

The work of three Germans in the late 1920s had a lasting impact on air and space flight.

# The Rocket Men

By Walter J. Boyne

**C**HARLES Lindbergh's spectacular 1927 New York-to-Paris flight set the aviation world afire, making the public receptive to new aerial adventures. Many caught the fever. Three young Germans—Fritz von Opel, Max Valier, and Friedrich Sander—were especially affected, and their ensuing 1928-29 experiments with aircraft and rocket power cast a long shadow on aviation.

Von Opel, heir to a German automotive empire, financed and led the experiments. By sponsoring early tests of rocket-powered transport, he popularized the idea of rocket propulsion in Germany. The work, though short-lived, had a tremendous effect on the development of air and space flight.

Fritz A.H. von Opel was the only child of Wilhelm von Opel and was the grandson of Adam Opel, founder of the Adam Opel A.G. firm, a manufacturer of sewing machines and bicycles. In 1899, the company turned to the manufacture of automobiles and, by the 1920s, had become the largest automaker in Germany.

Then, as now, the stature of an automobile was often determined by its performance in races. Von Opel's uncle prepared and personally raced Opel cars in major events such as the Targa Floria, Kaiserpreis, and Gran Prix. Through this experience, the young von Opel saw that the racing publicity was good for sales, and he



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Max Valier shows off the fuel tanks of a liquid-powered rocket racer. Valier was, in 1927, one of the founders of the German "Spaceflight Society." Valier, Fritz von Opel, and Friedrich Sander developed the first rocket cars and aircraft.

was quick to seize an opportunity which shortly came along.

The idea was to build and race a rocket-powered car. This was suggested to von Opel by Max Valier. Austrian by birth, Valier was studying physics at the University of Innsbruck when the World War broke out in August 1914. He served in the imperial Austro-Hungarian Air Force as an observer. After the war, he became highly interested in rocketry.

Valier, in 1927, became one of the founders of the famous German Verein für Raumschiffahrt, or "Spaceflight Society," a group of brilliant scientists who would play a major role in making rocket spaceflight a reality.

Everyone understood that Valier was more interested in publicizing rocketry than marketing Opel automobiles. However, he was quick to point out that building a successful rocket-powered car would achieve both goals.

Von Opel soon confirmed that he was interested in pursuing Valier's project. Valier then contacted Friedrich W. Sander, a German pyrotechnical engineer who, in 1923, had purchased H.G. Cordes, a Bremerhaven firm famous for its manufacture of black-powder rockets used for harpoons and signal devices.

### Triple Threat

The group combined into one entity the financing, the theoretical knowledge, and the practical capability necessary for success. Moreover, von Opel, Valier, and Sander said from the start that their experiments with cars were but a prelude to grander experiments with air- and spacecraft. They were working on rocket-powered aircraft at the same time they were building their famous rocket cars.

It was logical to begin with autos; the extremely wealthy Opel had at his disposal his father's factory and testing track in Germany. The three men began their experiments using a standard Opel automobile. Von Opel wanted to be the test driver, but Sander and Valier talked him out of it. If something happened to him, they pointed out, all Opel backing would be lost. A regular Opel test driver, Kurt C. Volkhart, was pressed into service.

The members of the group set March 12, 1928, as the date for the car's first trial run. They fitted the



Von Opel, Valier, and Sander developed the Rak 1 rocket car, converted from an Opel racer. In its first public test, it reached 62 mph in eight seconds. It was a public relations winner, but von Opel insisted that rocket-powered flight was the goal.

car with only two rockets, which were to be ignited by conventional string fuses. When they were lit off, the rockets propelled Volkhart and the car a distance of about 500 feet, reaching a top speed of three miles per hour.

It was not much—but it convinced von Opel that they were on the right track. After two tests, they went to an Opel race car, which they christened "Rak 1." "Rak" was short for the German word "rakete," which meant rocket.

Rak 1 was stripped of its engine and radiator to reduce weight. To help keep the car's wheels on the ground at expected high speeds, the group attached behind each front wheel a small, wing-like stub, set at a negative angle of attack.

For propulsion, they elected to use 12 black-powder rockets, each 3.5 inches in diameter, mounted in four rows of three rockets each and ignited electrically. The propellant was similar to gunpowder, in that it burned in a subsonic deflagration wave and not in a supersonic detonation wave.

Acting in his role of publicity director for Opel, von Opel arranged for a demonstration for the press on April 11, 1928.

The group took Rak 1 to the Opel track—this time in view of the German media. Valier signaled "Go," and Volkhart pressed the firing pedal to the floor, igniting the first bank of rockets. These were quick firing and intended for acceleration; they shot

the car forward in a cloud of smoke. Volkhart pressed the pedal again and other rockets fired. Slower burning, they kept the car rolling for a longer distance.

Only seven of the 12 rockets actually ignited, but the acceleration proved to be excellent. Rak 1 reached a speed of 62 mph in just eight seconds.

### Eye on the Prize

Von Opel and his group were immensely pleased by Rak 1's performance—and even more so by the resulting storm of favorable publicity. They made it plain, however, that they had no plans to produce rocket cars for the commercial market. Their real goal was to fly a rocket-powered aircraft.

In the meantime, they continued their land projects and built Rak 2, designed from the ground up as a rocket car. It was far larger and more streamlined than its predecessor. The Rak 2 was powered by 24 rockets packing 264 pounds of explosives.

On May 23, 1928, von Opel himself got behind the wheel. Before 2,000 spectators at a Berlin race track, he drove the car to a record-setting speed of nearly 148 mph. The resulting international publicity more than repaid every cent the Opel firm had invested. Moreover, it gave the science of rocketry a major boost.

There followed a series of Earth-bound rocket experiments. One featured a specially built motorcycle,



It was in the Rak 1 airplane that von Opel finally made a rocket-powered flight, achieving around 90 mph on Sept. 30, 1929. The aircraft didn't survive the landing, but von Opel did. Apparently satisfied, he walked away from rocketry.

equipped with six rockets, which reached a speed of 124 mph. Another was the Rak 3, a rocket car designed to run on railroad tracks. On June 23, 1928, the car attained a top speed of 157.5 mph over a three-mile stretch of straight track near Hanover. Some 20,000 spectators lined the track to watch Rak 3 break the existing world speed record of 133.5 mph for railcars.

Not surprisingly, the press and the public were quick to assume that commercial rocket vehicles would follow in due course. This was never the intent of the trio, who saw a genuine practical application for rockets only in aviation and space projects.

In fact, in March 1928, von Opel, Valier, and Sander went off to Wasserkuppe, the highest peak in Germany's Rhön Mountains, from which glider experiments had been staged since 1910. Gliding took on a new importance when the Treaty of Versailles prohibited Germany from maintaining an air force. A glider club was established, and, in 1922, Arthur Martens introduced the sailplane with a one-hour flight of his "Vampyr."

Opel and company contacted Alexander M. Lippisch, the director of Rhön-Rossitten Gesellschaft, a glider research group. They knew that Lippisch, starting in 1921, had produced some 50 swept-wing, tailless glider designs. In the view of the Opel group, such an aircraft would be ideally suited to the installation of Sander rockets. Lippisch agreed

to build a tailless glider for experimental purposes.

### Enter the Duck

After testing out a Lippisch model, von Opel and his associates in June 1928 purchased a full-size Lippisch aircraft, the "Ente" (Duck). The group selected one of Lippisch's test pilots, Fritz Stamer, to fly it.

With a wingspan of just under 40 feet, and a length of some 14 feet, the Ente featured a canoe-like fuselage, canard surfaces, and rudders mounted outboard on a straight rectangular wing. Each of the aircraft's two 44-pound-thrust rocket engines were tightly packed with about eight pounds of black powder. They were at the top of the rear end of the fuselage.

Designed to fire in sequence, the rockets were ignited electrically by the pilot. An automatic counterweight system was set to adjust the aircraft's center of gravity as the rocket fuel was consumed. An elastic launching rope was used to catapult the Ente into the air.

The first test of the Ente came on June 11, 1928. It was a failure; the glider did not become airborne and the rocket simply fizzled out.

A second launch that day, however, was successful. After being slung into the air, Stamer reported, he ignited one rocket and heard it "hiss threateningly" behind him. When the first rocket burned out, he ignited the next. In such a way he was able to fly a complete circle of about 4,900 feet in circumference, landing just as the rocket thrust expired.

Stamer was quoted as saying that

Fritz von Opel was heir to the Opel automobile empire. With his personal wealth and access to the company's design, construction, and test facilities, he was critical to the rocket enterprise.



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the first rocket flight had been “nothing special.”

On Stamer’s second flight, however, the rocket exploded, punching holes in the wing and damaging the fuselage. Stamer then had to make a quick emergency landing from an altitude of about 60 feet. He abandoned the airplane immediately, after which fire consumed the Ente.

Heartened by the first flight of the Ente and not dismayed by the second, von Opel immediately contracted with Julius Hatry for a specialized rocket plane. Hatry, a glider builder and regular at the Wasserkuppe gliding competitions, was engaged at the time in building the Mü 3 “Kakadu.” With a span of 65 feet, it was the largest sailplane yet built.

Hatry’s design for Opel was rather more elegant than the Ente. With a wingspan of 36 feet and length of 16 feet, the new aircraft had a conventional high-aspect-ratio glider wing and twin rudders mounted on booms that lifted the tailplane well out of the line of rocket thrust.

The glider has often been referred to as Rak 3, but von Opel designated it Rak 1.

### Wreck of the Rak

Sander installed on Rak 1 a battery of 16 rockets, each with 50 pounds of thrust. The first flight came on Sept. 30, 1929. Before a large crowd assembled outside of Frankfurt, the intrepid von Opel made a successful flight of almost two miles in 75 seconds, reaching an estimated top speed of around 90 mph. Rak 1 made an extremely hard landing and was destroyed, but it had made an emphatic point about rocket aviation.

At that point, the work of the Opel group—as a group—came to an abrupt end. The impact, however, was long-lasting.

Their work had led directly to use of jet-assisted takeoff for heavily laden aircraft. Germany was first to test this when, in August 1929, a battery of solid rocket propellants helped a Junkers Ju-33 seaplane get airborne.



Von Opel quit Germany before World War II, but his work led to the Me-163 Komet, the world’s first combat rocket airplane. The notorious V-1 and V-2 missiles were also partly inspired by von Opel’s rocket experiments.

The German experiments had a tremendous influence upon Lippisch, whose experience with the Ente helped pave the way for the Messerschmitt Me-163, the first and only operational rocket fighter.

The experiments excited the interest of what was then a clandestine German military, which provided funding for further development of rockets as a substitute for artillery. This led to a host of weapons, the most important being Germany’s V-2 terror weapon, the world’s first ballistic missile.

After World War II, these German rocket and missile designers would have a great influence on America’s own missile and space programs.

What happened to the original members of the von Opel group?

The brilliant scientist, Max Valier, came to an unfortunate end. He was killed when a new, alcohol-fueled rocket he had built blew up during a 1930 experiment.

Friedrich Sander, the group’s pyrotechnician, also met an unpleasant fate. After secretly manufacturing military rockets for the German Army, he contracted to sell some to Italy but was denounced in 1936 as a traitor. Imprisoned for a year, his com-

pany went bankrupt. A second company was nationalized in 1938, and he died the same year.

As for Fritz von Opel, his flight in the Rak 1 evidently satisfied his appetite for rocket flight. In 1929, he abandoned the rocket and aircraft projects and settled in Switzerland, adopting Swiss citizenship.

It was in some ways an odd move, though there was no lack of possible political and economic motives.

Though Adolf Hitler was still four years from seizing control of Germany, the Weimar Republic was already tottering and showing signs of collapse. Fascism was on the rise.

Sensing approaching trouble in Germany, Wilhelm von Opel had already arranged a two-stage sale of Opel to General Motors, with a payout of some \$30 million. Wilhelm gave his son Fritz nominal control (Wilhelm remained the real power) of this huge fortune, allowing him 20 percent of income generated by its investments.

The younger von Opel presumably went on to lead a long life of opulence. He died in Switzerland in 1971, more than 40 years after his famous flight in his rocket plane.

During those four decades, von Opel must surely have watched with wonder the endless developments that his experiments had spurred. Working together, von Opel, Valier, and Sander had thrown a big rock of publicity into the mill pond of science. The ripples have not yet ceased to spread. ■

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