

## Carl Benz and the Engine of Progress

How do you build something you've never seen? That's what Carl Benz (1844-1929) was trying to do from the mid-1880s to the early 1890s in Mannheim, Germany. First of all, should the self-propelled vehicle he was developing—his automobile—be based on a bicycle, a tricycle, or a four-wheeled carriage? Around the same time (but unknown to Benz) Gottlieb Daimler (1834-1900) and his partner Wilhelm Maybach, were also developing their own first self-propelled vehicle, and it was the world's first motorcycle. Years later, Daimler's company and Benz's would merge. But originally, Benz himself opted for a three-wheeler. He placed his air-cooled engine horizontally, at the rear.

Benz had already invented the engine, which itself had presented many choices and problems. Other early, experimental automobiles had tried to use electricity, steam, compressed air: all sorts of power units. In Mannheim, where Carl Benz lived and worked, an accident had occurred that changed history. A housewife bought the refined petroleum product that the Germans called *benzin* to clean some gloves. She put it in a bowl. It exploded, causing a fire. Benz—like Daimler some years earlier—was impressed with this volatile, combustible liquid, and thought that such explosive energy could be harnessed to provide power for an engine. Benzin (no connection with the family name of Benz!) was known in English as petroleum spirit, or petrol, or gasoline. Benz overcame many difficult problems such as ignition, and the result was the forerunner of the gasoline-powered internal combustion engine still prevalent today.

But what kind of vehicle was it practical to manufacture? What would people want to buy? Without enough money for research and development, Benz relied on his wife Bertha, and their eldest boys, to help out. When Benz rolled his first car into the courtyard of the workshop in Mannheim, the ignition system broke down before he could give Bertha a celebratory ride. Benz fixed it. But before Bertha could get on, the chain to the rear wheels broke. Finally Bertha was able to sit next to him as he steered the horseless carriage ... into a brick wall. They weren't hurt, but the car clearly needed some work. Benz kept tinkering. Bertha and her twelve-year-old son, Richard, would pedal her sewing machine in the living room to charge up the primitive battery for the ignition. Benz switched from air-cooling to water-cooling, he turned the engine vertical, and he made many other improvements. But he thought it wasn't yet ready to market.

Finally, Bertha and the boys got tired of waiting for Carl to go public with his machine. He had been making short test drives around the area, but they decided on