
BACKGROUND BOOKS

THE SPACE EFFORT

The early birds of space exploration were inspired, in part, by science fiction. Konstantin Tsiolkovsky (1857–1935), for example, credited Jules Verne with planting the “first seeds” of the idea of interplanetary flight.

During the 1890s, Tsiolkovsky built the first wind tunnel to test aerodynamic designs. By 1903—the year the Wright brothers first flew their plane at Kitty Hawk—Tsiolkovsky was tackling the theoretical problems of rocket engines (heat transfer, navigation mechanisms, and fuel-supply maintenance). His research feats are described in Nicholas Daniloff’s **The Kremlin and the Cosmos** (Knopf, 1972).

Tsiolkovsky did not construct or test rockets, but an American soon did. In 1898, Robert H. Goddard (1882–1945) read H. G. Wells’s *War of the Worlds* and dreamed of building a spacecraft. Thirty-eight years later—at his Aunt Effie’s farm in Auburn, Mass.—he launched the world’s first liquid-fueled rocket, which rose to a height of 41 feet.

“In a field so complex that it would call for teams of scientists and technicians,” writes biographer Milton Lehman, Goddard “remained a solitary, mustering a few mechanics to help him.” In **This High Man: The Life of Robert H. Goddard** (Farrar, 1963), Lehman explains Goddard’s reticence. Much of his early work ran into official apathy, public indifference, and ridicule in the press. Yet, Goddard persisted.

If not many Americans were paying attention to Goddard, several Germans were. For years, said Wernher von Braun, “Goddard was ahead of all of us.” Von Braun

(1912–77) was technical director of the group of Germans who, during World War II, developed the V-2, a long-range ballistic missile used against London. A detailed account of the evolution of the V-2—fore-runner of the rockets that would carry men into space—is found in **The Rocket Team** (Crowell, 1979) by science writers Frederick I. Ordway III and Mitchell R. Sharpe.

In the most complete biography of von Braun, **Reaching for the Stars** (Doubleday, 1960), Erik Bergaust recounts the scientist’s run-in with the Gestapo. As von Braun’s rockets were nearing operational status in 1942, he was briefly held by the Gestapo and charged with making “statements to the effect that the V-2 was not intended as a weapon of war, that [he] had space travel in mind when it was developed.”

After the war, von Braun and 100 coworkers surrendered to the Americans and were transferred to White Sands, N.M., to continue their rocket tests. Early in 1958, four months after the Russians launched Sputnik 1 in 1957, von Braun put the first U.S. satellite in orbit. The stage was set for NASA and the “space travel” that von Braun had in mind when he worked on the V-2.

A vivid portrait of the first U.S. astronauts—Alan Shepard, John Glenn, Gus Grissom, Scott Carpenter, Gordon Cooper, Wally Schirra, and Deke Slayton—is **The Right Stuff** (Farrar, 1979) by journalist Tom Wolfe. These former test pilots, says Wolfe, shared “an ineffable quality . . . not bravery in the simple sense of being willing to risk your life [but] the ability to go up in a

hurtling piece of machinery . . . and then go up again *the next day*, and the next day, and every next day."

Opposing the astronauts' view of themselves (shared by the press and the public) as test pilots was NASA's conception of their role in the space mission. The scientists and engineers saw the Mercury capsule as fully automated; "the astronaut [was] added to the system as a redundant component." But the astronauts wanted to fly their spaceships. Eventually, Wolfe notes, they were successful in their design demands—first a window instead of a planned porthole, then an exploding escape hatch that they could detonate, then an "override system" by which an astronaut could take over and guide the spacecraft.

These man-oriented changes paid off later. In 1970, 200,000 miles from Earth, Apollo 13 suffered a loss of power due to an explosion in an oxygen tank. The dramatic story is related by *New Yorker* writer Henry S. F. Cooper, Jr. in **Thirteen: The Flight That Failed** (Dial, 1973). The astronauts—Jim Lovell, Fred Haise, and John Swigert—had to use the lunar landing module as a "lifeboat" for power and oxygen. They landed safely, doing "a lot better by themselves than their elaborate paraphernalia had done by them."

Novelist Norman Mailer also comments trenchantly on our spacemen. In his quirky **Of a Fire on the Moon** (Little, Brown, 1970, cloth; New American Library, 1971, paper), he calls them "the core of some mag-

netic human force called Americanism." They are "men of much personal strength, moral and physical, . . . the depths of their character are kept hidden by the impenetrable qualities of their personal surface, and they shine in appearance."

At least one astronaut has exposed his "hidden character." Michael Collins is the Apollo 11 astronaut who did not get to walk on the moon; he piloted the command module. His long, often funny **Carrying the Fire** (Farrar, 1974) provides a colorful personal account of traveling in space: "I have seen the earth eclipsed by the moon, and enjoyed it. I have seen the sun's true light, unfiltered by any planet's atmosphere. I have seen the ultimate black of infinity in a stillness undisturbed by any living thing."

The tranquility of space, however, may be shattered by human settlement, according to Princeton physicist Gerard K. O'Neill. In **The High Frontier: Human Colonies in Space** (Morrow, 1977, cloth; Bantam, 1978, paper), O'Neill sees orbiting space colonies as feasible by the end of this century.

In this new world, man will mine natural resources from the moon and asteroids, relay solar energy back to Earth, and live in an artificially created earth-like environment. O'Neill's "Island Three" would have a land area of 500 square miles and support a population of several million people. O'Neill is no mystic; all of his designs are based on existing technology.

EDITOR'S NOTE: Most of the titles mentioned in this essay were suggested by Bruce Mazlish and Richard P. Hallion, associate professor of history and administration, University of Maryland.