



CORNELL ASTRONOMICAL SOCIETY NEWSLETTER

ISSUE 18 • JULY 2024



LETTER FROM THE EDITOR

Greetings, readers! My name is Shane Kuo, and I am pleased to serve as the CAS Newsletter Editor-in-Chief for the 2024-2025 academic year. I hope you all are having a wonderful summer. This newsletter has covered much this past year, from our lecture series, astrophotography, and (attempted) viewing of two solar eclipses. It is hard to believe that more than two revolutions around the sun have passed since this newsletter was created to share news from Fuertes and the broader scientific community and spread the joy of astronomy to the community after the pandemic. Now that the pandemic is over, the newsletter continues to allow CAS members to work together to express and share their love of the stars. These past years have been so memorable, and I look forward to the next!

TABLE OF CONTENTS

Martha Stahr

Carpenter • 3

Estevan Antonio

Fuertes • 5

Carl Sagan • 7

Credits • 9

(continued on next page)

I want to thank Justine Singleton, who has been a wonderful member of the Fuertes community and a prolific contributor to the newsletter for its entire existence. Her pieces have transported us across the solar system, and imagine how it would feel to visit the mountains of Iapetus, the oceans and seas of Titan, and walk alongside the astronauts of Apollo on the moon. I wish her and the rest of the seniors who have made these past years so great good luck on their next journey in life. Good night and joy be to you all.

This past year, CAS has been working on documenting our long and storied history with the Museum Restoration Project. The Cornell Astronomical Society can use our beloved observatory and telescope to share the wonders of astronomy with the community owing to the generous contributions of time, money, and effort of many people over the past century and the support of the Astronomy Department here at Cornell. We want to celebrate those who have been so influential in the development of the Astronomy Department and the creation and continued operation of the Fuertes Observatory by writing posters about their life, accomplishments, and relationships with Cornell and Fuertes. Through the lens of their stories, we hope to show how Fuertes and Cornell Astronomy have changed throughout the years. These posters will give visitors a more detailed understanding of our past and provide a background for the many historic telescopes and artifacts at Fuertes. In this special edition of the CAS Newsletter, we will show a sneak peek into the history of Fuertes through our newly created posters. Regular newsletters will be released once again as the semester begins, and we hope to see you at the observatory!

Shane Kuo, Editor-in-Chief



MARTHA STAHR CARPENTER

BY BEN JACOBSON-BELL

Martha Stahr Carpenter was one of Cornell's earliest Professors of Astronomy. In her forty-year career, she advanced the studies of both variable stars, as a three-term president and lifetime member of the AAVSO, and radio astronomy, as one of the nascent field's first researchers.

Professor Carpenter was born Martha Stahr (pronounced stair) on March 29, 1920, in Bethlehem, Pennsylvania. She recalled an early interest in astronomy, and realized it could be her career after attending a class with Professor Leah B. Allen at Hood College. She transferred to Wellesley College for its astronomy major, and completed her Master's and PhD at UC Berkeley in 1945.



Professor Carpenter pictured with the controls of the 11m (36ft) antenna at Potts Hill

Credit: [CSIRO Radio Astronomy Image Archive](#)

Professor Carpenter's graduate work and early career were defined by the observation of variable stars, which rise and fall in brightness over time. She discovered several variable stars as a graduate student, and later incorporated the observation of variable stars into coursework for her students.

Professor Carpenter and her students submitted these observations to the American Association of Variable Star Observers (AAVSO), where she served as president for three terms. Kristine Larsen, her colleague at the Association, wrote a biography describing her life, career, and accomplishments; her work serves as one of the most detailed accounts of Prof. Carpenter's life.

When Professor Carpenter joined Cornell in 1947, she became the first woman professor in the College of Arts & Sciences and one of Cornell's two Professors of Astronomy at the time. She advised Vera C. Rubin's Master's thesis, which showed that other galaxies do not move uniformly away from the Milky Way, as predicted by Edwin Hubble.

(continued on next page)

Rubin's later work on galaxies—in particular, showing that the outer parts of spiral galaxies move as fast as the inner parts—provided the first major evidence for dark matter.

Professor Carpenter also served as the collaborating astronomer for the School of Electrical Engineering's construction of a 5-meter radio dish near the Ithaca airport. This was an early effort by Cornell to break into the field of radio astronomy; the university's leadership in this field continues to this day.

Many of Professor Carpenter's efforts during this time focused on compiling three exhaustive encyclopedias of astronomical literature: *The Bibliography of Radio Astronomy*, *The Bibliography of Extraterrestrial Radio Noise*, and *The Bibliography of Natural Radio Emission from Astronomical Sources*. Professor Carpenter continued publishing supplements to these invaluable collections through 1965.



Professor Carpenter with instrumentation from the Potts Hill Antenna

Credit: [CSIRO Radio Astronomy Image Archive](#)



Image of Martha Stahr Carpenter on the Potts Hill antenna

Credit: [CSIRO Radio Astronomy Image Archive](#)

Although she left Cornell in 1969, Professor Carpenter remained involved in radio astronomy for many years. She took up a lectureship and then a professorship at the University of Virginia, another leader in radio astronomy. She taught, advised, and conducted research there until her retirement in 1985. Professor Carpenter died in 2013, aged 92, survived by her two daughters.

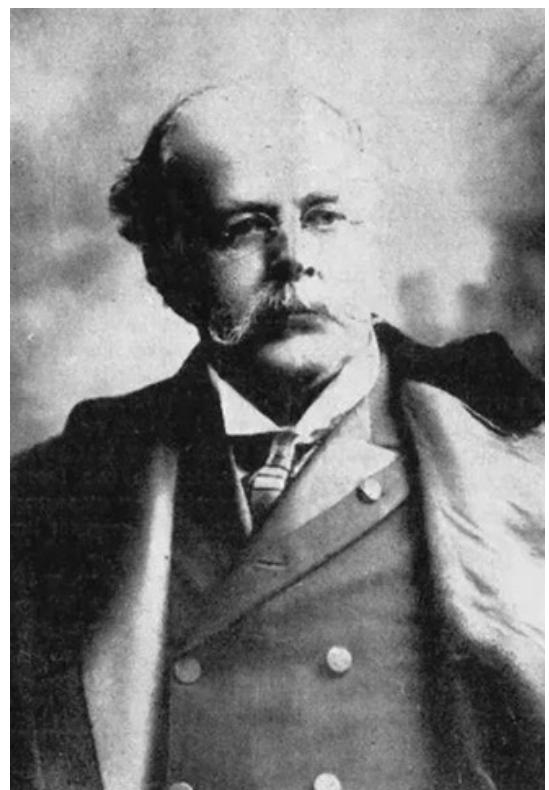
ESTEVAN ANTONIO FUERTES

BY JACK QUALENBUSH

Throughout his 3 decades at Cornell, Estevan Antonio Fuertes turned one of the first Colleges of Civil Engineering in the world into a top-tier institution, revolutionizing what it meant to be a civil engineer.

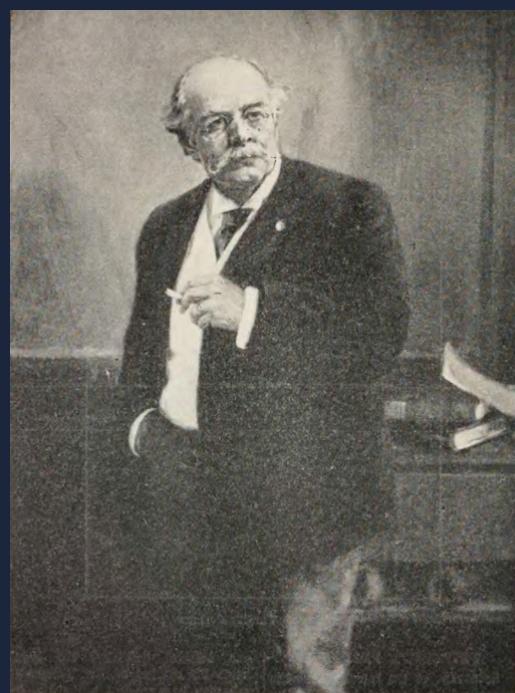
Estevan Antonio Fuertes was born to Estevan Fuertes and Demetria Fuertes on May 10, 1838 in San Juan, Puerto Rico. His father was a military officer, instilling values of hard work into his son. This paid off, as Professor Fuertes attended Conciliar College in San Ildefonso, Spain, at 16 years old, where he obtained a bachelor's and Ph.D. After obtaining his Ph.D., Fuertes came to the U.S. to study at Rensselaer Polytechnic Institute where he graduated in 1861 as a civil engineer (C.E.).

Fuertes spent the next decade working in both the U.S. and Puerto Rico. He first served as an assistant engineer and then director of Public Works for the western half of Puerto Rico, where he helped build important infrastructure for the developing nation.



Professor Estevan A. Fuertes

Credit: [Cornell Archives](#)



*Professor Estevan A. Fuertes, depicted here
with Mogul Cigarettes*

Source: [Anna Milo Upjohn, Popular Science](#)

He then returned to the U.S. to work as an engineer on the Croton Aqueduct Board. On this board, Fuertes assisted in maintaining the Croton Aqueduct, which was the first aqueduct in New York City and provided fresh, clean water to many of its residents.

In 1871, Fuertes was appointed chief engineer of a U.S. expedition to Mexico and Nicaragua. During this expedition, Fuertes was in charge of writing a report about the possibility of a canal connecting the Gulf of Mexico to the Pacific Ocean. His report was extremely valuable and helped lead to the construction of the Panama Canal.

After returning to the U.S. in 1873, Professor Fuertes was called to Cornell to revamp its College of Civil Engineering, and served as its dean and director for the next thirty years. Despite only having a handful of students and two rooms, he reinvented what it meant to be an engineering student. Much like A. D. White, Fuertes focused on practical and hands-on applications of engineering.

(continued on next page)

He taught a wide array of courses about land surveying, geodesy, water hydraulics, and sanitation. His teaching style was tough but rewarding, attracting people from all across the world. There are no greater examples of his educational approach than the Cornell Hydraulic Laboratory (1898–1963 beneath Triphammer Falls) and the former iteration of Fuertes Observatory.

The Hydraulic Laboratory was a state-of-the-art laboratory constructed in the summer of 1898 that used the Triphammer Falls underneath Beebe Lake to study water hydraulics and purification. The Hydraulics Laboratory is the main reason why Beebe Lake is a lake. Before its construction, Beebe Lake was more of a pond, but the original dam was expanded upon the lab's construction, allowing water to accumulate and turning Beebe Lake into an actual lake. Unfortunately, it was abandoned in 1963 due to rampant flooding; however, it remained an iconic scene in Cornell architecture until its collapse in 2009.

Another great example of Professor Fuertes' approach to hands-on learning is the A. C. Barnes or Fuertes Observatory. In 1902, Fuertes retired from his positions as dean and director of the College of Civil Engineering due to deteriorating health conditions. Despite his health, his determination to education endured, and in the same year, he was appointed Cornell's first professor of astronomy. In this role, he was in charge of constructing and teaching at Cornell's third observatory, which was a large red brick building featuring three rotating domes. Here, Professor Fuertes taught classes on geodesy, which combined practical astronomy, surveying techniques, and math to map the Earth. Unfortunately, this observatory was demolished in the 1910s due to the need for a drill hall for WW1.

Professor Fuertes died from influenza on January 16th, 1903. He left behind six children, including James Fuertes, an accomplished civil engineer, and Louis Agassiz Fuertes, a very prominent ornithologist.

Outside of teaching, Professor Fuertes' pastimes included meteorology and smoking. For meteorology, he would provide meteorological data and readings for a portion of upstate New York. For the latter, Professor Fuertes was such an avid fan of smoking and cigarettes that he gained the nickname "The Mogue", referencing the brand of cigarettes he smoked. This brand, named Mogul Cigarettes, featured a man to whom Fuertes bore a striking resemblance. Due to his name being hard to pronounce for Americans at the time, he insisted that people use this nickname instead of mispronouncing his name.

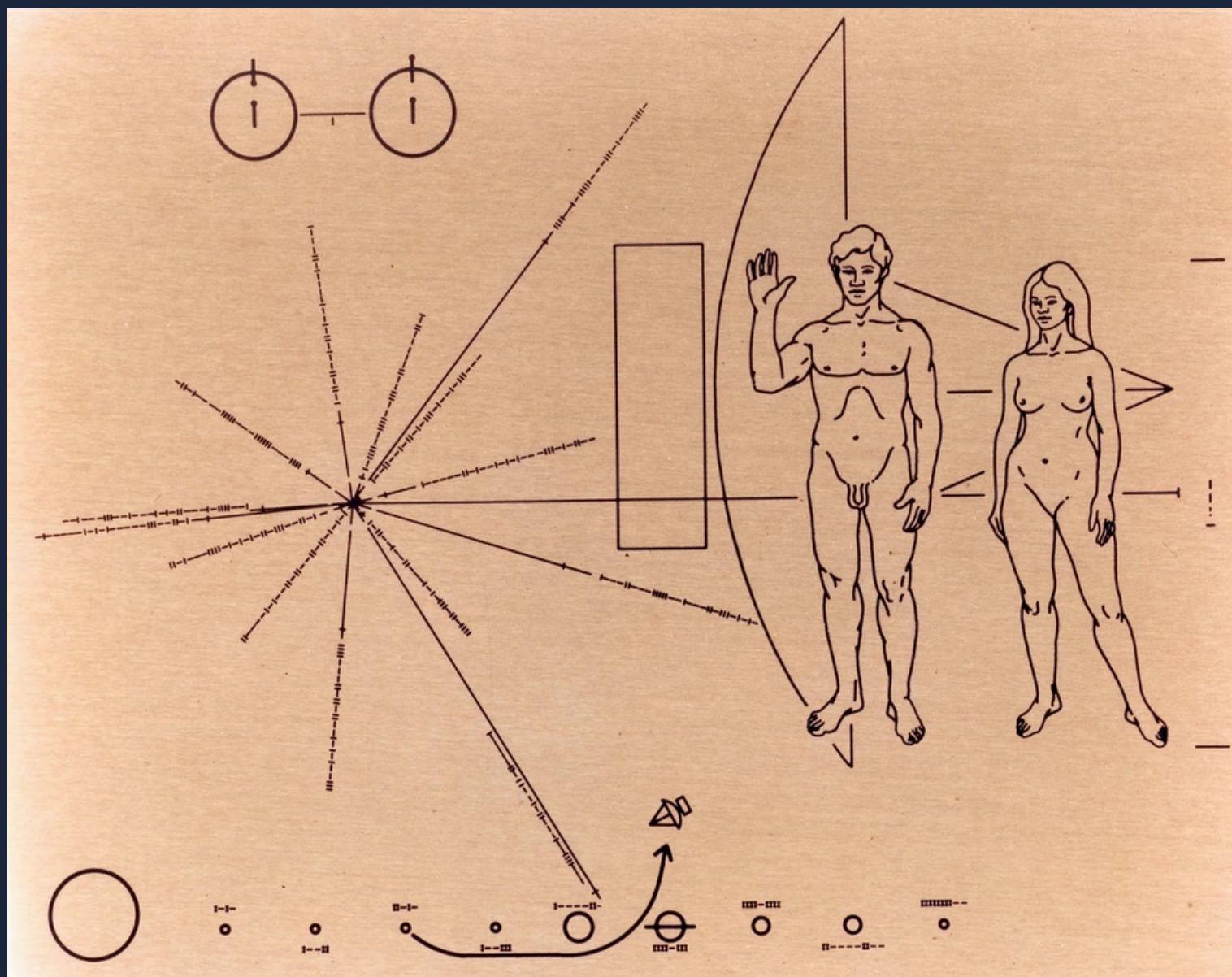


Fuertes Observatory Transit Room, with instruments relevant to Geodesy

CARL SAGAN

BY GILLIS LOWRY

During his three decades at Cornell, Professor Carl Sagan transformed the way scientists communicate with the public and search for extraterrestrial life. Prof. Sagan advised NASA missions, sent messages to the stars, and became an advocate for planet Earth while publishing hundreds of scientific papers and dozens of popular-science books.



The Pioneer plaque, mounted on the outside of the Pioneer 10 and 11 spacecraft. On top, the hydrogen atom helps specify units for the other diagrams on the plaque. At left, a map of nearby pulsars describes our Solar System's position, while the illustration at the bottom shows the Pioneer spacecraft departing our home planet and escaping the Solar System. Linda Salzman Sagan illustrated the two human beings at right.

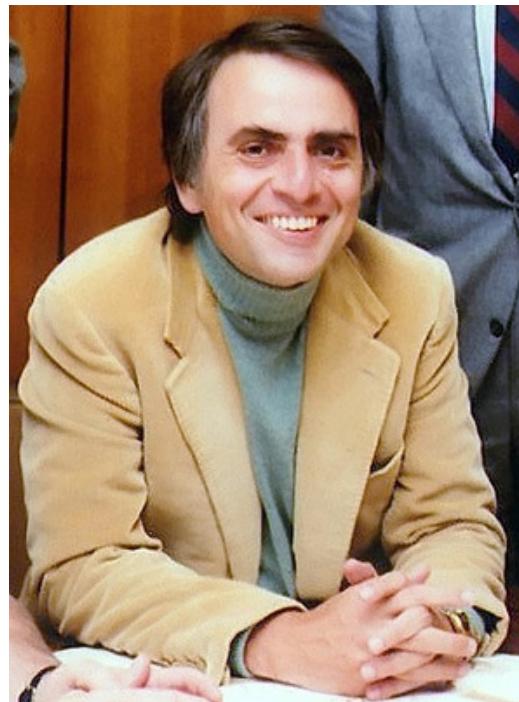
Source: [NASA-ARC](#)

(continued on next page)

Prof. Carl Sagan was born in Brooklyn on November 9th, 1934, to Rachel and Samuel Sagan. As a child, he would lie in vacant lots and try to wish himself to Mars like the protagonist of Edgar Rice Burroughs' novels: "thinking myself to that twinkling red place."

Prof. Sagan's doctoral thesis at the University of Chicago explored the chances of alien life on the Moon, Jupiter, and Venus, at a time when little was known about worlds beyond Earth. He tempered his dreams of finding alien life with skepticism, and became one of the first people to prove that the atmosphere of Venus was a "runaway greenhouse," far too thick and hot for life.

At Cornell, Prof. Sagan utilized the Arecibo radio telescope alongside Prof. Frank Drake to send a message depicting humanity toward the stars. Prof. Sagan also worked on the Pioneer plaques and Voyager Golden Records, mounted aboard the first probes to enter interstellar space.



Carl Sagan
Source: [NASA-JPL](#)



Carl Sagan
Source: [NASA](#)

Prof. Sagan's 1980 series *Cosmos: A Personal Voyage* (with Ann Druyan and Steven Soter) was the most widely-viewed show on American television for a decade. This success fueled Prof. Sagan's activism: he co-founded the Planetary Society to advocate for space policy, testified before Congress regarding climate change, and protested at nuclear test sites.

Near the end of his life, Prof. Sagan urged NASA to turn the Voyager spacecraft cameras towards home for a final time. The "Pale Blue Dot" portrait, and Prof. Sagan's speech, is a reminder of our species' delicate and finite position in the universe.

Prof. Sagan died in 1996 at the age of 62, just prior to the release of his science fiction novel-turned-film *Contact*. He was survived by his five children—and by generations of scientists and stargazers who share his wonder and skepticism alike, who wish themselves to the same twinkling worlds he loved so dearly.

CREDITS

CAS Officers

Erik Payton, President
Andrew Lewis, Vice President
Christopher Brown, Treasurer
Jillian Epstein, Outreach Coordinator
Shane Kuo, Editor-in-Chief
Phil Nicholson, Faculty Advisor

Cornell Astronomical Society (CAS) is a student-run non-profit organization founded in 1972.

Contact:
209 Cradit Farm Dr.
Ithaca, NY 14853
astrosociety@cornell.edu

Contributors to this issue

Ben Jacobson-Bell
Gillis Lowry
Andrew Lewis
Jillian Epstein
Shane Kuo
Jack Qualkenbush

Sources for Title Image

[Cornell in Pictures: The First Century](#)

Sources for “Martha Stahr Carpenter”

[1](#) - [2](#) - [3](#)

Image credit: [CSIRO](#)



Sources for “Estevan Antonio Fuertes”

[1](#) - [2](#) - [3](#) - [4](#) - [5](#) - [6](#) - [7](#)

Image credit: [Cornell Archives](#), [Anna Milo Upjohn](#), [Popular Science](#)

Sources for “Carl Sagan”

[1](#)

Image credit: [NASA-ARC](#), [NASA](#), [NASA-JPL](#)

