission to the space station using the Crew Dragon spacecraft. Former space shuttle pilot Michael Lopez-Alegria, now an Axiom executive, will command the mission; the names of the paying passengers have not been released, but rumors say that they will be actor Tom Cruise, a movie director, and a cameraman, who will film scenes for an upcoming movie in weightlessness inside the space station. The passengers will pay $55 million each to Axiom for use of the Crew Dragon, the launch and return, and $35,000 a day to NASA for a ten day stay aboard the space station.

At about the same time, RKA, the Russian Space Agency, will sponsor a paying passenger mission to ISS using the Soyuz spacecraft. It is scheduled to be launched in October 2021 and will spend eight days aboard the Russian segment of the space station. Along with the Russian commander, one of the two paying seats has already been sold to Johanna Maislinger, an Austrian airline pilot. The other is believed to be eventually occupied by a Japanese business executive who was originally supposed to go into space almost five years ago but had to be bumped due to schedule changes. RKA has announced that one Soyuz mission a year from now on will be a paying passenger flight to ISS, in order to make up funding that will be lost now that the U.S. has its own crewed spacecraft system. It assumes that Crew Dragon and Starliner will also offer paying passenger flights in the future and hopes to take away some of their business with lower fees and costs.

More Comet NEOWISE Images

Two more images of Comet NEOWISE taken by Msgr. Ronald Royer, a retired priest and amateur astronomer, from his observatory near Springville in Tulare County

The Rise of the Reflector

Until the late 1800s, most reflector telescope mirrors were made of polished metal(the mirror for Newton's first reflector was made of polished copper). It was around the turn of the century that a technique was developed to put powdered aluminum on glass to make a highly reflective surface. Then, in the early 1900s, the Corning Glass Company in New York started making mirrors from a newly developed type of glass called Pyrex. It was so successful that Corning eventually became known as the world's best-known telescope mirror making company(among its many achievements are the 200" Hale Telescope mirror at Palomar and the 94" mirror for the Hubble Space Telescope). The advent of the Pyrex-aluminumized mirror meant that reflector telescopes could be made in much larger sizes and more cheaply, and, as a result, almost no large refractors were made after 1900(another factor contributing to the decline of refractors was chromatic aberration, which does not occur in reflectors).

Update on Betelguese-Smaller, Nearer, and Burping

Scientists studying the star Betelguese since it started to mysteriously dim in 2019 have come up with an explanation and some modified numbers about it. In August, observations by the Hubble Space Telescope showed that the dimming was most likely caused by a jet of plasma gas which was ejected from the star and cooled enough to turn into a dust cloud that obscured part of its surface. In addition, renewed interest in the star has shown that it is closer than previously calculated, now about 530 light years away, not almost 700, and it is smaller than previous studies have shown. Also, the most recent findings about its dimming episode also show that, even though a red giant, it will probably not explode for at least 100,000 more years.

Star Stories

Alcyone

Alcyone is the brightest star in the well-known star cluster the Pleiades. It is one of approximately a dozen bright stars that can be seen with the naked eye during the winter in the constellation Taurus, the Bull. It is also known Eta Tauri, has an apparent magnitude of 2.87 and an absolute magnitude of -2.62. Its stellar classification is B5 and it is almost ten times the size of the Sun. Alcyone is about 136 parsecs, or 443 light years from Earth. Like the rest of the stars in the Pleiades, it is fairly young, believed to be only about one hundred million years old; it and all of its companions were probably formed in the same gas cloud and are slowly dispersing. Scientists believe that in about another one hundred million years, the Pleiades star cluster will no longer exist; due to proper motion, all the stars will have gone their own separate ways. (right-The Pleaides. Alcyone is almost in the middle, with its three small companions next to it)

Alcyone is a multiple star system, with three known smaller companions. The main star, Alcyone A, is the one that most people see; it has at least two much smaller and fainter stars orbiting it. Alcyone B is a magnitude 6.3 A star, Alcyone C is a Cepheid variable star, and Alcyone D is a magnitude 9.1 F star. Some scientists believe that the Alcyone system has at least four more stars involved in it, but these have not yet been definitely proven to be associated with the main star.

In ancient times, Alcyone was one of the Seven Sisters, also sometimes called the Daughters of Atlas in Greek mythology. The other six, also represented by stars in the cluster, were Electra, Maia, Merope, Taygeta, Calaeno, and Sterope(or Asterope). The seven were the offspring of Atlas and Pleione, from which the name Pleiades comes from. The name is believed to come from the Greek word *Plein,* "to sail," because its appearance in the sky was a sign of good sailing. Some scholars, though, believe that it also refers to a flock of doves. A number of other cultures also prominently feature Alcyone and the other stars of the Pleaides. The oldest known depiction of them is on the Nebra Sky Disc, which was found in Germany and dates to 1600BC.(Right-the Nebra Disc. The cluster of seven circles near the top right is believed to be the Pleaides). Ancient Babylonian and Egyptian texts mention the Pleaides, as do both the Bible and the Koran. The Pleaides are also mentioned in several ancient Greek literary works dating back to almost 1000 BC. In modern culture, the Japanese word for The Pleaides is Subaru, and the logo of the car company, on every one of its vehicles, shows six stars in a pattern to represent the cluster(In ancient Japan, the name for the Pleaides was *Mutsarubashi,* which means "six stars").

Astronomy Joke of the Day

Have you heard about the new restaurant on the moon?
The food is good but there's just no atmosphere.

From *Cool Science*

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

The Aldershot Observatory

The Aldershot Observatory is a bit of an oddity. It consists of a single red brick building with an 8" refractor telescope not far from a well-lit major road on a flat piece of land at the edge of a huge military base southwest of London in England. Looking back further, its history is just as unique as its setting.

The story of the observatory starts with a man named Patrick Alexander, a wealthy amateur astronomer who, in 1891 had the well-known opticians Thomas and Howard Grubb of Dublin build an 8" refractor telescope for him. The telescope and its mount did not have an electric drive; instead, it was run by a clock drive with a mainspring that had to be wound up every two hours. Where Alexander used it is not really known, although it is believed that he had it mounted at one of his estates near Bath in southwestern England. Whether he did any real observing with it is also not certain(he had other telescopes), but he apparently enjoyed showing it off to friends and colleagues. In 1905, Alexander offered the telescope to the War Ministry, which accepted it and decided to locate it in Aldershot, then the main base for the British Army. The building for the telescope was finished in 1906, and afterwards the telescope went into operation, which brings up another mystery. Exactly what the Army did with it is not clear either. The consensus is that it was probably used to train military officers in celestial navigation. In 1908, the Army established an airfield at nearby Farmborough, which eventually became the headquarters of the Royal Air Force, and the observatory was also believed to have been used to track aircraft activity.

In the 1920s and 30s, the Army allowed both professional and amateur astronomers to use the telescope, and most of them studied variable stars, multiple star systems, and planetary studies, which by then, due to air and light pollution, was about all that could be seen at the site. After World War II, the observatory was made available to observers on a sporadic basis, mostly depending on who the Army approved of and how noteworthy the project was. Over the years, though, the observatory decayed and was vandalized on several occasions. In 1979, it was closed down, and pretty much forgotten until 1998, when a group of amateur observers got permission from the Army, which still legally owned it, to restore it. In 2000, it was reopened for use by amateur astronomers and for public outreach. Today, those who are familiar with the observatory say that the telescope is still in excellent shape but is next to useless due to its location. As such, few people use it anymore, and it has essentially become an historical curiosity.

Those who know the observatory well are concerned about its future because the British Army is planning to eventually close the Aldershot base and sell the land to private developers. They fear that it will get lost among the new developments or even be torn down. A local group is trying to raise funds to save the observatory and possibly move it to a more protected and far less light polluted site.
Source-Wikipedia

Astronomy Short

When Maartin Schmidt of Caltech discovered in 1963 that 3C 273 was a new class of objects, ones that were brilliantly lit and billions of light years away, he first wanted to call them "Kennedies," after the recently assassinated president. But he eventually agreed to name them based on their original enigmatic name, QSROs, a short form of their description-quasi-stellar radio objects-Quasars.

From *First Light* by Richard Preston

From the Observer Archives

The first part of this puzzle, entitled "Mindbenders," from the October 1983 issue, is repeated here with the solution, which was originally in the November 1983 issue, below it.

Mind Benders

An old friend of yours, after much hesitation, reveals to you that she is actually an extraterrestrial being. You are surprised and somewhat skeptical. She agrees to give you some fingernail clippings for testing in a well-equipped biochemical laboratory. Your preliminary tests show that the clipping seem to contain a combination of DNA and amino acids normally found in human fingernails. You are beginning to doubt your friend's sanity. Then you conduct a straightforward experiment with the clippings that conclusively shows your friend is from another world. What measurement did you perform? Why is this experiment definitive?

November 1983

To determine if your friend was truly from another world, you analyzed the polarized light as it passed through your friend's fingernails. Amino acid molecules, which make proteins, can be constructed in two geometrical forms(with the exception of glycine) one the mirror image of the other but otherwise identical. Molecules from one geometry will rotate in the polarized light in one direction, while the other geometry will rotate in the other direction. All life on Earth uses only one form of amino acid, "left-handed," the so-called L form. When you found that your friend's molecules were of the "dextro" or the right-handed form, you were certain that she was not crazy but really correct. Now the D form will work just as well as the L form, but the two cannot mix. One or the other must be used exclusively. It would be impossible for a human from Earth to produce offspring with one with the reverse form. You have all heard the old story about being incompatible with another party because the other party had "left-handed threads!" Well, this would be exactly the case. You would also really wonder about what it was that your friend used for food.

A Personal and Family Memoir on Halley's Comet

By Larry Parmeter

After Steve Harness's excellent talk on comets at the October Zoom meeting, I sent him a personal and family story. When Halley's Comet came around in 1986, I wrote to my grandmother, who was born in 1896 and grew up on a farm near Watsonville, and asked her if she had seen the comet in 1910. She told me that she remembered her teacher at school talking about it and encouraging the students to view it, and that one night she went outside and saw what she was pretty sure was the comet- and I've read that in the 1910 appearance, it was so bright and large in the sky that it would have been hard to miss. So, she was one of those who lived during Halley's Comet on two different occasions, which was something that probably not a lot of people could claim(My grandmother died in 1998 at age 102).

Right-Images of Halley's Comet as it appeared in 1910