5. Automobiles

The earliest automobiles were invented in Germany and France. On May 14, 1886 German inventor Karl Benz created the first motor car, called the Benz Patent-Motorwagon. Within the next ten years many inventors around the world were creating new models of vehicles with steam, electric and gasoline engines. Some of these went on to become successful automobiles, but many of the early automobiles never succeeded beyond the initial prototypes. Cost, labor, and design problems kept many more in the developing stages only. On June 4, 1895, Michelin invented the first pneumatic automobile tire, a tire made of reinforced rubber and filled with compressed air. This, of course, made an enormous improvement in the comfort of an automobile ride. Automobiles had popped up in the hands of the wealthy and early adopters in the late 1800s and early 1900s, but getting around on horseback was the most customary transportation until Henry Ford started mass production of the Model T and made automobiles affordable for the average family.

The first automobiles were expensive and considered a luxury that only the rich could afford. The American inventor Henry Ford decided he wanted to make a car that the "average American" could buy. On July 19, 1903, he started the Ford Motor Co. and sold 1700 cars in the first year. Five years later, on November 16, 1908, he introduced the Tin Lizzie, the first Model-T car, and this is the car that is generally considered the first affordable automobile. This is also the car that my brother John bought, as we have seen. The 1908 advertisement you see here was advertising the Ford Touring Car, which my brother bought for $850.00.

There were three Ford styles altogether, all available on the 100-inch wheelbase chassis: the 5-seat Touring Car (also called the Flivver), the 2-seat runabout, shown here, and the 7-seat Town Car. All were built in Detroit, Michigan, and until 1913 were available in four colors: gray, blue, green, or red. In 1913 the color black was added. The Model T was sold from 1908-1927 and became the most influential car of the 20th century, ahead of BMC Mini, Citroen DS, and Volkswagen Type I. It cost $850 in 1908 and went down to less than $300 by 1925. The Ford Runabout pictured here was advertised in the Akron Colorado Weekly Press on October 8, 1915, for

$395. The Ford Touring Car then cost $445, and the Ford Town Car $645. When my brother traded up for a new Ford Touring Car two years after he had bought his first car, he bought the new 1910 model shown here. I thought this was a magnificent automobile! Look at those classic sleek lines! The extension at the back was the hood, which could be put up or folded down as in the advertisement. In the photo from my wedding day you saw it up, and it took typically two men to operate the hood. Four men could do the job more efficiently, but one person alone could also do it.

However, my absolute favorite automobile is the gorgeous little Runabout shown here, and as you can probably guess, the reason is simple: this photo that I saw showed women driving it!

I could just see myself in that driver's seat and going for a drive with my friend, and I could hardly wait! By the way, my little one, that's another thing the war did. When we women saw the photos of the nurses and ambulance drivers in France, there was no longer any need to try to convince us, and our husbands, that women certainly could drive vehicles safely, just as men could.

The 1910 Tourer was a little fancier than the previous ones, and my brother paid $975.00 for his. Competing cars cost between $2000.00 and $3000.00. Johnnie decided that we should wait until we had our own farm before buying our car. This happened quite quickly actually. After a land agent convinced Johnnie's father that a farm in Wisconsin would be a good investment, Johnnie's father made several trips to Bloomington to check things out and then bought a farm there on February 12, 1910. He made his plans about how the farm would be managed, and by late spring of that year he sent Johnnie and his daughter Caroline over to Wisconsin to manage the farm and get the fields and gardens planted so they would produce enough for a small dairy herd and a small family during the coming winter. Johnnie and I were married November 22, 1910 and moved to that farm the following week. During that first winter we worked hard to improve the farm and the farmhouse. By late spring of 1911 we felt confident that the farm would indeed be profitable. We decided to use the money Johnnie had saved working for his father and the dowry I had earned as a hired girl to buy our first car, a 1911 Ford Touring Car for $750.00. I agreed with Johnnie that even though I loved the Runabout, and it was cheaper at $680.00, it would not be practical for a family. By then I was pregnant with our first child. In addition, Johnnie had plans to use the Ford as a truck to haul things, especially cans of milk, as a tractor to do things like plowing the field, and as an engine to run farm machines like the threshing machine.

The Model T was (intentionally) almost as much a tractor and portable engine as it was an automobile. It has always been well regarded for its all-terrain abilities and ruggedness. It could travel a rocky, muddy farm lane, cross a shallow stream, climb a steep hill, and be parked on the other side to have one of its wheels removed and a pulley fastened to the hub for a flat belt to drive a bucksaw, thresher, silo blower, conveyor for filling corn cribs or haylofts, baler, water pump, electrical generator, and many other applications. One unique application of the Model T was shown in the October 1922 issue of *Fordson Farmer* magazine. It showed a minister who had transformed his Model T into a mobile church, complete with small organ.

During this era, entire automobiles (including thousands of Model Ts) were even hacked apart by their owners and reconfigured into custom machinery permanently dedicated to a purpose, such as homemade tractors and ice saws. Dozens of aftermarket companies sold prefab kits to facilitate the T's conversion from car to tractor. The Model T had been around for a decade before the Fordson tractor became available (1917–18), and many Ts had been converted for field use. (For example, Harry Ferguson, later famous for his hitches and tractors, worked on Eros Model T tractor conversions before he worked with Fordsons and others.) During the next decade, Model T tractor conversion kits were harder to sell, as the Fordson and then the Farmall (1924), as well as other light and affordable tractors, served the farm market. But during the Depression (1930s), Model T tractor conversion kits had a resurgence, because by then used Model Ts and junkyard parts for them were plentiful and cheap.

The most significant development in making automobiles affordable was the moving assembly line that Ford adopted in 1913, which greatly reduced the cost of producing a vehicle. The Model T was

Ford's first automobile mass-produced on moving assembly lines with completely interchangeable parts, marketed to the middle classes. Henry Ford said of the vehicle:

"I will build a car for the great multitude. It will be large enough for the family, but small enough for the individual to run and care for. It will be constructed of the best materials, by the best men to be hired, after the simplest designs that modern engineering can devise. But it will be so low in price that no man making a good salary will be unable to own one – and enjoy with his family the blessing of hours of pleasure in God's great open spaces."

Although credit for the development of the assembly line belongs to Ransom E. Olds with the first mass-produced automobile, the Oldsmobile Curved Dash, in 1901, the tremendous advancements in the efficiency of the system over the life of the Model T can be credited almost entirely to the vision of Ford and his engineers. Ford had introduced the Model T in 1908, and the first models were priced at $850. When the Ford Motor Co. improved mass-production of cars with the first conveyor belt-based assembly line in 1913, costs per automobile came down significantly, and by 1924 the cost of a new Model T had dropped to $290. Also, in 1916 Ford introduced installment buying with payment plans. The Model T sold extremely well, and Ford became the largest automobile company in the United States. By 1927, 15 million Model Ts had been sold.

As a result of the moving assembly line, Ford's cars came off the line in three-minute intervals, much faster than previous methods, increasing production by eight to one (requiring 12.5 hours before, 93 minutes afterwards), while using less manpower. By 1914, the assembly process for the Model T had been so streamlined it took only 93 minutes to assemble a car. That year Ford produced more cars than all other automakers combined. The Model T was a great commercial success, and by the time Henry made his 10 millionth car, 10 percent of all cars in the entire world were Fords. In fact, it was so successful that Ford did not purchase any advertising between 1917 and 1923.

In the first years of production from 1908 to 1913, the Model T was available only in gray, green, blue, and red. Green was available for touring cars, town cars, and runabouts. Gray was only available for the town cars, and red only for the touring cars. By 1912, all cars were being painted midnight blue with black fenders, like my brother's car. Only in 1914 was the "any color so long as it is black" policy finally implemented. It is often stated Ford suggested the use of black from 1914 to 1926 due to the low cost, durability, and faster drying time of black paint in that era. Paint choices in the American automotive industry, as well as in others (including locomotives, furniture, bicycles, and the rapidly expanding field of electrical appliances), were shaped by the development of the chemical industry. These included the disruption of dye sources during World War I and the advent, in the mid-1920s, of new nitrocellulose lacquers that were faster-drying and more scratch-resistant, and obviated the need for multiple coats.

Now Johnnie, here is a lot of really technical information about the Ford Model T, and we can skim over it if you like. It is quite interesting, actually.

The Model T had a front mounted, 177 in^3 (2.9 L) four-cylinder *en bloc* motor (that is, all four in one block, as common now, rather than in individual castings, as common then) producing 20.2 hp (15 kW) for a top speed of 40-45 mph (64–72 km/h). The small four-cylinder engine was known for its L heads. According to Ford Motor, the Model T had fuel economy on the order of 13 to 21 mpg (5 to 9 kilometres per litre or 11.1 to 18.7 litres per 100 km). The engine was capable of running on gasoline, kerosene or ethanol, though the decreasing cost of gasoline and the later introduction of Prohibition in the United States soon made gasoline the fuel of choice.

A flywheel magneto (broadly equivalent to a modern alternator) produced low voltage alternating current to power a trembler coil, which created a high voltage current. This ignition pulse was passed to the timer (analogous to a distributor in a modern vehicle) and redistributed to the firing cylinder. Ignition timing was adjusted manually by using the spark advance lever mounted on the steering column which rotated the timer. A battery could be used for starting current: at hand-cranking speed, the magneto did not always produce sufficient current (but was initially available on early cars). A certain amount of skill and experience was required to find the optimal timing for any speed and load. When electric headlights were introduced in 1915, the magneto was upgraded to supply power for the lights and horn. In keeping with the goal of ultimate reliability and simplicity, the trembler coil and magneto ignition system was retained even after the car became equipped with a generator and battery for electric starting and lighting. Most cars sold after 1919 were equipped with electric starting, which was engaged by a small round button on the floor in front of the driver's seat.

Before starting a Model T with the hand crank, the spark had to be manually retarded or the engine might "kick back". The crank handle was cupped in the palm, rather than grabbed with the thumb under the top of the handle, so that if the engine did kick back, the rapid reverse motion of the crank would throw the hand away from the handle, rather than violently twisting the wrist or breaking the thumb. Most Model T Fords had the choke operated by a wire emerging from the bottom of the radiator where it could be operated with the left hand. This was used to prime the engine while cranking the engine slowly then starting the engine with the left hand with a rapid pull of the crank handle.

The car's 10 gallon (38 litre) fuel tank was mounted to the frame beneath the front seat; one variant had the carburetor (a Holley Model G) modified to run on ethyl alcohol, to be made at home by the self-reliant farmer. Because fuel relied on gravity to flow forward from the fuel tank to the carburetor, a Model T could not climb a steep hill when the fuel level was low. The immediate solution was often to drive up steep hills in reverse. In 1926, the fuel tank was moved forward to under the cowl on most models.

While the first few hundred Model Ts had a water pump, its use was abandoned early in production. Ford opted for a cheaper and more reliable circulation system based on the thermo-syphon principle. Hot water, being less dense, would rise to the top of the engine and up into the top of the radiator, descending to the bottom as it cooled, and back into the engine. This was the direction of

water flow in most makes of cars even when they did have water pumps, until the introduction of crossflow radiator designs. Water pumps were also available as an aftermarket accessory for Model T.

The Model T was a rear-wheel drive vehicle. Its transmission was a planetary gear type billed as "three speed". In today's terms it would be considered a two speed, since one of the three speeds was actually reverse.

The Model T's transmission was controlled with three foot pedals and a lever that was mounted to the road side of the driver's seat. The throttle was controlled with a lever on the steering wheel. The left pedal was used to engage the gear. With the handbrake in either the mid position or fully forward and the pedal pressed and held forward the car entered low gear. When held in an intermediate position the car was in neutral, a state that could also be achieved by pulling the floor-mounted lever to an upright position. If the lever was pushed forward and the driver took his foot off the left pedal, the Model T entered high gear, but only when the handbrake lever was fully forward. The car could thus cruise without the driver having to press any of the pedals. There was no separate clutch pedal.

The middle pedal was used to engage reverse gear, and the right pedal operated the engine brake. The floor lever also controlled the parking brake, which was activated by pulling the lever all the way back. This doubled as an emergency brake.

Although it was extremely uncommon, the drive bands could fall out of adjustment, allowing the car to creep, particularly when cold, adding another hazard to attempting to start the car: a person cranking the engine could be forced backward while still holding the crank as the car crept forward even though it was nominally in neutral. As the car utilized a wet clutch, this condition can also occur in cold weather where the thickened cold oil acts somewhat like an adhesive and prevents the clutch discs from slipping freely. Power reached the differential through a single universal joint attached to a torque tube which drove the rear axle; some models (typically trucks, but available for cars as well) could be equipped with an optional two speed Ruckstell rear axle shifted by a floor mounted lever which provided an underdrive gear for easier hill climbing. All gears were vanadium steel running in an oil bath.
Tires were pneumatic 30 in (76 cm) in diameter, 3.5 in (8.9 cm) wide in the rear, 2 in (5 cm) in the front. The old nomenclature for tire size changed from 30×3 to 21" (rim diameter) × 4.50 (tire width.

Now let’s take a quick look at how to drive the Model T:

Ford made the Model T easy to drive compared to today's cars since the people to whom he sold his cars did not know how to drive anything other than a horse. It is not like driving a modern car, though three pedals are on the floor like a modern manual transmission car. A Model T has a steering wheel that works the same way as in cars of today, but almost everything else is different.

The first Model Ts did not even have a starter like a modern car. This is the powerful electric motor in a car that turns the engine to make it run when it is turned off. The engine on the Model T was started with a hand crank on the front of the car. A wire loop near the radiator worked the choke on the carburetor to give the engine extra fuel to help start it when it was cold. This could be

dangerous if a person were not careful. If the levers that controlled the engine were not set the right way, especially the spark control, the engine could backfire, or spin the wrong way. Many people got broken arms this way. Doctors even had a special name for this kind of break: the "Ford fracture". Many Model T owners added electric starters to their cars and it was not long before Ford started doing the same. A Model T is in high gear by default, so if the parking/clutch lever was not engaged, the car had a tendency to run over the operator when started.

To make a modern car go or accelerate once the engine is running, a person steps on a pedal on the floor to engage the transmission into low gear. To make a Model T accelerate, move two levers near the steering wheel. The lever on the right was the throttle (or engine speed), and the lever on the left adjusted the time that the spark plugs fired. These levers needed to be set properly before the engine could be started.

The three pedals on the floor of the Model T were for the brake on the right, reverse in the middle to make the Model T go backwards, and a pedal on the left to shift the gears from low to high speed. A lever on the floor worked the brakes as well as the clutch. Pulling the lever toward the driver would set the parking brake and help keep the car from moving while parked. When the lever was placed in the middle, the transmission would be in neutral.

Once the engine is running, the driver now has to make the Model T move on its own. Step on the pedal all the way to the left, move the throttle lever to "give it the gas" and gently move the floor lever forward. This is low gear, the powerful gear used to get the Model T moving. Once it is moving, move the right lever up, let the left pedal come all the way up, and give it more gas to shift into high. To make the car go faster still, move the throttle lever as well as the spark advance lever. Stepping on the left pedal only halfway puts the car in neutral, the same as the lever. This helps the Model T come to a stop without causing the engine to stop as well.

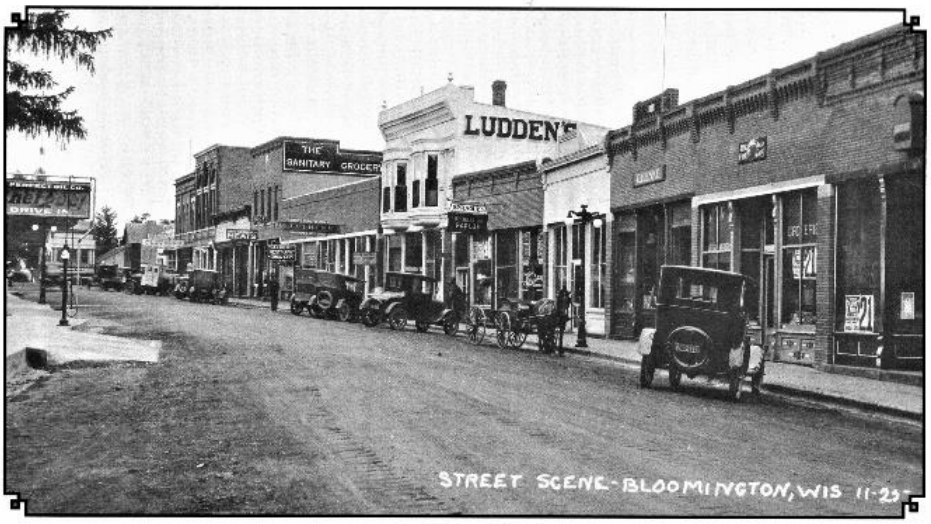
The brakes on a Model T work the rear wheels by the use of brake bands inside the transmission. Modern cars have brakes on all four wheels. There were no brakes on the front of a Model T.

Well, as you can imagine, my Little Dear One, it took me a few tries to get this driving thing right. Putting the car into neutral without the engine stalling out was particularly tricky for me. And there really were broken arms from trying to start the Model T, so I always asked Johnnie or one of the men to start the car if I wanted to drive it. When we saw this advertisement in our local newspaper on June 10, 1914: “Avoid a broken arm. Have an electric starter installed on your Ford. Brown and Garthwaite,” Johnnie took our car into town to get a starter installed, so I could start the car myself.

The earliest automobiles to appear in the Bloomington area were not Fords. These photos are from about 1910. In the 1910 street scene, we see one horse and buggy on the main street, but no automobiles.

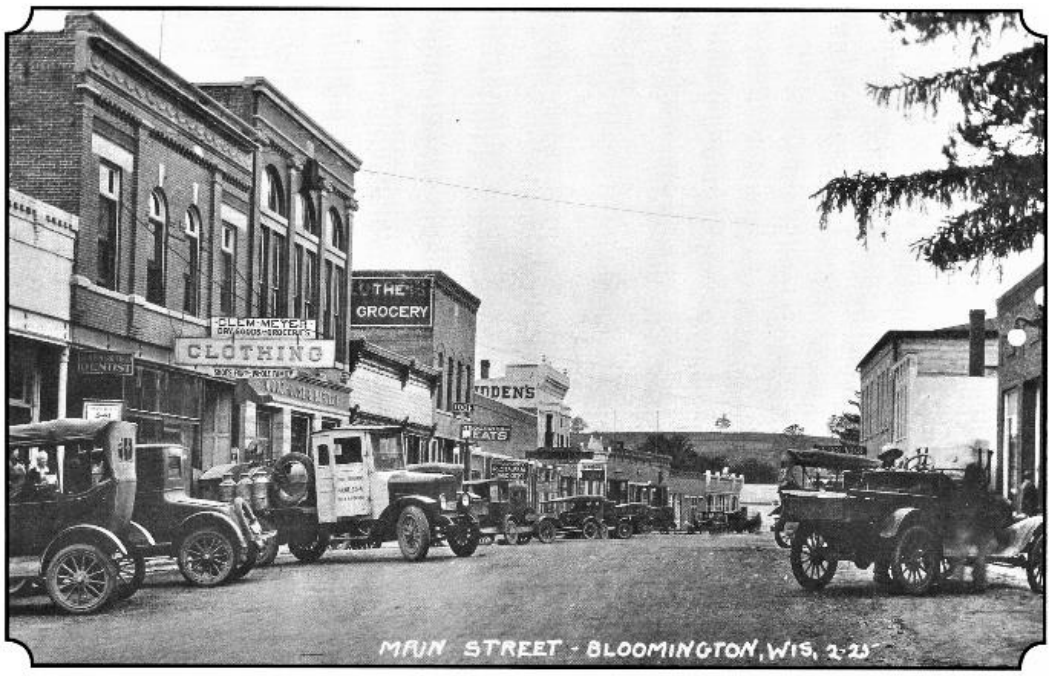
Main Street in 1912

The next photos show how quickly cars caught on in Bloomington. The 1912 photo was one year after Johnnie and I moved to Bloomington, and you see one Ford automobile on the main street, plus horses and buggies.



Main Street 1925

On these 1925 photos you see only one horse and buggy, and the rest are cars and trucks. You can see that the lower photo is labeled "Fords on Main Street. The automotive dealer in Bloomington was Fred Welsh, who opened a Ford Motor Company Dealership that he operated successfully for many years. Most of the cars in Bloomington then were Fords. As we have seen, farmers used them as transportation, trucks, tractors, and energy sources for their farm equipment.



Fords on Main Street

The following automobile timeline is culled from notices in the Bloomington Record newspapers of that time and show the adoption of the automobile in Bloomington from the first automobile that came through town in 1904 to the 1935 change of ownership in the automobile dealership.

AUTOMOBILES IN BLOOMINGTON

July 21, 1904 an automobile passed through the village on Tuesday

November 4, 1909 an ordinance is being drafted for a speed limit of 6 miles per hour for automobiles in the village because of many accidents caused by frightened horses.

July 13, 1010 Dave Ballentine has purchased a 40 h.p. Lambert automobile

July 24, 1912 R. N. Hoskins has a new 1912 model Cadillac

July 31, 1912 R. French has a new automobile, an E.M.F. Touring car.

1912 Photo of Main Street (Canal Street) showing newly installed concrete sidewalks. The street is oiled gravel. (In the 1925 photo the street is still oiled gravel.)

August 28, 1912 Fair Publicity Idea: Thirty automobiles and the Bloomington Band will go on an excursion through the area next Monday to present a program of music and speeches at each stopping place.

June 10, 1914 Advertisement: "Avoid a broken arm. Have an electric starter installed on your Ford. Brown and Garthwaite."

October 20, 1915 "The Auto Bus took a load of 18 for a pleasure ride to Prairie du Chien Sunday afternoon. Coming home in the evening one of the wheels broke a plank on the bridge at Bridgeport, and the boys got out and pried it out with planks."

August 16, 1916 R. N. Hoskins, the funeral director, has purchased a fine new Ford hearse, the first auto hearse in the county.

1916 mailing envelope: There are now seventy-five automobiles owned in the village

September 26, 1917 Fred Welsh sells the feed mill and will put up a new service garage building

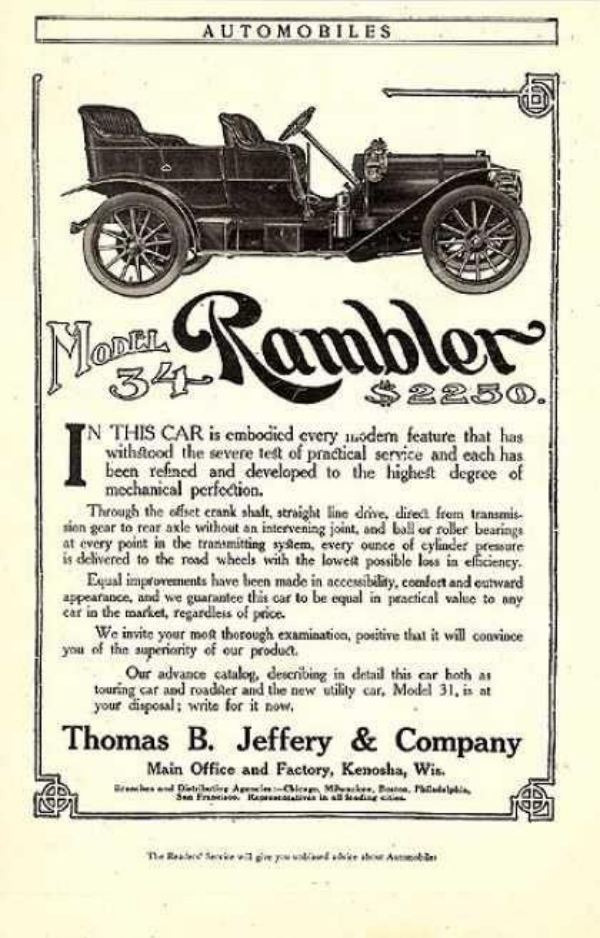
January 16, 1918 Fred Welsh and a group of drivers started out for Bagley to bring new Fords back to Bloomington, but they got into snow drifts by Andy Recker's. They had to return home, and bobsleds and horsepower were used to bring the cars home.

The streets in town are oiled gravel until after 1925.

February 13, 1935 Fred Welsh will again take the Ford car agency. Mr. Welsh sold hundreds of Fords when he had the agency some years ago.

Snow and ice made road conditions hazardous for automobiles in the cold Wisconsin winters. This 1929 photo was taken after my time but shows the big snowstorm of 1929 and how cars had to follow each other in a straight line in order to avoid getting stuck in a snowdrift.

The Model T was certainly not the only car on the roads in Bloomington in those days. It was just the most common for about 20 years. The first people in Bloomington who bought automobiles did not buy Fords. They were, of course, the wealthy, and they had their own favorites, as we have seen in the Timeline. There was a car manufacturing plant right in Wisconsin, however, a very successful one, about 205 miles from Bloomington, straight across the state, on the western shores of Lake Michigan. Thomas Jeffery was a bicycle manufacturer in Chicago, and his Rambler bicycle model was the second-best-selling bicycle in the United States during the 1890s. At the turn of the Nineteenth Century, Jeffery became interested in the automobile, and built a single-cylinder car in 1897. The following year, with his son Charles he built two more and exhibited them at the 1899 Chicago International Exhibition & Tournament and the first National Automobile Show in New York City, receiving positive reviews in both. The new cars had front-mounted two-cylinder engines and left-hand drive and were given a good reception by show-goers and the press. Although the cars were not displayed with a particular name, the press generally referred to them as 'Ramblers,' the brand with which Jeffery was well known.



Jeffery sold his bicycle business in 1901 to Colonel Albert Pope's American Bicycle Company and bought the old Sterling Bicycle Co. factory in Kenosha, Wisconsin, where he set up shop to build automobiles. He started commercially mass-producing them in 1902 and by the end of the year had produced 1,500 motorcars, one-sixth of all existing in the US at the time. The Thomas B. Jeffery Company was the second largest auto manufacturer then, (behind Oldsmobile). Rambler innovated various design features and was the first to equip cars with a spare wheel-and-tire assembly. This allowed the driver, when experiencing a common puncture (flat tires) to exchange the spare wheel & tire for the flat one. The production version introduced in February of 1902, was rather different from the prior models. It was powered by a single-cylinder engine placed under the seat, and a tiller on the right was used to control the vehicle. The cars were left –hand drive. During its first year, 1500 buyers bought the car at a cost of $750.

Rambler cars enjoyed excellent sales, placing third in the country in 1905 and 1906 and remaining in the top ten throughout the decade. Thomas Jeffery died of a heart attack in 1910, and the business passed to his son. In 1914, to honor his father's memory, Charles Jeffery re-christened the 'Rambler' car with the family name. But in 1915, having narrowly escaped death at the sinking of the Lusitania, Charles experienced an epiphany and chose to retire. He sold the company in 1916 to Charles Nash, after which the Nash name was gradually phased in and there were no more Ramblers. The 1913 Rambler Model 83 Cross Country Touring car in this ad was one of the last motorcars still branded as a Rambler. As we can see, it is advertised for $2250, significantly higher than the $650 cost of the Ford Model T Touring Car in 1913. The 1913 Rambler Model 83 was called the Kenosha Cadillac, after the place of manufacture, and was advertised as a cross-country touring car guaranteed for 10,000 miles in 1913.

During 1913, Rambler produced only the 83 series of motorcars in four body styles all on a 120-inch wheelbase and powered by a 318 cubic inch 42 horsepower inline four-cylinder engine with magneto ignition. The car was beautifully styled, finished in Brewster Green on the body with a black hood and fenders, black canvas top and green wood spoke artillery wheels. The seats were black leather. The car also featured handsome nickel brightwork, a single rear-mounted spare wheel, toolbox mounted on the right running board, folding windshield, dual rear-view mirrors, full

set of side curtains stowed under the rear seat, robe rail on the back of the front seat, accessory speedometer and a horn mounted on the steering column.

ERECT NEW GARAGE AT NEW VIENNA

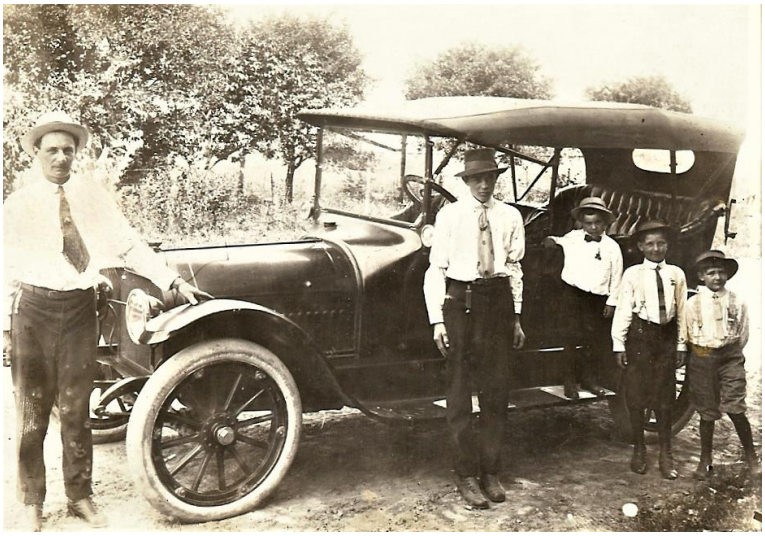
NEW VIENNA AUTO SUPPLY CO., NAME OF NEW CONCERN.

4-18-1913.

Work On New Building Has Begun. —E. M. Kerper Is Manager.

New Vienna, Ia., April 17.—New Vienna is to have a modern garage, which will be operated by the New Vienna Auto and Supply Company. The erection of a new building 40x45, is now under way and the structure will be rushed to completion. The garage is located south of Kerper's store facing Columbus street. E. M. Kerper is manager of the new enterprise and Ed. Dusold will have charge of the repair department. Mr. Kerper states that the auto company will feature the Rambler machine and several other medium priced cars and a complete stock of accessories will be carried.

As we see in this advertisement, a new garage opened in New Vienna in 1913, to be operated by the New Vienna Auto and Supply Company with E. M. Kerper as manager. "Mr. Kerper states that the auto company will feature the Rambler machine and several other medium-priced cars, and a complete stock of accessories will be carried."

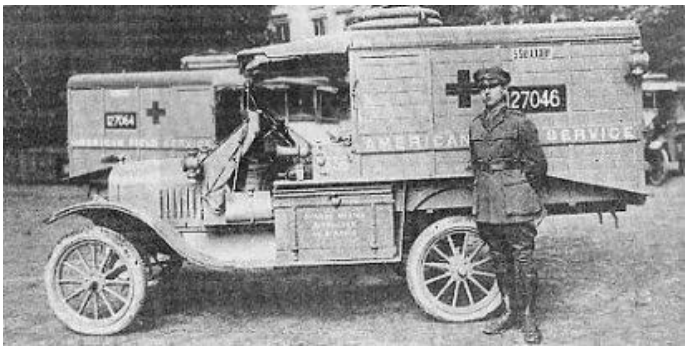


My mother brought me these photos of a proud New Vienna family who had just bought a Rambler Cross-Country Touring Car. The 1907 Rambler sold for $2500, but by 1908 had dropped to $2250.

The practicality of an automobile was limited at first because of the lack of suitable roads. Roads were mostly dirt and hard to travel in bad weather, especially for heavy machinery. The Federal Aid Road Act of 1916 allocated $75 million for building roads. By 1924 there were 31,000 miles of paved road in the United States. State governments began to use the corvee system to maintain roads, which required physical labor on a public project by local citizens. Motivation was the need of farmers in rural areas to transport their goods. 4-Wheel drive was developed to help power through bad roads. Bloomington was a very progressive town and immediately applied for road-building money. Because Johnnie and I lived on the fairgrounds road in Bloomington, our road was one of the first ones paved under the new program. The paved road made it possible for us to travel more quickly, safely, and comfortably into town.

World-wide there were hundreds of automobile manufacturers competing for market share in a rapidly-expanding market. Some of them, like Ford, found lasting success while others did not. Some of those that succeeded did so because of World War I, which became a huge catalyst for those automobile manufacturers that were able to successfully adapt their vehicles to the needs of the military, like Rolls Royce, Ford, Citroen, and BMW. Let's look briefly at how the war used these vehicles.

From an automotive perspective, World War I was a major turning point in the history of transportation; previously, in every war ever waged, equipment and supplies were moved in and around the battle areas by some combination of horsepower or manpower. World War I saw the first widespread use of motorized vehicles in various supporting roles.



Even during the first battles of the war in 1914, the Ford Model T was a major player as many privately owned Model Ts were commandeered for various military uses. The basic Model T Tourer and its slightly smaller version called the Runabout, were quickly modified to serve important purposes in the war, like ambulances and supply vehicles. When the World War began in June 1914, the automobile was in the middle of its awkward teen years. By the end of the war it had proven its worth.

First released in October of 1908, the Ford Model T was designed to be a car for the people, as we have seen. Unlike cars that had come before it, the Model T was made to be easy to operate and inexpensive enough that any working person could own one. Ford's redesigned manufacturing process made this possible. Instead of being assembled in place, Model Ts moved along a monorail, with large machines placed in the order they were needed to produce individual car parts. This moving production line became an instant hit, cutting fabrication time in half. Within five years, Ford had adapted the method to each of its various assembly lines, minimizing the company's expenses and revolutionizing the modern factory. Ford's most popular Model T, the Touring series, originally cost $850, or approximately a teacher's yearly salary in 1908. Although this was a comparatively reasonable price, the Model T's straightforward operation and ease of repair are what really made it sell. The Model T's high clearance, light weight, and four-cylinder engine allowed the car to handle nearly any rough road surface. The vehicles traveled an average of 10-12 miles per gallon and could sometimes reach speeds of more than 30 miles an hour, though only on the best roads. The worst that could be said for them is that their brakes were inferior. The Model T quickly gained the nickname "Tin Lizzie," a reference to motorcars being cheap metal versions of horses, which were often called Liz or Lizzie. The Model T's simplicity generated a huge

aftermarket for accessories and parts, as most of the original vehicles didn't even include an instrument panel. This vehicle proved immediately adaptable to the needs of war.

Perhaps the role of ambulance is the best known of the Model T's war efforts. Its sheer versatility was certainly not limited to ambulance duty; it was also a delivery truck, a staff car, and an artillery mover.

The United States military was a huge purchaser of the Model T, allowing the American Expeditionary Force to be the first truly motorized military operation in history. There was logic with that decision; all materiel had to be shipped to Europe and that was always a multi-week endeavor. Sending horses meant some amount of acclimation time after arrival whereas a Model T was ready to go. At its peak, the American Expeditionary Force would have 60,000 motorized vehicles of various varieties in the European Theatre; of those, approximately 15,000 were Model T's.

Even though the United States had the largest number of Model T's in use, the total number used by the American Expeditionary Force is difficult to determine. The length of time the United States was involved in the war was relatively short. This created some anticipated needs to be eliminated, orders being filled just after the cease-fire, or cancelled entirely.

Our soldiers in France loved the Model T and immortalized it with a ditty they composed, in imitation of the popular 1890 poem by Rudyard Kipling, *Gunga Din*.

Yes, Tin, Tin, Tin
You exasperating puzzle, Hunka Tin
I've abused you and I've flayed you,
But by Henry Ford who made you,
You are better than a Packard, Hunka Tin!

It is ironic that at the beginning of the war, Henry Ford was an intense pacifist, even traveling to Washington to try to convince the president not to join the war. He thought the war would be bad for the American economy. But almost as soon as war was declared, the tractors and trucks built in Ford's British factories were soon being produced almost exclusively for the armed forces. Eventually, even Ford's cars were repurposed into suitable warzone surplus. Once converted into a mobile field ambulance for the Red Cross, the almost-omnipresent Ford Model T soon became a common sight on the Western Front. Then when America entered the war in 1917, Ford's factories went into high gear to keep up with the need in Europe. Then he even tried to design a tank for the battlefield, but it was too basic compared to the French Renault FT, and the US Tank Corp cancelled its 15,000-unit contract after only 15 examples had been shipped to France. So Ford's plants in Europe focused on car production, and when the war was over, a staggering two out of every five cars on UK roads was a Ford, a vast majority of which were Model Ts.

There have been countless different cars built over the years. Yet of those, how many have repeatedly demonstrated a pronounced aptitude for such a dizzying array of varied and diverse tasks? The Ford Model T, as passenger car, pickup, delivery truck, tractor, and stationary power plant at home as well as being ambulance, delivery truck, and artillery mover in war-torn Europe and Africa, was certainly a formidable mechanical soldier during the Great War.

But the Ford Model T was not the first nor the only automobile in the war. It's easy to forget the impact of the young automotive industry during the war, whether it be on the battlefields or the home front. The companies that sell some of today's most popular cars – Rolls Royce, Vauxhall, Renault, Ford, Citroen and more – all took part in the conflict, and not in the ways we might have thought.

As the self-proclaimed maker of the 'best car in the world' in the pre-war years, it was perhaps inevitable that the British military would call upon Rolls-Royce to provide them with sturdy and dependable motorized transport. As good as the stock Silver Ghost model was – Rolls-Royce had been producing it for eight years by the outbreak of the war – it did require some beefing up for battlefield life. Armored cladding filled in for the coach-built bodywork of the customer cars, and some came with a rotating machine gun turret on the top. World War I also played a part in establishing Rolls-Royce as an aero-engine manufacturer. Despite only offering three engines at the time, and even though it was never able to fully keep up with demand, Rolls-Royce's units ended up powering more than half of the aircraft used by the Allies during the war. By the time the Second World War started, its famous Merlin engines would power Spitfires, Hurricanes, Lancaster bombers and countless more aircraft over the skies of Europe and Asia.

This beautiful skinny-wheel car did not see front line action, but it was one of the defining vehicles of the war. The Vauxhall D-Type, or "25hp," which first rolled off the production line in 1915, crossed battlefields on the entire Western Front. It had a 4-cylinder 3,969cc engine that could take five passengers to just over 60 mph. It was reserved for use by military higher-ups because it offered an appealing alternative to traveling through conflict zones by horse. Back in the day when comparing engine power to horsepower was really relevant, 25 hp was a big deal. (The animals

were likely even more excited: about 8 million horses died in the four years of fighting, and it's safe to assume the 1,500 D-Types produced for the military kept that number from going even higher.)

The Vauxhall's solid chassis and durable engine proved a winning combination. At the insistence of the British war offices, Vauxhall produced up to seven of these vehicles a week. By 1916, they were cranking out about eight a week, which was just the right number. Armies were careful to avoid over-reliance on machines, which required tools to be on-hand, and which, if they broke down, could immobilize valuable cargo. Horses and ground armies still had their place, and the Vauxhall was used to transport VIPs. Another British creation of the era, the Mark I tank, had more combat-related duties. Even in that minor role and with those skinny tires, the car worked. According to Vauxhall literature, a gunner on a D-Type in 1916 said, "The old Vauxhall will go on being bumped, swamped, bogged, and perhaps shelled; but its work is to help win the war, and it does it with a good heart." One of only two D-Types that survive today, the car pictured here appeared in Steven Spielberg's film War Horse, once drove King George V around northern France, and will take part in centenary commemorations of the war in Britain.

Of all the car manufacturers to participate in World War One, Renault was by some margin the most active. Like Rolls-Royce, Renault did initially contribute to the French war effort by supplying cars to the military. More impressively, every single Renault taxicab in Paris was temporarily repurposed as a troop transport in 1914, to help counter the German offensive during the First Battle of the Marne. As important as the commandeered cabbies were, of even more significance to the war was Renault's FT light tank. Although no-where near as heavily armed or as imposing as the British heavy tanks, their relative speed and the sheer quantity of them made this dinky little device a devastatingly effective asset. Renault produced approximately 3,600 of them, and more than half of the tanks used by the Allies during the war were FTs. Crucially for the firm's future interests, World War I inadvertently gave Renault the tools it needed to create commercial vehicle off-shoots. Its first tractor, for example, was heavily based on the FT tank. Renault's various commercial vehicle sub-divisions still exist today, although most have now been separated from the car company.

So very many things were happening in the years before and after the War, my Little Dear One, and happening so fast, it seemed. The world we lived in and didn't think much about was disappearing quietly but swiftly. We started to feel like we were living in a most exciting time, where a kind of life our parents could not have dreamed about was just around the corner for us. Can you imagine living without cars, or electricity, or telephones? Well, that's what my parents did, and what I did as a child. I know the cars you have seen here seem old-fashioned to you, but they were magical to us. Before cars, when we wanted to go somewhere, we traveled by horse and buggy, or just on a horse, or walked. The horses pulled our heavy farm equipment and loads of hay and corn. We used kerosene lamps for light, and we burned wood or coal in our stoves and furnaces. If we wanted to talk to a neighbor, we had to go to that neighbor's house. If we needed to get a message to someone who lived far away, we had to send a telegram or letter. It was all hard work then, and everything took a lot of time. But suddenly, it seemed our whole world was changing. Suddenly we were learning about the new world of cars and telephones and electricity. It was hard to keep up. Most of these changes had been started before the war, but the war really sped up their development. Before we talk about all these changes, though, maybe we should see what the war itself was really like.