

**CVA Meeting-January 7 at FSU-Be There!**



**2023 CVA Calendar in this Issue**

# THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno

January-February 2023

## Artemis 1 Paves the Way for America's Journey Back to the Moon



From its November 15 launch from the Kennedy Space Center to its December 11 splashdown in the Pacific Ocean off of Baja California, the Artemis 1 mission confounded its critics. Once derided for its lengthy delays and huge cost overruns (which are still serious problems), the spacecraft performed flawlessly during its twenty-five days in space, traveling to the moon and back. It prepares the way for the next Artemis mission, which will be crewed and will check out all systems for a moon landing by Artemis 3.

The Artemis program grew out of the Constellation program in the early 2000s, which called for a return to the moon and then to Mars. The current iteration was approved in 2010 under the Obama Administration and immediately ran into cost and logistics problems. Five years behind schedule and \$8 over budget, it is still a thorn to many, but it now has shown itself to work and points the way to America's space future.

Images by NASA/ESA

**Astronomy Quote of the Month-**

“Our mistake is not that we take our theories too seriously, but that we don't take them seriously enough...”

-Steven Weinberg, from *The First Three Minutes*

### In this Issue-

**Artemis 1 Images and More**

**The Most Distant Galaxies Found by JWST**

**The Earth is running out of Oxygen-  
But not Soon**

**Telstar**

**Virgin Galactic Back in the Sky**

**NGC 2276**

**The Wise Observatory**

**Star Stories-Rasalhugue**

**Profiles in Astronomy-Asada Goryu**

**A Sombering Relic Found off the  
coast of Florida**

Central Valley Astronomers

Web address  
[www.cvafresno.org](http://www.cvafresno.org)

Webmaster-Scott Davis

Officers and Board- 2023

President-  
Ryan Ledak

1st Vice-President-  
Steve Britton

2d Vice president-  
Scott Davis

Secretary/Treasurer-  
Steve Harness

Star Party Coordinator-  
Brian Bellis

Historian/Observer Editor-  
Larry Parmeter

Education Coordinator-  
Scott Davis

Director- Warren Maguire

Director- Clarence Noell

Director-Hubert Cecotti

Director-Lynn Kleiwer

Larry Parmeter is the  
editor of *The Observer*

He can be contacted at  
559-276-8753 or at  
[lanpar362@gmail.com](mailto:lanpar362@gmail.com)

# JWST Sees Familiar Objects in a New Way



The James Webb Space Telescope imaged the “Pillars of Creation” in the Eagle Nebula in October with its Mid-Infrared Camera, and NASA released the picture shortly afterwards. Unlike the iconic Hubble image, it peers through the dust to give an eerie and ethereal image of the vast cloud that harbors new stars.

Image from NASA/ESA/ JWST

Number of exoplanets found as of December 2022-  
5,227

How many more are out there?

Tens of thousands? Hundreds of thousands?

## Profiles in Astronomy

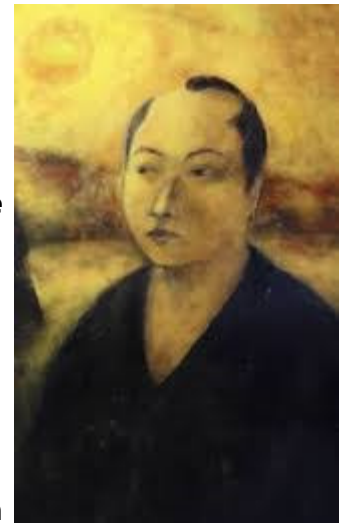
### Asada Goryu(birth name Ayabe Yasuaki)\* 1734-1799

Asada was born in Bungo in Kyushu province during the Edo Shogunate Era. His father was a wealthy Confucian doctor who financed most of his early studies. As a student, Ayabe showed an early interest in astronomy; he correctly calculated the solar eclipse of 1763 after official court astronomers had miscalculated it. He eventually moved to Osaka where, he, too, became a doctor, taking care of patients while also establishing and running a school for young astronomers. It was here that he changed his name, since he no longer had connections to his home area(In Japan in those days, a man's name was based on where he lived). He remained in Osaka for the rest of his life.

Asada is best known for introducing Western astronomy to Japan. Up to his time, most astronomical studies in his country were based on outdated Confucian ideas; he was able to find and read Western books on science and astronomy that he got from European visitors to Japan. He eventually had many of them translated into Japanese. He ground the lenses and built his own telescope, the first in Japan, and used it to study the moons of Jupiter, among many other objects. He and his students studied the sun and the moon and made precise measurements of their distances to the Earth. He also independently calculated and formulated what is now known as Kepler's third law of planetary motion. As well, around 1785, he was asked by the Japanese government to revise and update the Japanese calendar; he instead recommended one his foremost students, Takahashi Yoshitoki, who ended up doing it.

In addition to his astronomical studies, Asada also excelled as an anatomist; he wrote the first book on human anatomy in Japanese as a guide for other physicians. Near the end of his life, he said that he became a doctor only to make a living, and astronomy was always his true calling.

\*In Japan, like many Asian cultures, the surname comes first, followed by the personal name



## The Earth is Running out of Oxygen-But Not Anytime Soon

According to a study actually published in 2021, but not getting any real notice until a few months ago, the Earth will deplete its supply of oxygen, ending life for aerobic creatures, like humans. But, not to worry. It isn't going to happen for another billion years, give or take a few million. Currently, the Earth's atmosphere is about 21% oxygen, but, according to the research, first published in the magazine *Nature Geoscience*, the Sun's heating up in the next billion years will inhibit the production of carbon dioxide, trees and plants will not have enough to convert into oxygen, and the supply will subsequently diminish. The heating will also cause some of the oxygen in the upper atmosphere to float off into space. According to the study, there will still be a little bit left, but not enough to sustain large creatures like humans. The authors say that this shift will happen quite suddenly, on the scale of about 10,000 years or even less. Microscopic creatures like *Tridigrades* will probably survive, but not much else. Scientists now know that Earth once had a much higher percentage, perhaps as much as 35%, of oxygen than it does now; this, they say, is one reason why creatures of the past, like dinosaurs, were much larger than animals are today.



## What's New In Space

### Virgin Galactic to Resume Flights and Build a New Spacecraft

In November 2022, Richard Branson's Virgin Galactic announced that it will resume sub-orbital space flights starting in the Spring of 2023. Since its last flight in the Summer of 2021, it has been busy moving its operations to Spaceport USA in New Mexico and refining its White Knight Eve and SpaceShip 2 Unity craft. After initial test flights, the first commercial flight will take place in March or April 2023 and will carry five members of the Italian Air Force to an altitude of between fifty and sixty miles above the Earth. This flight was originally planned for the fall of 2021, but has been delayed several times due to FAA requirements and upgrades. Now, according to Virgin Galactic executives, the dual spacecraft system is finally ready to begin regular commercial flights.



Also, Virgin Galactic announced at the same time that it will begin building, in partnership with two other aerospace companies, the next generation of sub-orbital spacecraft, known as Delta. Although the Delta craft will look similar to Unity, it will be far more sophisticated and easier to "turn around" and use repeatedly. Delta will reportedly begin operational service in 2026 and will be able to make up to 300 flights a year.

### A Grim Reminder of a Tragic Event

NASA announced on November 10 that divers off the coast of Florida found a part of the Challenger space shuttle that exploded shortly after launch on January 28, 1986. They were filming a documentary about a missing World War II ship for the History Channel when they came across the wreckage. Film footage shows the divers examining heat tiles and measuring the size of the debris, which is about twenty feet long and believed to be part of the shuttle's fuselage. When they returned to shore, they showed the footage to NASA, which confirmed that it was from the Challenger shuttle. In the months following the Challenger tragedy, searchers recovered about 50% of the shuttle, but over the years, other pieces have been found as well, the best known in 1997 when part of one of the wings washed up on a beach near the space center in Florida. Legally, the shuttle is still owned by NASA, and anyone who finds a piece of it is obligated by law to turn it over to the space agency (same thing with the Columbia space shuttle, which broke up over East Texas in 2003. Only about 40% of it was found). The section that the divers found is still on the ocean floor; NASA has not yet decided whether it will recover it or not.



Many people have asked, what happened to the Challenger pieces that were found? Are they in a museum or somewhere else? The answer is that about four years after the tragedy, when the investigations were complete, NASA took the recovered parts and put them into an abandoned missile silo at the Cape Canaveral Launch Complex that had been used to test launch underground ICBMs in the 1960s and 70s, and then sealed it up. A memorial plaque at the site tells visitors and tourists what is below them.

# Space Age Archeology

## Telstar

Telstar 1 was the first communications satellite that established regular television and radio service between the United States and Europe. It was spherical-shaped, studded with solar cells and weighed 170 pounds, built by Bell Laboratories of New Jersey, and launched on July 10, 1962. Its first broadcast, sent to France on July 11, showed its American transmitting station in Maine and an American flag. Subsequent broadcasts the same day included news shows from CBS, as well as a baseball game between the Philadelphia Phillies and the Chicago Cubs and excerpts from the 1962 World Fair in Seattle, Washington. All of these were transmitted to the Eurovision Network and shown throughout Western Europe. Telstar also sent the first satellite computer data transmission from one IBM computer in the US to another in France. It was intended to be in operation for up to two years but stopped working after seven months due to radiation exposure from a nuclear test. A second Telstar satellite was launched on May 7, 1963, and provided broadcast communications between the US and Europe for almost two years before it went dead. Both Telstars are still in orbit today.



Telstar program managers originally envisioned twenty to thirty satellites in orbit, covering the entire globe with continuous broadcasts. Because of its low Earth orbit, Telstar 1 was effective for only about half an hour at a time while it was between the US and Europe, so a whole series was needed, and one would take over from another as it passed out of orbital range. However, advancements in communications technology eventually made this unnecessary. The Syncom satellites, first launched in 1963, were designed for geosynchronous orbits that could provide continuous communications between continents. Syncom 1 was a failure, but Syncom 2, launched in 1964, was successful, and with Syncom 3 and its successors, starting in 1965, the Telstar system was essentially obsolete. However, since 1983, at least a dozen commercial geosynchronous communications satellites using the Telstar name have been launched, but they are not related in any way to the original Telstars.

## From The Observer Archives

### "In Case You Didn't Know

President Bush has called for bases on the Moon and Mars, which has elicited a NASA report that presents a number of scenarios for not-so-distant expenditures.

The report nominates Space Station Freedom, scheduled to be finished by 1999, as a "transportation node where both lunar and Mars vehicles will be assembled, tested, launched, and refurbished to fly again..." The report continues, "We will not stop at the Moon because the imperative to explore will lead men and women to Mars, the planet most like Earth. Mars offers many unique scientific opportunities, but perhaps the most intriguing is whether life exists or has ever existed on Mars."

The schedules proposed would have men on the Moon by 2001, and a mission to Mars by 2016 at the very latest! Let's hope this gets off the ground and into space with a 'flying star.' "

From the February 1990 *Observer*

# Star Stories

## Rasalague

Rasalhague, pronounced rasel haig, is also known as Alpha Ophiuchi, is the brightest star in the constellation Ophiuchus, the Snake Handler. It is a binary star system; the primary star, known as Alpha Ophiuchi A, is a giant A5 star with a mass of about 2.5 times that of our Sun. The secondary star is a type K5 star with a mass of about .85 that of the sun. Together, the two stars have an apparent magnitude of 2.07 and an absolute magnitude of 1.2. The latest satellite measurements show the system to be 48 light years from Earth.

A Ophiuchi A is now believed to have gone off the main sequence and is entering its final stages of evolution. Scientists note that it is spinning very rapidly and, as such, has a oblate shape. Its companion A Ophiuchi B is still on the main sequence. Scientists have determined that the two have an orbital period of 8.6 years.

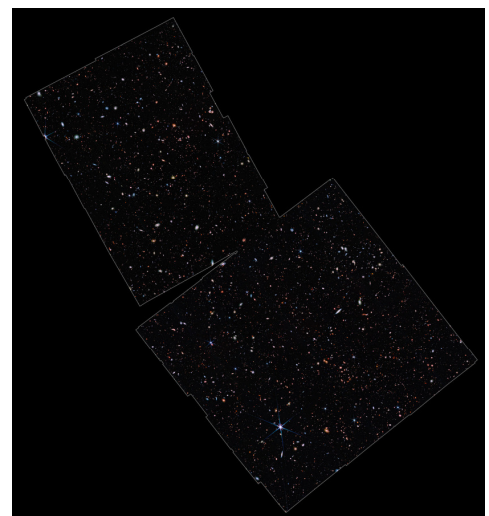
The name Rasalhague comes from the Arabic phrase *ra's al hawwa*, and means, "the head of the serpent collector." Ophiuchus, the snake handler, is seen in the heavens as holding on to the snake with both hands; on one side, the constellation is known as Serpens Caput- the "head of the snake;" on the other, it is Serpens Cauda, "the tail of the snake."



## JWST Finds the Yet-Known Oldest Galaxies in the Universe

The James Webb Space Telescope is apparently living up to its potential: Scientists at the Space Telescope Science Institute recently announced that it had found the four oldest galaxies yet observed in the universe, dating back to 13.5 billion years ago, only about 350 million years after the birth of the universe. The discovery was part of a project looking at hundreds of ancient galaxies and determining their redshifts with the space telescope's near-infrared spectrograph. With a group of four galaxies, the data came up with a redshift of 13.2, a figure that smashes the old redshift record set by the Hubble Space Telescope of 11.

The galaxy discoveries were part of a survey called JADES, for JWST Advanced Deep Extragalactic Survey, an effort by over eighty scientists from ten different countries to find the earliest galaxies. They used the data and images from the Hubble Space Telescope's Ultra Deep Field Survey to focus in on areas that seemed promising for ancient structures. After over thirty hours of observing hundreds of target galaxies, the JWSP found four that had extremely high redshifts, and confirmed that they were more distant and older than any observed previously. The team will now try to observe the structure of these ancient galaxies, seeing how they evolved in the early universe.



## Some of the Artemis 1 Images

all images from NASA/ESA



## Artemis 1 is History. Now What?

With the apparent success of the Artemis 1 mission, many are wondering, what is NASA's next step for the newly proven Orion spacecraft and the giant SLS rocket. The answer is both simple and complicated. The most immediate answer is the Artemis 2 mission, which will carry a crew of four in what is essentially a repeat of Artemis 1. Shortly after the launch of Artemis 1 on November 15, NASA chief administrator Bill Nelson said that he wants to see Artemis 2 launched by the end of 2023, but most space experts say that the earliest realistic date will probably be the summer or fall of 2024. Why the long delay, when the SLS is already five years behind schedule? It mostly has to do with budgetary and logistical decisions made almost ten years ago when the Artemis program was first outlined. Among other things, the SLS for Artemis 2 will use a different rocket configuration, which will require a new launch pad at the Kennedy Space Center (which is currently over budget and behind time. Sound familiar?) The rocket will also use the avionics system from Artemis 1, which will require at least twenty months for refurbishing and testing. Then there was the lunar lander dispute between NASA, Space-X, and Blue Origin, which experts estimate set back the first moon landing by at least a year. As such, the first landing mission, Artemis 3, will probably not take place until 2026 or 2027. Then, there is the cost. The Inspector General's report in 2021 estimated that each SLS launch will cost about \$4.1 billion, a figure it says is "unsustainable." After Artemis 3, NASA is seriously considering using Space-X's Starship rocket, or perhaps Blue Origin's New Glenn or the USA's Vulcan heavy lift rockets, which will cost almost ten times less than SLS. Also, NASA has chosen Space-X's Starship for the first lunar landing, but says it will evaluate other lander proposals for subsequent moon missions.

Now that Artemis 1 is complete, NASA will probably soon announce the prime and backup crews for Artemis 2 and possibly Artemis 3. It's already known that one of the four Artemis 2 crewmembers will be a Canadian. NASA has already announced that Artemis 3, the first moon landing mission, will include a woman and a person of color; it will most likely also have aboard a European, given the European Space Agency's contributions to the Artemis program. NASA and the Japanese Space Agency also recently announced that either Artemis 4 or Artemis 5 will have a Japanese astronaut as one of the crew. So, exciting things are coming in the next few years. If they only didn't take so long.

# Galaxy in the Eyepiece

## NGC 2276

2276 has the distinction of being one of the closest galaxies to the north celestial pole, only about four degrees from Polaris. It is a spiral galaxy in Cepheus, about 120 million light years from Earth, and has an apparent magnitude of 11.8, which puts it at the very limits for an 8" scope on a dark night. Its official classification is as a SABc galaxy, which, in an image looks distorted and off balance, due to its nearby companion NGC 2300, whose gravity is influencing it. 2276 was discovered in 1876 by the German astronomer Friedrich Winnecke, and is listed twice in the Arp catalogue, as Arp 25, and then combined with 2300, as Arp 114.



2276 is famous, in a sense, for producing a large number of recent supernovas: six since 1962. They are SN1962Q, SN1968V, SN1968W, SN1993X, SN2005dl, and SN2016gfy. The galaxy is known to have a black hole at its nucleus, known as 2276-3c, which gives off jets in either direction. It is also known to have areas of massive star formation, which many scientists believe is a result of a long-ago collision with a dwarf galaxy that has since been consumed by it.

Image: NASA/ESA/ HST

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

## Wise Observatory

The Wise Observatory is the only professional observatory in Israel. It is near the town of Mitzpe Ramon in the Negrev desert at an altitude of 875 meters above sea level, and is managed and operated by Tel Aviv University's department of physics and astronomy. It is used mostly by the professors and graduate students at the university.



The observatory was founded in 1971 as a collaborative effort between the university and the Smithsonian Institution and is named after the first president of Tel Aviv University, George Wise. It currently has five operational telescopes: a 1 meter Richey-Chretien reflector, a .5 meter reflector, a .7 meter reflector, and a .1 meter reflector that is operated remotely. There is also another .5 m wide field telescope that is managed and operated by the Korean Astronomy and Space Science Institute. These telescopes are involved in observing everything from galaxies to planets to nebulas to finding extra-solar planets. In recent years, the observatory has become known for its research into near-Earth objects, and has discovered seventeen of them.

---

## Astronomy (Bad-very Bad) Joke-

What did Mars say to Saturn?

Give me a ring sometime.

(Actually, there's some seriousness to this. Scientists now believe that Phobos and Deimos, Mars's moons, will crash into each other sometime in the future and break up, creating a ring around the planet, similar to the rings of Uranus and Neptune)

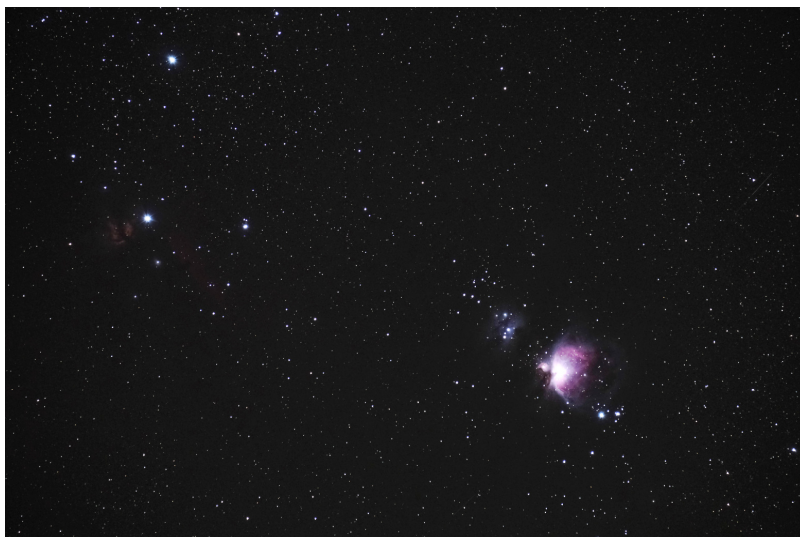


## CVA Member Images



**The Flaming Star Nebula by  
Connor Kessler**

**M42-the Great Nebula in Orion by  
Hubert Cecotti**



**M45, the Pleiades, also by Hubert  
Cecotti**

## The CVA 2023 Calendar of Events

(This was published in *The Observer* a few months ago, but it's always worthwhile to repeat dates and events)

### Monthly Star Parties Eastman Lake

January 21  
February 18  
March 18 and 25\*  
April 15 and 22\*  
FSU Vintage Days-April 15  
May 20  
June 17  
July 15  
August 12 and 19\*  
September 9 and 16\*  
October 14  
November 11  
December 9

\*New moon falls in the middle of the week

### Monthly meetings East Engineering Building, CSU Fresno-7pm

January 7  
February 4  
April 3

May 6  
June 3  
July-no meeting  
August-no meeting  
August 5-Board meeting  
September 20  
October 28  
November-no meeting  
December 16

### Riverpark Public star parties

April 29  
May 27  
June 24  
July 22  
August 26  
September 23  
October 21  
November 18

### Millerton Lake public star parties

June 10  
July 8  
August 5

### Astronomy Short-

NGC 7789, an open cluster in Cassiopeia, has gone by many names over the years. It is sometimes called the White Rose Cluster, also the Northern Rose Cluster. William Herschel catalogued it as G.VI.30. However, it is best known as "Caroline's Rose," after Caroline Herschel, William's sister, who discovered it in 1783. It has an apparent magnitude of 6.7, consists of between 700 and 1,000 stars, and is about 6,500 light years from Earth. It's a beautiful object in a pair of binoculars on a clear winter night.

