

Henry Ford and the Model T

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Henry Ford atop his creation, the Model-T, in 1896.

On May 26, 1927, Henry Ford watched the fifteen millionth Model T Ford roll off the assembly line at his factory in 1161 Highland Park, Michigan. Since his “universal car” was the industrial success story of its age, the ceremony should have been a happy occasion. Yet Ford was probably wistful that day, too, knowing as he did that the long production life of the Model T was about to come to an end. He climbed into the car, a shiny black coupe, with his son, Edsel, the president of the Ford Motor Company. Together, they drove to the Dearborn Engineering Laboratory, fourteen miles away, and parked the T next to two other historic vehicles: the first automobile that Henry Ford built in 1896, and the 1908 prototype for the Model T. Henry himself took each vehicle for a short spin: the nation’s richest man driving the humble car that had made him the embodiment of the American dream.

Henry Ford invented neither the automobile nor the assembly line, but recast each to dominate a new era. Indeed, no other individual in this century so completely transformed the nation’s way of life. By improving the assembly line so that the Model T could be produced ever more inexpensively, Ford placed the power of the internal combustion engine within reach of the average citizen. He transformed the automobile itself from a luxury to a necessity.

The advent of the Model T seemed to renew a sense of independence among Americans who had lost their pioneer spirit to industrialization. Yet the methods that Henry Ford devised for producing his car so efficiently advanced that very industrialization. Like its inventor, the Model T represented both high ideals and hard practicalities.

A Tinkerer in an Emerging Industry

By rights, Henry Ford probably should have been a farmer. He was born in 1863 in Dearborn, Michigan, on the farm operated by his father, an Irishman, and his mother, who was from Dutch stock. Even as a boy, young Henry had an aptitude for inventing and used it to make machines that reduced the drudgery of his farm chores. At the age of thirteen, he saw a coal-fired steam engine lumbering along a long rural road, a sight that galvanized his fascination with machines. At sixteen, against the wishes of his father, he left the farm for Detroit, where he found work as a mechanic’s apprentice. Over the next dozen years, he advanced steadily, and became chief engineer at the Edison Illuminating Company. At twenty-four, Ford married Clara Bryant, a friend of his sister’s; he called her “The Believer,” because she encouraged his plans to build a horseless carriage from their earliest days together. For as Henry Ford oversaw the steam engines and turbines that produced electricity for Detroit Edison, inventors in the U.S. and Europe were adapting such engines to small passenger vehicles. On January 29, 1886, Karl Benz received a patent for a crude gas-fueled car, which he demonstrated later that year on the streets of Mannheim, Germany. And in 1893, Charles and Frank Duryea, of Springfield, Massachusetts, built the first gas-operated vehicle in the U.S.

In the 1890s, any mechanic with tools, a workbench, and a healthy imagination was a potential titan in the infant industry. Even while continuing his career at Edison, Ford devoted himself to making a working automobile. In 1891, he presented Clara with a design for an internal combustion engine, drawn on the back of a piece of sheet music. Bringing the design to reality was another matter, but on Christmas Eve 1893 he made a successful test of one of his engines, in the kitchen sink.

The engine was merely the heart of the new machine that Ford hoped to build. On weekends and most nights, he could be found in a shed in the back of the family home, building the rest of the car. So great was his obsession that the neighbors called him Crazy Henry. However, at 2:00 A.M. on June 4, 1896, Crazy Henry punched a large hole in the wall of his shed, and emerged at the wheel of an automobile— *his* automobile. In the weeks that followed, Ford was often seen driving around the streets of Detroit.

Later that year, Ford attended a national meeting of Edison employees. Thomas A. Edison had been Ford's idol for years. But at the meeting, it was Edison who asked to meet the young inventor, after word got around that the obscure engineer from Detroit had actually built an automobile. "Young man, you have the right idea," Edison said. "Keep right at it." Ironically, he was most adamant that Ford not waste his time trying to make a car run viably on electricity.

Back in Detroit, Ford showed that he was no mere hobbyist: he sold his prototype for \$200. For three years, he watched the new field of automaking develop, and he progressed along with it. In 1899, thirty American manufacturers—most of them based in New England— produced about 2,500 cars. Still, most Americans in the market for automobiles became accustomed to buying imported ones. In 1898, though, the domestic bicycle industry faced an unusual slump and many manufacturers decided to turn to automaking to keep the factories busy.

Offered a senior position and part ownership of a new company, the Detroit Automobile Co., Ford, thirty-six years-old, quit the Edison Illuminating Company. Across town, the firm that would become Oldsmobile was launched at the same time. The Detroit Automobile Co. failed, without producing any cars, and Henry Ford was ousted by angry investors. (The firm survived, emerging from reorganization as the Cadillac Motor Car Company.)

Building a Motorcar for the Great Multitude

Ford continued to pursue his dream. Early automobile promotion took place largely on the racetrack, where manufacturers sought to prove roadworthiness by putting their cars on public view and pressing them to their very limits. In 1901, Henry Ford poured his expertise into a pair of big race cars, one of which he entered in a ten-mile match race against a car built by Alexander Winton, a leading automaker from Ohio. The race took place in Grosse Pointe, Michigan, and Ford's car won. Because of the victory, the coal merchant Alexander Malcomson agreed to back Ford in a new business venture. In 1903, they formed the Ford Motor Company, in association with about a dozen other investors. Capitalized at \$100,000, the company actually started with cash on hand of about \$28,000. Some investors contributed other types of capital; for example, the Dodge brothers, John and Horace, agreed to supply engines.

The company purchased most of the major components for its new models, a common practice of the day. Teams of mechanics built cars individually at workstations, gathering parts as needed until a car was complete. In 1903, Ford's 125 workers made 1,700 cars in three different models. The cars were comparatively expensive, and their high profit- margins pleased the stockholders. Malcomson decided to start yet another automobile company. But when it failed, he was forced to sell his other assets, including his shares in Ford. Henry Ford bought enough of them to assume a majority position. The most important stockholder outside of the Ford family was James Couzens, Malcomson's former clerk; as General Manager, then vice president and secretary-treasurer at the Ford Motor Company, he was effectively second-in-command throughout many of the Model T years.

The direction of the company toward even pricier models had bothered Henry Ford. He used his new power to curtail their production, a move that coincided with the Panic of 1907. This case of accidental good timing probably saved the company. Ford, insisting that high prices ultimately slowed market expansion, had decided in 1906 to introduce a new, cheaper model with a lower profit margin: the Model N. Many of his backers disagreed. While the N was only a tepid success, Ford nonetheless pressed forward with the design of the car he really wanted to build. The car that would be the Model T.

“I will build a motorcar for the great multitude,” he proclaimed. Such a notion was revolutionary. Until then the automobile had been a status symbol painstakingly manufactured by craftsmen. But Ford set out to make the car a commodity. “Just like one pin is like another pin when it comes from the pin factory, or one match is like another match when it comes from the match factory,” he said. This was but the first of several counterintuitive moves that Ford made throughout his unpredictable career. Prickly, brilliant, willfully eccentric, he relied more on instinct than business plans. As the eminent economist John Kenneth Gaibraith later said: “If there is any certainty as to what a businessman is, he is assuredly the things Ford was not.”

In the winter of 1906, Ford had secretly partitioned a twelve-by fifteen-foot room in his plant, on Piquette Avenue in Detroit. With a few colleagues, he devoted two years to the design and planning of the Model T. Early on, they made an extensive study of materials, the most valuable aspect of which began in an offhand way. During a car race in Florida, Ford examined the wreckage of a French car and noticed that many of its parts were of lighter-than-ordinary steel. The team on Piquette Avenue ascertained that the French steel was a vanadium alloy, but that no one in America knew how to make it. The finest steel alloys then used in American automaking provided 60,000 pounds of tensile strength. Ford learned that vanadium steel, which was much lighter, provided 170,000 pounds of tensile strength. As part of the pre-production for the new model, Ford imported a metallurgist and bankrolled a steel mill. As a result, the only cars in the world to utilize vanadium steel in the next five years would be French luxury cars and the Ford Model T. A Model T might break *down* every so often, but it would not break.

The car that finally emerged from Ford’s secret design section at the factory would change America forever. For \$825, a Model T customer could take home a car that was light, at about 1,200 pounds; relatively powerful, with a four-cylinder, twenty horsepower engine, and fairly easy to drive, with a two-speed, foot-controlled “planetary” transmission. Simple, sturdy, and versatile, the little car would excite the public imagination. It certainly fired up its inventor: when Henry Ford brought the prototype out of the factory for its first test drive, he was too excited to drive. An assistant had to take the wheel.

“Well, I guess we’ve got started,” Ford observed at the time. The car went to the first customers on October 1, 1908. In its first year, over ten thousand were sold, a new record for an automobile model. Sales of the “Tin Lizzie,” or “flivver,” as the T was known, were boosted by promotional activities ranging from a black-tie “Ford Clinic” in New York, where a team of mechanics showcased the car, to Model T rodeos out west, in which cowboys riding in Fords tried to rope calves. In 1909, mining magnate Robert Guggenheim sponsored an auto race from New York to Seattle in which the only survivors were two Model T Fords. “I believe Mr. Ford has the solution of the popular automobile,” Guggenheim concluded.

In the early years, Model Ts were produced at Piquette Avenue in much the same way that all other cars were built. Growing demand for the new Ford overwhelmed the old method, though. Ford realized that he not only had to build a new factory, but a new system within that factory.

Throughout his tenure as the head of the company, Henry Ford believed in maintaining enormous cash reserves, a policy that allowed him to plan a new facility for production of the Model T without interference or outside pressure. The new Highland Park factory, which opened in 1910, was designed by the nation’s leading industrial architect, Albert Kahn. It was unparalleled in scale, sprawling over sixty-two acres. John D. Rockefeller, whose Standard Oil refineries had always represented state-of-the-art design, called Highland Park “the industrial miracle of the age.”

In its first few years, the four-story Highland Park factory was organized from top to bottom. Assembly wound downward, from the fourth floor, where body panels were hammered out, to the third floor, where workers placed tires on wheels and painted auto bodies. After assembly was completed on the second floor, new automobiles descended a final ramp past the first-floor offices. Production increased by approximately 100 percent in each of the first three years, from 19,000 in 1910, to 34,500 in 1911, to a staggering 78,440 in 1912. It was still only a start.

“I’m going to democratize the automobile,” Henry Ford had said in 1909. “When I’m through, everybody will be able to afford one, and about everybody will have one.” The means to this end was a continuous reduction in price. When it sold for \$575 in 1912, the Model T for the first time cost less than the prevailing average annual wage in the United States. Ignoring conventional wisdom, Ford continually sacrificed profit margins to increase sales. In fact, profits per car did fall as he slashed prices from \$220 in 1909 to \$99 in 1914. But sales exploded, rising to 248,000 in 1913. Moreover, Ford demonstrated that a strategic, systematic lowering of prices could boost profits, as net income rose from \$3 million in 1909 to \$25 million in 1914. As Ford’s U.S. market share rose from a respectable 9.4 percent in 1908 to a formidable 48 percent in 1914, the Model T dominated the world’s leading market.

At Highland Park, Ford began to implement factory automation in 1910. But experimentation would continue every single day for the next seventeen years, under one of Ford’s maxims: “Everything can always be done better than it is being done.” Ford and his efficiency experts examined every aspect of assembly and tested new methods to increase productivity. The boss himself claimed to have found the inspiration for the greatest breakthrough of all, the moving assembly line, on a trip to Chicago: “The idea came in a general way from the overhead trolley that the Chicago packers use in dressing beef,” Ford said. At the stockyards, butchers removed certain cuts as each carcass passed by, until nothing was left. Ford reversed the process. His use of the moving assembly line was complicated by the fact that parts, often made on subassembly lines, had to feed smoothly into the process. Timing was crucial: a clog along a smaller line would slow work farther along. The first moving line was tested with assembly of the flywheel magneto, showing a saving of six minutes, fifty seconds over the old method. As similar lines were implemented throughout Highland Park, the assembly time for a Model T chassis dropped from twelve hours, thirty minutes to five hours, fifty minutes.

The pace only accelerated, as Ford’s production engineers experimented with work slides, rollways, conveyor belts, and hundreds of other ideas. The first and most effective assembly line in the automobile industry was continually upgraded. Those most affected were, of course, the workers. As early as January 1914, Ford developed an “endless chaindriven” conveyor to move the chassis from one workstation to another; workers remained stationary. Three months later, the company created a “man high” line—with all the parts and belts at waist level, so that workers could repeat their assigned tasks without having to move their feet.

In 1914, 13,000 workers at Ford made 260,720 cars. By comparison, in the rest of the industry, it took 66,350 workers to make 286,770. Critics charged that the division of the assembly process into mindless, repetitive tasks turned most of Ford’s employees into unthinking automatons, and that manipulation of the pace of the line was tantamount to slave driving by remote control. The men who made cars no longer had to be mechanically inclined, as in the earlier days; they were just day laborers. Ford chose to see the bigger picture of the employment he offered. “I have heard it said, in fact, I believe it’s quite a current thought, that we have taken skill out of work,” he said. “We have not. We have put a higher skill into planning, management, and tool building, and the results of that skill are enjoyed by the man who is not skilled.”

But the unskilled workers, many of them foreign born, didn’t enjoy their work, earning a mediocre \$2.38 for a nine-hour day. Indeed, the simplification of the jobs created a treacherous backlash: high turnover. Over the course of 1913, the company had to hire 963 workers for every 100 it needed to maintain on the payroll. To keep a workforce of 13,600 employees in the factory, Ford continually spent money on short-term training. Even though the company introduced a program of bonuses and generous benefits, including a medi-

cal clinic, athletic fields, and playgrounds for the families of workers, the problem persisted. The rest of the industry reluctantly accepted high turnover as part of the assembly-line system and passed the increasing labor costs into the prices of their cars. Henry Ford, however, did not want anything in the price of a Model T except good value. His solution was a bold stroke that reverberated through the entire nation.

On January 5, 1914, Henry Ford announced a new minimum wage of five dollars per eight-hour day, in addition to a profit-sharing plan. It was the talk of towns across the country; Ford was hailed as the friend of the worker, as an outright socialist, or as a madman bent on bankrupting his company. Many businessmen—including most of the remaining stockholders in the Ford Motor Company—regarded his solution as reckless. But he shrugged off all the criticism: “Well, you know when you pay men well you can talk to them,” he said. Recognizing the human element in mass production, Ford knew that retaining more employees would lower costs, and that a happier workforce would inevitably lead to greater productivity. The numbers bore him out. Between 1914 and 1916, the company’s profits doubled from \$30 million to \$60 million. “The payment of five dollars a day for an eight-hour day was one of the finest cost-cutting moves we ever made,” he later said.

There were other ramifications, as well. A budding effort to unionize the Ford factory dissolved in the face of the Five-Dollar Day. Most cunning of all, Ford’s new wage scale turned autoworkers into auto customers. The purchases they made returned at least some of those five dollars to Henry Ford, and helped raise production, which invariably helped to lower per-car costs.

The central role that the Model T had come to play in America’s cultural, social and economic life elevated Henry Ford into a full-fledged folk hero. But Ford wasn’t satisfied. Fancying himself a political pundit and all-around sage, he allowed himself to be drawn into national and even world affairs. Before the United States entered World War I, he despaired with many others over the horrors of the fighting; late in 1915, he chartered a “Peace Ship” and sailed with a private delegation of radicals for France in a naive attempt to end the war. In 1918, he lost a campaign for a U.S. Senate seat. The following year, he purchased a newspaper, the *Dearborn Independent*, which was to become the vehicle for his notorious anti-Semitism. The newspaper railed against the International Jew, and reported scurrilous conspiracy theories such as *The Protocols of the Elders of Zion*.

In 1915, James Couzens resigned from the Ford Motor Company, recognizing that it was Henry’s company, and that no one else’s opinion would ever matter as much. In 1916, Ford antagonized the other shareholders by declaring a paltry dividend, even in the face of record profits. In response, the shareholders sued, and in 1919 the Michigan Supreme Court upheld a lower court ruling that it was unreasonable to withhold fair dividends under the circumstances. The Ford Motor Company was forced to distribute \$19 million in dividend payments. In his own response to the escalating feud, Henry threatened publicly to leave the company and form a new one. He even made plans and discussed the next car he would produce.

Fearing that the worth of Ford stock would plummet, the minority shareholders suddenly became eager to sell; agents working surreptitiously for Henry Ford quietly bought up lot after lot of shares. The sellers did not receive all that the shares were worth, because of the rumors, but they each emerged with a fortune. James Couzens, the most wily of the lot, received the highest price per share, and turned to a career in the U.S. Senate (he won his race, unlike the old boss) with \$30 million in the bank. Ford gained complete control of the company at a cost of \$125 million—\$106 million of the stock, plus \$19 million for the court-ordered dividend—a fantastic outlay that he financed with a \$75 million loan from two eastern banks. On July 11, 1919, when he signed the last stock transfer agreement, the fifty-five-year-old mogul was so enthused that he danced a jig. The stock was divided up and placed in the names of Henry, Clara, and Edsel Ford.

In 1921, the Model T Ford held 60 percent of the new-car market. Plants around the world turned out flivvers as though they were subway tokens, and Henry Ford’s only problem, as he often stated it, was figuring out how to make enough of them. As a concession to diversification, he purchased the Lincoln Motor Car Company in 1921. Company plans seemed to be in place for a long, predictable future and Ford was free to embark on a great new project: the design and construction of the world’s largest and most efficient automo-

bile factory at River Rouge, near Detroit. Arrayed over 2,000 acres, it would include 90 miles of railroad track and enough space for 75,000 employees to produce finished cars from raw material in the span of just forty-one hours. River Rouge had its own power plant, iron forges, and fabricating facilities. No detail was overlooked: wastepaper would be recycled into cardboard at the factory's own paper mill. River Rouge was built to produce Model T Fords for decades to come, but by the time it was capable of full production later in the decade, a factory a tenth its size could have handled the demand for Model Ts.

The Model T's Ride Comes to an End

On June 4, 1924, the ten millionth Model T Ford left the Highland Park factory, which would remain the main facility for T production. While the flivver outsold its nearest competitor by a six-to-one margin that year, its unbridled run was nearing an unforeseen conclusion. After years of conceding the low end of the market to Ford, another automaker was setting its sights on that very sector.

An Epic Legal Battle

In 1879, a Rochester lawyer named George Selden applied for a U.S. patent for a road vehicle powered by a gasoline engine. Through his own delays and those of the government, however, a funny thing happened. Selden, who never built an actual automobile, received the patent on it in 1895, long after other people were building automobiles. In return for a percent of future revenues, Selden assigned the valuable patent to a group of New York financiers in 1897, and they defended it vigorously. In the first years of the century, they settled on a process by which automakers joined the Association of Licensed Automotive Manufacturers (ALAM), which served as a conduit for licensing fees of 1 1/4 percent on annual sales. Most of the country's automakers seemed reconciled to joining ALAM.

Even Henry Ford tried to join, in 1903, but the ALAM overstepped its bounds when it tried to dictate to him the price at which he could sell his cars. Ford refused to listen, refused to join the club, and certainly refused to pay the royalty. The ALAM brought suit. Even before the case was heard in court, the two sides battled each other through full-page newspaper advertisements. Ford's ads took the unusual step of offering to indemnify both buyers and sellers of his cars from any lawsuits claiming Selden patent infringement. (Only fifty customers were worried enough to accept the offer.)

In 1909, six years after the lawsuit started, it was finally heard by a federal judge in New York, who ruled that the patent was valid. Ford's entire enterprise seemed to be in danger, but he was defiant nonetheless. In 1911, the Court of Appeals overturned the decision, validating Selden's patent, but deeming it applicable only to vehicles substantially copied from the rickety contraption he had sketched back in 1879! The ruling not only freed Ford from the tyranny of the Selden patent, it freed all of America's other automakers, as well. Henry Ford had spent a great deal of money in legal fees, but he got his money's worth. As he said, "Probably nothing so well advertised the Ford car and the Ford Motor Company as did this suit."

At the beginning of the decade, General Motors was an awkward conglomerate of car companies and parts suppliers, managed more for the sake of its whip-saw stock-price than for efficiencies in automaking. In the middle of the decade, though, a revitalized GM, under the brilliant leadership of Alfred P. Sloan, Jr., began to offer inexpensive Chevrolets with amenities that the Model T lacked. Instead of a herky-jerky crank start, a Chevy had an electric starter. Instead of the sturdy but antiquated planetary transmission, it had a smooth three-speed. The market began to shift; price and value ceased to be paramount factors, Styling and excitement suddenly counted to the customer. Even though the Model T cost a mere \$290 in the mid-twenties, dealers clamored for a new Ford that would strike the fancy of the more demanding and sophisticated consumers.

But Henry Ford refused even to consider replacing his beloved Model T. Once, while he was away on vacation, employees built an updated Model T and surprised him with it on his return. Ford responded by kicking in the windshield and stomping on the roof. "We got the message," one of the employees said later, "As far as he was concerned, the Model T was god and we were to put away false images." Only one person persisted in warning him of the impending crisis: his son, Edsel, who had been installed as president of the Ford Motor Company during the dividend trial and its aftermath in 1919. It was the first of many arguments that Edsel would lose, as the once adoring relationship between the two deteriorated into distrust and disrespect on Henry's part and woeful disillusionment on Edsel's.

The Chevrolet continued to take sales from the dour Model T. By 1926, T sales had plummeted, and the realities of the marketplace finally convinced Henry Ford that the end was at hand. On May 25, 1927, Ford abruptly announced the end of production for the Model T, and soon after closed the Highland Park factory for six months. The shutdown was not for retooling; there was no new model in the works. In history's worst case of product planning, Henry sent the workers home so that he could *start* to design his next model. Fortunately, Edsel had been quietly marshaling sketches from the company's designers, and he was ready and able to work closely with his father on producing plans for the new car, called the Model A. It was a success from its launch in December 1927, and placed the company on sound footing again. By the time it went into production, the River Rouge had become the main Ford manufacturing facility.

When the last Model T rolled off the assembly line, it was not the end of an era, it was still the very dawn of the one that the little car had inaugurated. Cars—more than half of them Model Ts—pervaded American culture. They jammed the streets of the great eastern cities and roamed newly laid roads in southern California. Adapted to haul everything from mail to machine guns to coffins to schoolchildren, automobiles represented an opportunity for change in practically everything. They also became a crucial factor in recasting a growing economy. Henry Ford had created a car for the multitudes and that car had created the basis of the car culture embraced by every subsequent generation.

The Ford Motor Company, having survived its own crisis in the twenties, was one of only forty-four U.S. automakers left in 1929, out of the hundreds that had entered the fray since the beginning of the century. That year, Ford, General Motors, and the newly formed Chrysler Corporation—known then and now as the Big Three—accounted for 80 percent of the market.

Henry Ford died on April 7, 1947, at the age of eighty-three, having outlived the Model T by nearly twenty years. A century has passed since he took the first car he built for a ride. The world remains in large part the one set into motion by Henry Ford: a world in which cars are for everyone. As Will Rogers said, "It will take a hundred years to tell whether he helped us or hurt us, but he certainly didn't leave us where he found us."

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