

Armstrong, Neil (5 Aug. 1930-25 Aug. 2012), aerospace engineer, test pilot, and astronaut, was born Neil Alden Armstrong in Auglaize County, Ohio, the first of three children of Stephen Koenig Armstrong and Viola Engel. His father, an auditor with a state agency, moved the family fourteen times before finally settling in Wapakoneta in 1944. Neil was a good student, a voracious reader who skipped a grade in elementary school; he won a freshman science award and represented his school in a state-wide civics program. He was also an Eagle Scout, played in the Blume High School band and orchestra, served as vice president of the student council in his senior year, and graduated at age sixteen.

Armstrong was an avid airplane modeler who earned his pilot's license before his driver's license. In the spring of 1947 the sixteen-year-old flew a rented airplane 220 miles (354 kilometers) to Purdue University to pre-register for college. Under the terms of a navy scholarship program, he would spend two years at Purdue, then three years in uniform before returning to finish college. Having completed two years of engineering studies, eighteen-year-old Neil Armstrong reported for navy flight training at Pensacola, Florida, in February 1949.

Wearing the gold wings of a naval aviator, Armstrong was assigned to fighter squadron VF-51. After the outbreak of the Korean War, he flew the Grumman F9F-2 Phantom from the aircraft carrier Essex against North Korean ground targets. He flew seventy-eight combat missions between August 1951 and March 1952. On 3 September 1951 he struck a dangling cable designed to bring down jets coming in very low and fast. With six feet of his starboard wing gone, he struggled to keep his aircraft in the air until he could safely eject over friendly lines. Armstrong earned an Air Medal for the exploit.

Returning to Purdue in September 1952 he completed his upper level work and received his B.S. in 1955. While at Purdue he taught an entry level engineering course, served as musical director of his fraternity, flew jets as a naval reserve officer, and still found time to get to know Janet Shearon, a fellow Purdue student. They were married in Wilmette, Illinois on 28 January 1956. The union would produce three children between 1957 and 1963, one of whom died from a childhood brain tumor.

Combining his engineering training with his flying experience, Armstrong went to work as an engineering test pilot with the National Advisory Committee for Aeronautics (NACA) Lewis Flight Propulsion Laboratory in Cleveland in March 1955. He spent the next four months flying in support of the Lewis anti-icing research program and testing rockets used to probe aerodynamic heating at very high speeds. In June 1955 he transferred to the NACA's High Speed Flight Station at Edwards Air Force Base in California, where airplanes flew higher and faster than anywhere else in the world.

During his seven years at Edwards, Armstrong made over nine hundred flights in a wide range of aircraft, including such cutting-edge experimental craft as the X1-B and X-5. Between November 1960 and July 1962, he made seven flights in the North American X-15, reaching a peak altitude of over 200,000 feet and speeds of up to 3,989 miles per hour (6,420 kilometers per hour). He also consulted on the X-20 Dyna-Soar space plane then in the planning stages but destined for cancelation.

On 17 September 1962 the National Aeronautics and Space Administration announced the second group of astronauts, including the first civilian member of that exclusive club, Neil Armstrong, to follow the original Mercury Seven. He first flew into space as commander of the Gemini VIII mission on 16 March 1966, along with David Scott. Their task was to rendezvous and dock with the orbiting second stage of a modified Agena rocket. Within a few minutes of their successful docking, the linked spacecraft became unstable. Assuming that the problem was with the Agena, Armstrong undocked, only to discover that the Gemini attitude controls were at fault. Tumbling and rolling at a rate that would quickly lead to

unconsciousness and death, Armstrong regained control using a system intended for use during reentry and guided his craft to a safe landing in the Pacific.

Back in the crew rotation, Armstrong served as backup commander of both the Gemini XI and Apollo VIII missions before being selected as the commander of Apollo XI in December 1967. If all went as planned, Armstrong and Edwin "Buzz" Aldrin would become the first men to walk on the moon, while Michael Collins would orbit overhead in the command module. In addition to long days in the crew simulator, Armstrong practiced flying a Lunar Landing Training Vehicle, which he had helped to develop. Powered by a vertically mounted jet engine, with thrusters for control, the LLTV allowed an astronaut to practice techniques for landing on the moon. On 6 May 1968 Armstrong was one hundred feet in the air aboard the craft when the control system failed. He ejected at the last possible minute.

A Saturn V rocket boosted the crew of Apollo XI off launch pad 39A at the Kennedy Space Center on the morning of 16 July 1969. Four days later Armstrong and Aldrin entered the Lunar Module Eagle, separated from the Command Module Columbia and began their descent to the surface. As they were dropping toward the moon, a series of alarms sounded. Mission control advised that they could safely be ignored. Realizing that they were going to land beyond their planned target area, Armstrong took control of the descent, skimming over the surface of the Sea of Tranquility in search of a boulder-free area for landing. "Houston," Armstrong reported when safely on the surface, "Tranquility Base here. The Eagle has landed."

Some four and one half hours after landing Armstrong stepped from the landing pad on the Lunar Module to the surface, announcing, "That's one small step for [a] man, one giant leap for mankind." The astronauts spent two hours and thirty-six minutes walking on the moon. They planted the flag, set up scientific experiments, spoke to President Nixon, and collected over fifty pounds of lunar rocks. Preparing for lift-off from the moon they discovered that the switch that would activate the ascent motor to carry them back up to rendezvous with the Command Module had snapped off. Aldrin activated the switch with the tip of a pen.

The returning astronauts were greeted with celebrations across the nation and undertook a "Giant Leap" world tour. Announcing that he would not return to space, Armstrong accepted an administrative post with Advanced Research Projects Agency and earned an M.S. in engineering from the University of Southern California. He taught aeronautical engineering at the University of Cincinnati from 1971 to 1979, after which he consulted with aerospace firms, served on a number of corporate boards, and participated in the panel studying the destruction of the Space Shuttle Challenger in 1986. Separated from his wife in 1989 and later divorced, he married Carol Held Knight in 1994. Neil Armstrong died of complications from vascular bypass surgery in a Cincinnati hospital. His cremated remains were buried at sea with a ceremony aboard the USS *Philippine Sea*.

Neil Armstrong will always be remembered as the first human being to set foot on another world, but he had another view of himself. "I am and ever will be a white socks, pocket protector nerdy engineer," as he explained in a February 2000 address to the National Press Club. "And I take substantial pride in the accomplishments of my profession." (Hansen, p. 602)

Bibliography

Neil Armstrong's papers are held by the Archives and Special Collections Division of Purdue University. James R. Hansen, *First Man: The Life of Neil A. Armstrong* (2005) is a fine biography. *First on the Moon: A Voyage with Neil Armstrong, Michael Collins and Edwin E. Aldrin, Jr.* (1970) tells the story of Apollo XI from the points of view of all three astronauts. Michael Collins, *Carrying the Fire: An Astronaut's*

Journeys (1974) and Edwin Aldrin and Malcolm McConnell, *Men From Earth* (1980), offer a view of Neil Armstrong through the eyes of his fellow Apollo XI astronauts. An obituary appeared in the *New York Times* on 25 August 2012.

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