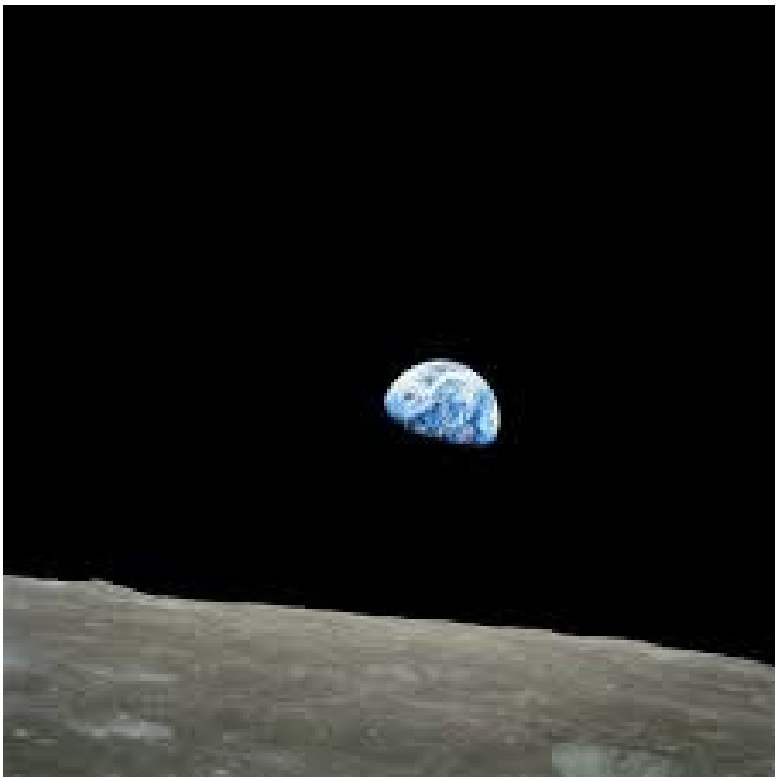
THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno Winter 2018

Earthrise: the Image that Defined a Planet

"God bless all of you on the good Earth."

Frank Borman, aboard Apollo 8, Christmas Eve, 1968



In this Issue-

The 50th anniversary of Apollo 8 and its legacy since then

How the world changed on a Christmas Day in what seems so long ago

Christmas Eve 2018 is the 50th anniversary of Apollo 8's epic flight around the Moon. In 1968, a year that made the United States(and the world) wonder if it would survive, Apollo 8 gave it new encouragement that things would be much better. This iconic image, named Earthrise, was taken by Apollo 8 astronaut Bill Anders, and has since become symbolic of all that is good about America and all that is hopeful about humanity

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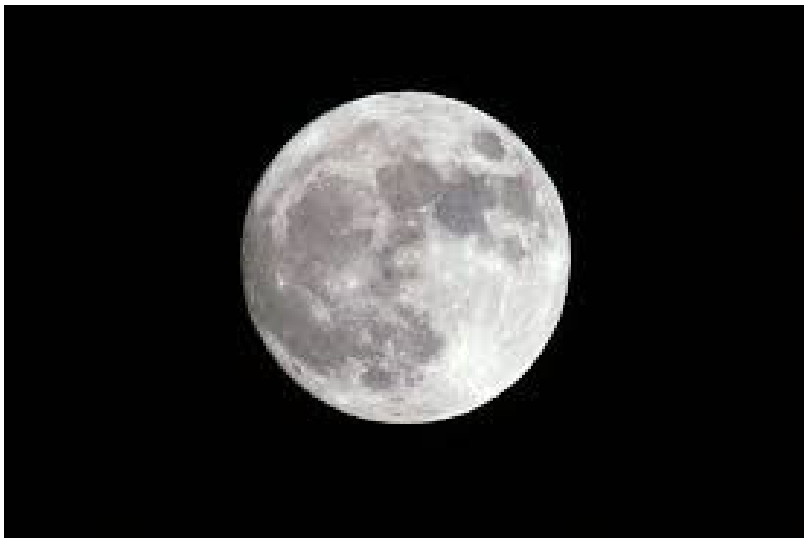


Number of exoplanets found as of October 2018

3,940

How many more are out there?

Tens of thousands? Hundreds of thousands?

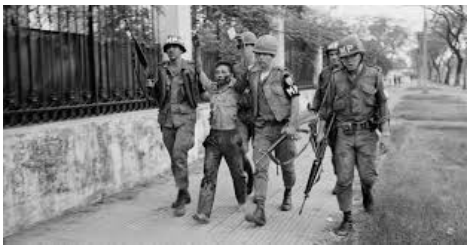
Larry Parmeter is the editor of the CVA *Observer*

He can be contacted at

559-276-8753

or at lanpar362@gmail.com

The Legacy of Apollo 8



1968 was not a good year for the United States or the world. The Tet Offensive by the North Vietnamese questioned America's ability to bring to a close the seemingly endless war in Vietnam. In the middle of it, Lyndon Johnson announced that he would not run for reelection as President of the United States. Then the killings began. Martin Luther King, Jr. apostle of nonviolence and Nobel Prize winner, was shot down outside his hotel room in Memphis, Tennessee.

The mourning had barely ended when Robert Kennedy, who was running for the Democratic nomination for president, was killed in a Los Angeles hotel only minutes after announcing victory in the California primary. The summer was full of violence in the streets, not just in the U.S., but overseas as well. In August a major American political party was torn apart in Chicago by the war, the tides of history, and the old versus the new. The election campaign that fall was bitter and brutal, leading to the reemergence of Richard Nixon on the national scene. Then came Apollo 8.

Apollo 8's journey to the Moon was originally not meant to be. After the success of Apollo 7, the next mission was intended to the Earth orbit test of the Lunar Lander (which would eventually become Apollo 9). After that would come the mission involving Frank Borman, Jim Lovell, and Bill Anders(replacing Michael Collins, who was forced to undergo back surgery in August), which would fly 4,000 miles from Earth and test the Apollo heat shield in a simulated lunar return trajectory. But the lunar lander mission was delayed, and American intelligence agencies kept picking up rumors that the Soviet Union was going to attempt a manned lunar flight as early as November. So, shortly after Apollo 7 landed on October 22, NASA engineers and managers and astronauts held a series of meetings, and finally announced that the next Apollo mission would go to the Moon in December.

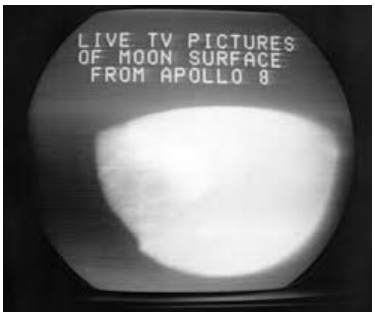
The mission was full of unknowns. No manned space mission had ever gone beyond 800 miles above the Earth. The Van Allen radiation belts that the craft would pass through were a worry. The giant Saturn 5 rocket had never been launched with a manned crew. And if something went wrong while at the Moon, it would be three long days coming back, not simply a quick reentry and splashdown. All of these and more were on the minds of NASA as the preparations went forward.

It is now known that the Soviets did attempt a manned circumlunar mission in order to beat Apollo to the moon. On December 10, a manned Zond spacecraft(a Soyuz modified for lunar missions) was set to be launched from the Baikonur Cosmodrome; the pilot has never been named, but is believed to have been Pavel Belalyev. According to reports, the countdown was stopped about fifteen minutes before launch due to an electrical problem, and the spacecraft was eventually taken back to the assembly building for repairs. When it was finally launched, unmanned, in mid-January 1969, the rocket exploded about a minute after takeoff. If a pilot had been aboard, he would have been killed.

Apollo 8, as it was now called, was launched on December 21. The date was thought by many to be a nod to the Christmas season, but it actually had more to do with orbital mechanics than holiday cheer. The Moon, the Earth, the Kennedy Space Center, and the path of the spacecraft were all in the right position at that date. After a successful launch, Apollo 8 took three days to travel to the

Moon. Most of the time, Borman, Lovell, and Anders could not see the Earth or the Moon; the craft was upside down and slowly rotating to even out the heat and the cold. When it went behind the Moon on the afternoon of the 24th, no one was sure if the Apollo's main rocket engine would work to put the craft into lunar orbit. It did, and as the Apollo emerged from the back side of the Moon, the crew saw the Earth rise above the surface, a brilliant blue and white ball in the blackness of space. Anders grabbed his Hasselblad camera and a roll of color film, and began shooting frame after frame. One of the images, officially known as 68-H-1401, became one of the most famous photographs ever taken.

Later that evening, Christmas Eve 1968, the crew gave their now famous reading from the Book of Genesis, closing with Borman's "God bless all of you on the good Earth." For a trouble-wracked planet, they were the right words, as well as the right images, at the right time. They redeemed the horror and tragedy of the year, and gave a ray of hope amid all the carnage and destruction and tears.



Apollo 8 had one more hurdle: the firing of the main rocket engine to take them back to Earth. On the final orbit, on Christmas Day morning, the engineers and technicians held their breaths in Houston until Apollo 8's radio signal was reestablished. Then they heard the voice of Jim Lovell saying, "Please be informed that there is a Santa Claus." Apollo 8 was heading home. Three days later, it was safely back on Earth, and the world cheered rather than mourned. On December 30, NASA released the Apollo 8 images, and 68-H-1401, was retitled "Earthrise." It appeared in dozens of magazines, including Time, Life, and Newsweek. The emerging environmental movement seized upon it as its symbol, politicians used it as an assertion of American might, and philosophers saw it as a new way of understanding the planet and the humans on it. It became one of the best known images around the globe, and even today inspires imagination and optimism in people.

Fifty years have passed since that week. Much of the world is still roiled in war and politics, and legacy of Apollo is beginning to diminish. But people still remember. Borman is 91, Lovell is 90, and Anders is in his late 80s. But they are all still alive and they all still believe in what they did and how they hopefully made a troubled world a little bit better place one Christmas Eve with one photograph.

"To me it was strange that we had worked and had come all the way to the moon to study the moon, and what we really discovered was the Earth."

-Bill Anders in an interview in December 2018, commemorating the flight of Apollo 8

Editor's note-I was sixteen and living in St. Louis on December 24, 1968. On Christmas Eve, all of us in my family sat around our black and white TV set and watched Apollo 8's Christmas message live from the Moon. It gave me shivers and inspiration then; its still does today.