Hermann Oberth: The Man Who "Invented" Space Travel
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In this the centennial of powered flight, there's much to celebrate in terms of flying accomplishments and the people behind them. One genius in particular is Hermann Oberth, known to space historians as the "inventor" of space flight. But most people, even flying professionals, would have a hard time figuring out why he is called that, and why he deserves it – as he truly does.

The first explorer down any new direction always seems to have it the hardest. Whether its blazing a path through tangled jungle, or stomping a trail in deep snow, the fact that somebody with immense vigor and perseverance has gone before always makes it easier on subsequent travelers.

It's not just true for physical exploration, since mental advances into new ideas and concepts require equally awesome strength and stamina. Once a new idea has been first worked out, it's always easier for more people to catch on and pitch in.

Flying through the air was an idea that came naturally to our ancestors from just watching birds do it, and the human ache to duplicate and surpass our feathered friends goes back tens of thousands of years or more. Succeeding was a matter of inspired engineering, as we are celebrating this year.

But flight beyond the atmosphere, out between the planets, simply wasn't even thinkable for all those thousands of years. What were the engineering and navigational challenges? What were the human challenges? That was an intellectual path that nobody had ventured along until the late 1800's when scientific discoveries demonstrated that the entire Universe above Earth's atmosphere was real and perhaps reachable. Several visionary writers such as Jules Verne created imaginary scenarios, but these were fanciful guesses.

Then along came Herman Oberth, and step by step along an untrodden path he worked out how such space activity had to proceed. Unknown to him, in Russia a deaf schoolteacher named Konstantin Tsiolkovskiy and an eccentric American tinkerer named Robert Goddard 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, an experience that convinced him that he did NOT want to become a doctor. 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 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's simplicity itself – 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 (two other men, in Russia and America, had also invented the same equation independently, but none of them knew each other and they didn't tell many people).

Working towards a degree in physics at Heidelberg, he wrote a thesis on the mathematics of rocket travel into space. He established concepts (such as the cryogenic-fueled multi-stage rocket) that have become 'obvious', but his ideas encountered ferocious opposition. For example, most scientists and academicians refused to believe his proof that rockets could work in a vacuum (even with "nothing to push against"), or that a rocket-propelled vehicle could achieve speeds higher than the velocity of its own exhaust. The university rejected his thesis, so he returned home (now in independent Romania) where his work was accepted at a local university. He got a job teaching 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.

For the next four years, Oberth energetically debated his critics at large public gatherings. He was emotionally well armed for arguments, because even his loving daughter described personality traits such as "obsession and notorious contrariness." The result of the debates was an even longer book published in 1929, "Ways To Space Travel". As his daughter later wrote, "From then on he was 'the grand old man' of rocket research although we was only 35 years old!"

"Sixty years ago when I had to defend my book, the people that believed in me and my ideas gave me the strength to combat misunderstanding, mistrust, jealousy, and denial," he explained, shortly before his death. "I have experienced the entire scale of human reaction. I was honored and extolled, laughed at and spat at, and in 1929 in Berlin not only my ideas but also my money was stolen."

Those last remarks refer to his work on the German 'science fiction' movie "Woman on the Moon", produced by Fritz Lang, for which he was technical advisor. 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.

Some of the photographs of these experiments show a round-faced 17-year-old assistant who had joined up as a volunteer. This was Wernher von Braun, who later built the V-2 missiles of World War II and ultimately the Saturn-V boosters which carried men to the Moon: "[He] was the first who, in conjunction with the theory of real space flight, reached for his slide rule and worked out the numbers, and set forth concepts and proposals for construction," von Braun would write. "I personally thank him not only for being the guiding star of my life, but also for my first contact with the theoretical and practical sides of rocket technology and space flight."

Oberth would later become an advisor to the German team at Peenemunde that developed the V-2 'wonder weapon', but he soon found that his disciples had already learned all he had to teach them and 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 and quietly (and successfully) hid out from history – at least for awhile. 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. He traveled to the US several times on extended visits to advise von Braun, but always returned home. 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, for the first time, he held a moon rock in his hands, and wept.

Now that the hard engineering of rocketry and spacecraft had passed him by, he turned his attention to philosophy while developing his bushy white hair and moustache that made him a perfect Mark Twain lookalike. Several more books followed. "For sixty years, since my own writings and experiments of the twenties, I have been fortunate to see others carry on the work through which the door to space has been opened," he wrote in 1985 when he was 91. "From all this we now can look at earth from space and see a priceless, but breakable jewel that is entrusted to the human race. I am convinced that from this giving to humanity of a new way to look at itself, the human derivations of God can be assured for an infinite period of time." 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."

"He knew human nature," his daughter Erna Roth-Oberth would later write. "Lack of understanding, pomposity, intellectual thievery, envy, and jealousy as well as unscrupulous struggle for power were the constant companions of his life." Yet he also lived to see his controversial claims fully vindicated, and to be honored by the world.

The criticism never beat him and the praise never seduced him, she wrote. "Up until his last day on December 28, 1989, his creative strength was unbroken, "she continued. "He cared little for criticism or praise, and never considered anything finished, for a true

scholar never stops learning." Nor, in this celebratory centennial of flight, should we ever stop learning about pioneers such as Hermann Oberth.