

Hermann Oberth:
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Hermann Oberth (1894-1989), German spaceflight theoretician and author, widely considered the 'inventor' of the concept of space flight in the 1920's. Unknown to him, Konstantin Tsiolkovskiy in Russia and Robert Goddard in America were making similar mental journeys, but their ideas did not reach a large audience and by the time they were more widely published, Oberth's ideas had become much better known.

Born in 1894 in a German village in Transylvania (then part of the Austro-Hungarian Empire), as a boy Oberth (pronounced 'Obert') was enthralled by Jules Verne's books about flight to the Moon. Deciding to follow his father's footsteps and become a doctor, he entered medical school in Munich in 1913, but was enlisted in World War I in the medical corps, which taught him he did not want a medical career. Instead, on his own time he developed detailed plans for a long-range military missile (that one war later would become the V-2), but concluded that it couldn't be built – at least, not in 1918. German military officials rejected the idea with the declaration that it was impossible for rockets to fly farther than four miles.

On paper, he also developed the fundamental 'Rocket Equation' that described the motion of a rocket as it consumes propellant, getting lighter while expelling the exhaust at a high velocity. It was simple – the velocity change achieved is the exhaust velocity times the natural logarithm of the ratio of the initial weight to the final weight – but like so many other earth-shaking equations, he created it from nothingness simply by thinking about it (Tsiolkovskiy and Goddard had also developed it independently).

Working towards a degree in physics at Heidelberg, he wrote a thesis on the mathematics of rocket travel into space. The university rejected his thesis, so he returned home (by now in independent Romania) where his work was accepted at a local university. He then taught mathematics and physics at a high school near his childhood home.

Meanwhile he persisted in publicizing his ideas about space travel in books and lectures, the first man with scientific training to do so. The opening words of his second book, "The Rocket to Interplanetary Space", were: "With the present day state of science and technology, the construction of machines that can climb higher than the earth's atmosphere is possible." He concluded that "It is probably possible for men to ride in these vehicles." The book became a popular sensation all across Europe. After several years of public speaking and debating, he brought out an even longer book in 1929, "Ways To Space Travel".

Oberth was technical advisor to the first serious cinematic space production, "Woman on the Moon", produced by Fritz Lang in 1929. Although it introduced more new concepts which have become commonplace (such as a countdown leading to launch, or to

astronauts floating about the cabin in 'zero gravity'), plans to actually build and fly a rocket 30 miles up as a publicity stunt never worked. Oberth was a thorough theoretician but not an engineer, and he lost his left eye in explosion of one of his rocket engine tests.

In World War 2, he was an advisor to the German team at Peenemunde that developed the V-2 'wonder weapon', but he soon found that his disciples had gone on much further in practical applications. He was transferred to a project for anti-aircraft missiles (which didn't work), and as the Third Reich collapsed he made his way back to his new home near Nuremberg. He did some engineering work for Swiss and Italian companies while writing a new book, "Men In Outer Space" (1954), in which he detailed plans for a space shuttle vehicle.

Oberth traveled to the US several times on extended visits to advise Wernher von Braun (who at 17 had been one of his early students). On one visit in 1969 he attended the launching of Apollo-11 for the first lunar landing; at the age of 91, he attended a space shuttle launch; in 1984, he held a moon rock in his hands, and wept. He defined the goal of space travel as: "To make a place for Life where it can exist and continue to grow, to populate each unpopulated world, and to make each populated world meaningful."