A Brief History of Motion

What’s in it for me? Discover how much the car has impacted our daily lives and what’s in store for the future.

When it comes to cars, you may think that issues like the electric car and renewable fuel sources are relatively recent concerns. But the fact of the matter is that these debates have been going on since the first cars were rolling off the assembly line. Only now, these debates have reached a point where it seems like changes are finally being made. For most of us, cars have been around for so long that we tend to overlook the critical role they played in how our towns and cities were designed. In large and small ways, cars have a day-to-day impact on our lives. With climate change wreaking havoc and a pandemic disrupting our habits, it seems we’ve finally found the time to rethink our relationship with our cars and take back our streets once and for all. In these blinks, you’ll learn

how chariots were the first status symbol on wheels; why early electric cars were marketed toward women; and why the smartphone may hold the future of transportation.

The invention of the wheel led to both practical uses and luxurious status symbols for ancient kings.

Science has given us a lot of answers over the years, but history still retains a few secrets. For instance, who invented the wheel? For a while, it was assumed that the wheel came from Mesopotamia, often referred to as the “cradle of civilization,” and emerged sometime around 3500 BC. However, new carbon dating results suggest that the origins of the wheel may reside in the Carpathian mountains, in areas like western Ukraine. A clay model of a bull on four wheels, found in Ukraine, was dated to have been made between 3950 to 3650 BC. In nearby southern Poland, a drawing of a four-wheeled carrier was found etched onto a pot that dates back to 3630 - 3380 BC. The key message here is: The invention of the wheel led to both practical uses and luxurious status symbols for ancient kings. The Carpathian mountains were loaded with copper ore, which was one of the major ingredients that precipitated the Bronze Age. Mining copper ore was no easy task, of course, and it makes perfect sense that the world’s first small hand-pulled wheeled vehicles would be ones that were used to cart ore out of the copper mines. So it was from the Carpathians that the invention of the wheel spread outward, to areas such as Mesopotamia. At least that’s the theory that historian Richard Bulliet helped popularize in 2016. But, surprisingly enough, wheels didn’t catch on overnight. They weren’t exactly easy to make with the tools at the time. And since it would be a while before axles and other modifications would make turning possible, their use was limited. By 3000 BC, two-wheeled carts were being used, but it wasn’t until 2000 BC that chariots took wheels into new territory. The invention of spoked wheels was a big leap. It meant wheels could be bigger, lighter, and faster. This led to the creation of chariots, which were pioneered by the Hittites as a military tool. Not only were they used to move weapons and supplies, war chariots were also

painstakingly decked out with lavish decorations and used to elevate kings and heroic warriors into faster-than-life, god-like beings. Indeed, it was common for Egyptian and Hittite rulers to be buried with their chariots upon death. Already, wheels were becoming something of a status symbol in ancient times.

Roman roads and innovations gave way to coaches and, eventually, trains.

By the mid-fourth century BC, the chariot was obsolete as a military vehicle. But in the centuries to come it would continue to be a fixture of competitive games in Rome. Successful chariot racers were the superstar athletes of the day, as well as some of the richest men around. As for the evolution of the wheel, Roman wagons and two-wheeled carts were helping to carry goods throughout the expansive Roman region. This led to the creation of Roman roads and some of the first standardized rules of the road, as well as city planning that focused on creating a traffic system. In the city of Pompeii, a grid-like system of one-way streets was created that isn't too different from Manhattan. The key message here is: Roman roads and innovations gave way to coaches and, eventually, trains. Another important development that came during Roman times was steerable front wheels, which made the use of four-wheeled carts much more practical. This led to covered wagons, coaches, and long-distance stagecoaches. It may seem odd, but for a long time, carriages and other wheeled vehicles were seen as unmanly. In Rome, carriages were what senator's wives rode in. This attitude continued though, and wasn't limited to Rome. Well into the Middle Ages, the only way for a self-respecting nobleman to travel was by horseback – or on a camel, depending on where you lived. But by the sixteenth century, coaches were gaining in popularity. Coaches had steering and suspension, as did carriages from past centuries, but they were lighter and could travel faster. On top of that, large carriages were being used in Europe in military campaigns against the Ottoman Empire. Multiple wagons could be put together to form mobile forts, and they could be used to carry and fire cannons. So, wheeled transportation eventually gained a more masculine reputation. Plus, coaches were starting to be decked out in fancy gilded decorations fit for royalty. But perhaps more important was the development of stagecoaches. This was an organized and scheduled system of coaches that could take passengers on long journeys that were broken up into stages, hence the name. Stagecoaches gained popularity in the seventeenth century and in more ways than one they were the precursor to the next big development, the train.

People were eager for a cleaner and quieter horseless carriage.

Ah, city life. If you've ever been a resident of a major metropolis, you know that being part of a bustling hub full of culture and entertainment comes with a price. And if you were walking around New York or London in 1890, one of the biggest costs was horse manure. In London alone, there were 300,000 horses trotting along, and each one left behind around 22 pounds of manure, along with a quart of urine, every day. People complained of the noise, the terrible smell, the sheer difficulty in crossing the street. And on rainy days, those streets could become a literal cesspool of filth that would get splashed across sidewalks, doorways, and people alike. The consensus was clear: something had to change. The key message here is: People were eager for a cleaner and

quieter horseless carriage. You might think that trains would reduce the number of horses, but in fact it only made things worse. Trains only meant that more goods and people were being transported, which meant that more horses and carriages were needed to carry those items from the train depots to their final destinations. At New York City's Seventh Avenue Street Railway, 2,500 horses were housed on four separate floors! It was all too much. But the question remained, what would a horseless carriage look like, and how would it function? In 1894, a competition in France offered people an exciting look at some of the best ideas at that point. It was an 85-mile road race from Paris to Rouen, with 21 vehicles making the final cut. All of the cars had either steam engines or petrol engines, and almost all of them were steered with the use of tillers. Only one car had been modified by the owner to use a steering wheel. It was a well-attended event, with people cheering on the cars as they kicked up dust and rolled by at around 10 mph. Surprisingly, the steam engine car was first to arrive in Rouen, but it didn't win. The race was intended to decide more than which car was fastest. It was also meant to decide things like reliability and practicality. While the steam engine car was powerful and good at climbing hills, it required a team of operators to constantly keep the engine fueled. So a car with an engine designed by German engineer Gottlieb Daimler was awarded the highest prize. In the follow-up race next year, there would be no doubt as to the real winner. Sort of.

Attitudes toward cars went from hostile to accepting as prices came down.

One year after the Paris-Rouen race, the follow-up competition was more ambitious in every possible way. The race covered 730 miles, from Paris to Bordeaux. And this time a car, powered by a cutting-edge Daimler Phoenix engine, reached an average speed of 15 mph. It arrived in Bordeaux a full eleven hours before the second car, a Peugeot. Unfortunately, the Daimler had only two seats, rather than the required four, and was disqualified. But the writing was on the wall, petrol engines were the winner. Thanks in part to the excitement over these races – the press coverage was captivating readers on both sides of the Atlantic – interest in automobiles was gaining momentum. But the reception to actual cars on public roads would be mixed at best. The key message here is: Attitudes toward cars went from hostile to accepting as prices came down. While early cars weren't exactly fast by today's standards, they could kick up a lot of dust as they drove down country roads. Plus, rural families were losing a lot of chickens and other small farm animals to passing automobiles. Children were being killed too. So initial reactions were in fact hostile toward these new and dangerous vehicles. A popular book, The Wind in the Willows, featured a character named Mr. Toad. He was an automobile enthusiast who continually crashed his cars and generally terrorized his neighbors with his reckless driving. Many readers could relate. Another reason for the animosity towards automobiles was that early models were not cheap. They were seen as deadly toys that only rich people could afford. It wasn't until the famous Ford Model T that prices came down and attitudes began to change. Thanks to a revolutionary new assembly line approach to manufacturing, where the car moved down a line and workers specialized on one specific task, Ford was able to crank out a record number of cars that could be sold for the low price of $850. Before that, the average American car sold for $2,834, which would be about $80,000 today. Model Ts went on sale in 1908 and they were an instant hit. For the first time, a car was being sold to the average person. The ads didn't feature a car being parked in front of a fancy restaurant or driven by a chauffeur. It was a mass-produced car for the masses, and it wasn't bad

either. It had a good engine and could even outperform cars that cost a lot more. It changed everything.

Starting in the 1920s, cars became important status symbols.

Between 1900 and 1920, the number of cars on the road in the US had increased a thousand times over, from 8,000 cars on the road, to 8 million. In Europe, the numbers were equally staggering. But by this time, attitudes about cars were changing once again, and the Model T was already considered passé. General Motors, in particular, was revolutionizing the automotive game. GM had a collection of brand names under its umbrella, and each brand represented a step up the economic ladder. Plus, in 1919, GM introduced a payment plan option, which gave people the chance to become drivers even if they couldn't afford the full price. GM customers could also trade in their old car as a way to help take the next step up the ladder. The key message here is: Starting in the 1920s, cars became important status symbols. By clearly designating their brands – from Chevrolet to Pontiac, Oldsmobile, Buick, and Cadillac – as belonging to different price options, what you drove became a clear indicator of your economic status. This was a significant incentive for people to keep buying new cars, even if the car they had was perfectly fine. And GM was eager to keep this going by making it their policy to continuously introduce new models every year. All of this was completely anathema to Henry Ford. His whole business model was based on making one car and making it efficiently. He didn't even want to offer more than one color. Meanwhile, GM was hiring fashion experts to help design the colors for next year's models. People were now being given the opportunity to choose from all kinds of options so that their car could not only reflect their economic status, but also their personality. Eventually, Ford would have to admit that his strategies around the Model T were no longer viable. By 1928, after producing 15 million Model Ts, Ford moved on to the Model A. This time there would be different color options and installment plans offered. Nevertheless, by this time GM had taken over the top spot as America's favorite car manufacturer.

By the 1930s, the car industry was booming and decisions with lasting consequences were being made.

Millions more cars on the road meant more accidents. It took some time before things like standardized signage, traffic lights, and speed limits would be set. Many of these rules of the road would start in the US and make their way over to Europe. In fact, many can be traced back to Los Angeles. It may sound unlikely, but California weather was particularly friendly to drivers and the state has always had a high number of cars on the road. Still, leading up to the 1930s, there was some debate about whether the roads were for people, or for cars. Car lobbyists were blaming jaywalkers for accidents, while pedestrians were blaming cars. In 1934, the law was decided: pedestrians had to cross in designated areas. Crosswalks. Otherwise, cars had the right of way. The key message here is: By the 1930s, the car industry was booming and decisions with lasting consequences were being made. In 1933, Germany's new chancellor, Adolf Hitler, was so impressed with America's automotive industry that he wanted to replicate the

success at home – by giving the car priority in both economic policy and on the roads. He suggested getting rid of registration taxes, building a cross-country motorway, and starting a new inexpensive brand of car for the people: the Volkswagen. Soon, Germany had its own booming industry with 1.5 million jobs created, and a significant boost for getting out of the Great Depression. Meanwhile, in the 1939 World's Fair in New York City, industrial designer Norman Bel Geddes imagined what the world would look like in 20 years. The exhibit was called Futurama and it too envisioned a world based more around the car than on people. It featured massive superhighways gliding through the middle of ultramodern cityscapes. Perhaps it's not surprising that the exhibit's main sponsor was GM. Sure enough, the ideals of Futurama would begin to manifest themselves in the years to come. Interstate highways would cut through cities, and often the neighborhoods that would be hardest hit were the poorer sections of town. Black families in particular were forced from their homes in cities across America in order to make room for highway construction. Decisions favoring cars over people would continue to be made. But another decision that would have a lasting impact would be over fuel.

Marketing, politics, and science all factored into a reliance on gasoline.

Believe it or not, electric cars have been around for over 100 years. While they tend to have a limited range before the battery needs to be recharged or swapped out, electric cars have always been recognized as well-suited for short trips within a city. In the 1910s, the Electric Vehicle Company had a viable plan for establishing a fleet of electric cars, known as the Electrobat, that would operate like taxis around New York City. They even had an efficient battery-swapping operation to keep their cars moving. But a fraudulent loan scandal sank the company just as it was gaining traction. At the same time, companies like Babcock Electric, Detroit Electric, and Waverly Electric were all pitching electric cars toward women, since they didn't require cranking and seemed ideal for short shopping trips around the city. It's a marketing ploy that likely had a reductive effect in the long run. The key message here is: Marketing, politics, and science all factored into a reliance on gasoline. Even if electric cars hit some early roadblocks, that didn't mean we had to rely on non-renewable fuel. In fact, the idea of using the renewable fuel of ethanol was around since the beginning. Ethanol is essentially a type of alcohol that can be derived from vegetables and crop waste. The original Model T was actually a flex-fuel car, able to run on either gasoline or alcohol. And there were plenty of industry prognosticators back then who warned of the dangers in relying on a finite, unsustainable fuel. Most American gasoline came from Standard Oil, which was indeed a powerful force in politics even after it was deemed an illegal monopoly and broken up into separate businesses in 1911. But there was also a scientific reason why ethanol had trouble being adopted. Ethanol doesn't have quite the same efficiency as gasoline, so engines burn through it faster. Early estimates showed just how much farmland would be needed to supply America's cars with ethanol fuel and it led to legitimate worries about possible food shortages in the future. Plus, many farmers had a genuine concern about going against the powerful oil industry. Still, this is a debate that never really went away. For a while, it was quieted as oil in the Middle East was seen as a plentiful, if not entirely stable, new resource. But perhaps more importantly, burning fossil fuels has taken its toll on the environment and the world at large, and calls for an alternative have grown louder than ever.

There are some positive signs that people may be able to reclaim the streets.

There is an inescapable irony about the automobile. Cars were intended to alleviate the noise and pollution caused by horses. But in the long run they've made our streets noisier than ever, and the harmful compounds in vehicle exhaust can cause cancer and respiratory diseases. Then there's the fact that cars, trucks, and buses are responsible for one-fifth of the global CO2 emissions that contribute to climate change. There's also no denying that our reliance on gasoline has had a long-term effect in shaping our geopolitical structures, which also seem unsustainable at this time. In another twist, the COVID-19 pandemic has caused much of the world to reevaluate the way we do things, which includes questioning the value we've placed in car ownership. The key message here is: There are some positive signs that people may be able to reclaim the streets. Cars changed so many things, especially in the post-WWII years. It changed the way relationships were formed. Young people suddenly had a much larger dating pool thanks to cars. There were drive-in movie theaters and drive-through restaurants. Everything was focused on the car, including the way we designed our communities. The suburbs became a destination for middle- and upper-class families, and massive shopping malls with even bigger parking lots began to crop up in an effort to bring the urban shopping experience to those outside the city. In fact, many suburbs didn't even bother to put in sidewalks. Living in these communities without a car was hardly even an option. Even back in the 50s, some people recognized the danger in building communities around cars, rather than people. Before long, the sterile, cookie-cutter environment of the suburbs came to be seen as the breeding ground for existential nightmares. Now, thanks in part to a pandemic that has forced people to work from home and rely on e-commerce, a century's worth of community planning is being seriously questioned. It is highly unlikely that people will return to the workplace in pre-pandemic numbers. Already, people had looked at their commute as one of the worst parts of their day, and it's now apparent that we can be just as efficient, if not more so, working from home. Also, many towns and cities took the pandemic as an opportunity to rethink their roads by adding bike lanes and widening the sidewalks. Some cities are even establishing no-car zones, or enforcing extremely low speed limits to assert the idea that urban areas can once again prioritize people over cars.

While automated vehicles remain out of reach, bundled transportation apps are gaining popularity.

Another fanciful idea suggested in the Futurama exhibit back in 1939 was automated vehicles. In the future, cars would drive themselves. Norman Bel Geddes envisioned roads with sensors that would guide the cars along in peaceful harmony. These days, it's the cars that have the sensors, but the general idea is remarkably the same. A lot of time, effort, and money are being spent these days on trying to develop autonomous vehicle (AV) technology, but its future remains uncertain. Instead, there is a smartphone-based technology that appears the more likely option for future

transportation. The key message here is: While automated vehicles remain out of reach, bundled transportation apps are gaining popularity. Significant progress has been made in AV technology since contests were first held in the Mojave Desert back in 2004. Much like the Paris races at the end of the nineteenth century, the desert races quickly proved that what was once a pipe dream may be entirely possible. Yet, nearly 20 years later, the idea of putting AVs into general use remains out of reach. Strides have been made using machine learning, which is essentially showing the AV system countless examples and having it learn what different signs, obstacles, and road conditions mean and how to respond accordingly. The trouble is, machines continue to be stubbornly less effective than humans in being able to quickly recognize unpredictable changes to their surroundings. A human won't mistake a plastic bag floating in the wind as a flying child, which is what happened with one AV system. All of this continues to delay the use of AVs, and it's uncertain if there will ever be a real breakthrough. Meanwhile, the world continues to question the value of cars – no matter how they're being driven – and what has gained in popularity are Mobility-as-a-Service (MaaS) programs. First used in Helsinki around 2014, MaaS programs bundle together different modes of transportation in one convenient smartphone app. A user can put in their destination and the app will provide options that might include a bicycle, an electric scooter, public transportation, or a car-share option. All of these services can be strung together, paid for, and accessed with one app. Since then, MaaS programs have been launched in cities like Singapore, Antwerp, Berlin, and Birmingham. The lure of the automobile as a symbol of status and freedom has diminished. In the past decade, the smartphone has stepped into this role in many ways. While these devices, as well as MaaS programs, come with their own concerns around privacy and security, it's hard not to see the future of travel as being aligned with this kind of technology and flexibility.

Final summary

The key message in these blinks is that: Since ancient times, the wheel has functioned in more ways than one. Early carts were used for practical purposes while chariots were used to help turn kings into god-like heroes. The first automobiles were championed as a way to unburden our societies from the noise and pollution of horses. But as cars became widely affordable and even more desirable as status symbols, a booming business led to even more noise and pollution. Now, there's a reckoning underway about just how car-centric our society has become. Cities and towns around the world have been designed with cars rather than people in mind. With a pandemic and climate change crisis underway, serious reconsiderations are being made and new policies are beginning to put people first, once again. While alternative fuels and automated vehicles continue to be developed, there is also smartphone-based technology that is giving people options that may be more practical, flexible, and useful than car ownership.