

TODAY IN SCIENCE: CARL SAGAN'S BIRTHDAY

November 9 was the anniversary of the birth of astronomer and astronomy popularizer extraordinaire Carl Sagan. For decades, Carl Sagan's name was synonymous with astronomy. Most of us are familiar with this late American astronomer who, over the course of his life wrote more than 600 professional astronomical research papers and 20 books. He was an inspiration to many through the television series *Cosmos*. Sagan also contributed greatly to the field of planetary science and to the American space program.



It was Carl Sagan who said, "We're made of star stuff. We are a way for the cosmos to know itself."

Carl Edward Sagan was born on November 9, 1934 in Brooklyn, New York. He studied physics at the University of Chicago and earned his doctorate in astronomy and astrophysics in 1960. In the 1960s, one of Sagan's earliest works in professional astronomical research shed light on the atmospheres of our solar system's planets. The atmospheres of Mars and Venus, for example, are known now to resemble that of Earth. But in Sagan's day, scientists were still trying to understand how come Mars could be so cold while Venus is so hot. Sagan successfully confirmed that Venus could be a greenhouse furnace by using data from tables for steam boiler engineering.

Around this same time, Sagan became interested in the search for extraterrestrial intelligence (SETI) and contributed much to it. He proved that the building blocks of life could be easily created by exposing simple chemicals to UV light. In 1966, he helped **I. S. Shklovskii**, a Soviet astronomer and astrophysicist, revise and expand his classic book on extraterrestrial life, *Intelligent Life in the Universe*.

In 1971, after being denied tenure at Harvard University, he went on to become a professor at Cornell University in Ithaca, New York, where he spent the rest of his professional career.

Sagan contributed mightily to the U.S. space program.

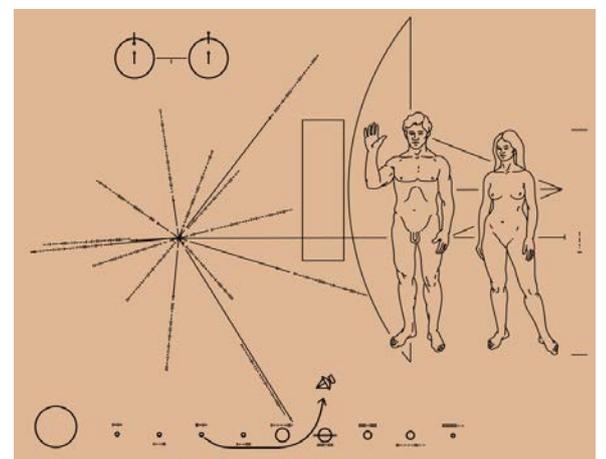
Among other things, he briefed astronauts before their trip to the moon, and he was part of the Mariner, Viking, Galileo, and Voyager space missions. In the Viking missions, for example – two probes sent to explore Mars in the 1970s – he advised on the choice of ideal landing sites.

But, in addition to his books and the *Cosmos* television series, it's Sagan's actual messages to the cosmos – placed aboard the first spacecraft designed to leave our solar system, on the Pioneer and Voyager missions – for which he's most remembered.

The original idea for the Pioneer plaques – a pair of gold-anodized aluminium plaques carrying messages from humankind, placed aboard the 1972 Pioneer 10 and 1973 Pioneer 11 spacecraft – came from journalist and consultant **Eric Burgess**. He approached Sagan about it, and NASA agreed to it and gave Sagan three weeks to prepare a message. Together with astronomer **Frank Drake** (who formulated the famous Drake Equation) Sagan designed the plaque, with artwork prepared by his wife at the time, **Linda Salzman Sagan**. The Pioneers and the plaques they carry are now billions of miles from Earth and eventually they'll cross out of the Sun's influence, into the realm between the stars. In the late 1970s Sagan and his wife-to-be, **Ann Druyan**, contributed to the design of the Voyager craft Golden Records with 116 images of human activities, Music and a Welcome Message in 55 languages. "Somewhere, something incredible is waiting to be known." AK with EarthSky Notes



Carl Sagan poses with a model of the Viking lander in Death Valley, California.



A Pioneer plaque, which Carl Sagan helped design and place aboard the first two spacecraft ever to leave Earth for interstellar space