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## The American Engine

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# The American Engine

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You have heard it in action movies when the hero is involved in a high-stakes car chase. You have heard its distinct shouting sound coming from a Ford Mustang or Chevy Corvette near where you live. Perhaps less noticeable, the same sound comes from the Nissan work truck that travels around your neighborhood to a construction site; from that rusty old beater and the brand new Cadillac SUV. They all serve a different purpose, all are produced by different companies and cost vastly different prices. What do all these automobiles have in common? Under the hood lies an American-born V8 engine.

The V-8 engine is America's motor. Its mass use compared to the rest of the world proves it. American manufacturers built some of the first and most influential V8 engines. Its unique characteristics made it superior to other engine options. American lifestyles and economic affluence fostered continual use of these engines from World War II to the present. The V8 has had an inestimable impact on the culture of the United States while remaining invisible, hidden beneath the hoods of millions of American cars and trucks.

The V8 is an internal combustion engine that powers many cars. Internal combustion means that the engine produces energy by exploding a mixture of air and gasoline that then moves pistons. The pistons' movement is then used to turn the wheels. The V in V8 describes the layout of the pistons inside of the engine. (Fig.1) The eight refers to the number of pistons in the engine. They are lined up in a V shape divided with four pistons on each side or "bank" of the engine. The V8 is not the only engine used in automobiles; four-cylinder and six-cylinder engines are also common.

In the present, V-8 engines are found in three kinds of automobiles: sports cars, luxury cars and trucks, with trucks being the most prevalent. Nearly all trucks that are sold in the United States could have the possibility of having this special motor under its hood. All manufacturers

from Audi to Toyota produce a V8 in some capacity. There is one major difference between the V8's in trucks and cars and that is price. Buying a truck is the cheapest way to experience this motor with most manufacturers putting out basic, work trucks for just over thirty thousand dollars. With the exception of Chrysler, no sedan under \$60,000 has a V8 engine. In the past, however, the V8 was widely available.

From the 1930's to the 1980's the V8 was the king of engines in the American automobile. During this period the V8 engine was the standard engine throughout the automobile industry in the United States. As today it was a premium but one that was much more affordable because so many cars had them. From the budget Fords to top of the line Cadillacs a V8 could be found under the hood along with other engine choices. This can be seen in some of the production numbers from manufacturers during the height of the V8's usage, the 1960's. In 1960, for example, Chevrolet produced 1.4 million full-size cars,<sup>1</sup> which was comparable with many of the other domestic producers like Ford, which produced 1.3 million cars.<sup>2</sup> A 1961 advertisement (Fig. 2) from Chevy which displays the lineup of full-size cars is evidence of how numerous the V8 was in these production numbers.<sup>3</sup> The advertisement displays eighteen different models, from wagons to coupes all were offered with the possibility of having a V8 under the hood. Even the cheaper models have the V8 option displayed in the illustrations. Domestic manufacturers relied almost exclusively on the V8. Few imports offered the V8 engine option.

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<sup>1</sup> "1958-1965 Chevrolet Full Size Production Numbers," 348-409.com, accessed November 21, 2017, <http://www.348-409.com/production/html>.

<sup>2</sup> "The Classic Ford Facts about Classic 1960 Ford Production Statistics," The Classic Ford, accessed November 21, 2017, [http://www.theclassicford.com/1960\\_ford\\_production.htm](http://www.theclassicford.com/1960_ford_production.htm).

<sup>3</sup> "Display Ad 17 -- No Title," *New York Times*, 1961.

The automobile had its start in Europe before the turn of the twentieth century. The first record of a V8 engine is a 1902 patent created by French engineer Léon Levavasseur.<sup>4</sup> His engine, along with many of the other early V8's, were used in boats and airplanes rather than cars. Eventually the design made its way over to the engine bay of automobiles but never truly came into widespread usage. This is not to say that the engine did not exist, as some companies like British Rover and Italian FIAT used them sparingly. Many European manufactures placed their focus on very small engines. Four, three and even one-cylinder cars could be found on the streets of England and France. Even in many luxury cars a six cylinder would be chosen over other options. Evidence for this is found in that Mercedes-Benz used nothing larger than six cylinders in all their models from 1926 well into the 1960's.<sup>5</sup> Due to the lack of development of the V8, it was an imported American engine powering the car models offering the V8 configuration. Rover, a British manufacturer bought the rights to reproduce a V8 engine, originally designed by Buick, in the 1960's.

The geography and lifestyle of Europe, where widely-used forms of public transit have existed for a longer time, prevented widespread adoption of V8 engines. Other places in the world, such as the former Soviet Union, rarely produced more than four-cylinder engines. Only in the late 1960's was a V8 engine produced, but it was completely reserved for upper ranks of the communist party and KGB agents.<sup>6</sup> One exception to the general lack of V8 powered cars across the industrialized world of the early to mid-twentieth century was Australia. In Australia V8 engines have been numerous and unlike in America continue to see popular and widespread

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<sup>4</sup> Jack Baruth, "The Sound of Violins," *Road & Track* 68, no. 3 (October 2016): 62–68.

<sup>5</sup> "Mercedes-Benz Timeline Catalogue," Automobile Catalog, <http://www.automobile-catalog.com/timeline-mercedes-benz.html>.

<sup>6</sup> "Soviet Cars | History of Russia," History/Russia, accessed December 7, 2017, <https://historyofrussia.org/soviet-cars/>.

use today. This is due to the massive presence that American manufacturers had in Australia and the growth of Australian companies that followed the American formula after World War II.

The V8 engine has received short shrift in the historiography of the American automobile and is absent from European historiography. Jay Hirsch, James Flink, and John Jerome, define the historiographical debate. In *Great American Dream Machines: Classic Cars of the 50's and 60's*, Jay Hirsch examines a collection of cars all considered American classic cars. These cars are all from what the author and many others called the golden age of American automobiles, 1950-1970. Each car is displayed with technical information, photographs and a small history and explanation of the car's significance. The V8 engine was found under the hood of these American classics. Each car is unique and enjoyed widespread popularity or brought some innovation that would revolutionize future models. This book brings the character of these cars to life. His introduction onto the subject helps to explain why these cars are so special and remain so to this day. Hirsch argues the golden era saw the car ownership skyrocket and having something aspirational was not unobtainable. Further, the memories and experiences people had with these cars is what makes them valuable and sought after today.<sup>7</sup>

*Death of the Automobile* by John Jerome is a very different commentary on the golden age of automobiles in America. Written not long after the "golden era," the central claim of the book is that the automobile cannot remain the primary mode of transportation. He too argues that the period of 1950-1970 was unique in automotive history but rather than producing dream machines that evoke nostalgia, the results were more sinister. Jerome questions the excess of automobile design during this period and how the future or sustainability were not considered. In his chapters focusing on this significant twenty-year period he argues that it was not truly the

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<sup>7</sup> Jay Hirsch, *Great American Dream Machines: Classic Cars of the 50s and 60s* (New York : Macmillan, 1985).

golden age for the cars and their drivers but rather the corporations that manufactured and sold the cars. I disagree with his claims that the V8 and other large engines were completely unnecessary and wasteful. He points out that the horsepower race of the big three (Ford, GM, Chrysler) in this period led to lack of innovation in other areas but I believe it is that race which made people so interested in the cars of this era and the engine. Jerome's view targets the strategy of these companies building cars for young people, "Supercars," as he calls them. He often brings up that purchasing a car in this period was an event; family friends and neighbors would all be taken for rides. Looks and comfort may have impressed buyers but experiencing the thrill of acceleration is what really shocked and awed. This could only be possible with the V8 that came from these American cars. The book provides a great counter to the automobile and highlights many of the statistics that make this period so different.<sup>8</sup>

Merging Hirsch's and Jerome's arguments is Roger Flink, whose deeply-researched and carefully detailed *The Automobile Age* focuses on the cultural impacts of the automobile on American culture. In his book, Flink argues the American century (1890-2000) is defined by a combination of what he calls "the highway renaissance" and "the automotive ideal." The synthesis of these ideas, when combined with post-war economic prosperity and the ubiquity of the automobile, especially those with V8 engines, orients the entire field of twentieth-century American history as an orbit around automobiles. Without Flink's work no examination of post-war American culture is complete.<sup>9</sup>

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<sup>8</sup> John Jerome, *The Death of the Automobile; the Fatal Effect of the Golden Era, 1955-1970* (New York: Norton, 1972).

<sup>9</sup> James Flink, *The Automobile Age* (Cambridge, MA: MIT Press, 1990), 9-13.

To determine why the V8 is America's engine it is important to examine the beginnings of the Engine in the United States at the beginning of the 20th century. The very first American manufacturer to utilize a V8 engine was Cadillac in their 1914 Type 51. Just as today the Cadillac of 1914 was a luxury car beyond the reach of the general public due to its high cost. In 1917 Chevrolet attempted to bring a more affordable V8 to the market with the Chevy Series D. At great risk, Chevrolet designers decided to use a more advanced valve train for the time and this would backfire on them. The standard four cylinder used in many other Chevy models had more power, were more reliable and economical than the complex V8. The Series D was only sold for one year.<sup>10</sup> This was the problem that faced manufactures who tried to produce V8's in the early 20th century. If they built V8 engines cheaply they were too inefficient and if they built them too well the cars were too expensive.

In the 1930's, Ford Motor Company produced a V8 that changed everything. The success of the Model T, Ford's first car, had made the company massively profitable in the nineteen years it was on the market. When it came time for a replacement the company poured everything they had into a new car from the ground up. They even initially attempted to create an entirely new engine to power it, the X8. It had too many issues during testing and Ford eventually ordered his engineers to create a V8 that would be cheap to manufacture but still be high quality. Henry Ford's personal engineer, Charles Schulz, was responsible for the majority of the engine and Amol Zoline designed the complicated ignition system.<sup>11</sup> The group that designed the engine were given simple tools and machinery to make sure what they produced would be easy to

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<sup>10</sup> "Chevrolet 1918," GM Heritage Center, May 1, 2012, <https://web.archive.org/web/20120501213736/http://gmheritagecenter.com/gm-heritage-archive/docs/Chevrolet/1918-Chevrolet.pdf>.

<sup>11</sup> "1932 - The Invention of the Ford V8 Engine - A Documentary about the Design and Development of Their V8 and the Model A • r/Cars." Reddit, accessed November 6, 2017, [https://www.reddit.com/r/cars/comments/5ewf45/1932\\_the\\_invention\\_of\\_the\\_ford\\_v8\\_engine\\_a/](https://www.reddit.com/r/cars/comments/5ewf45/1932_the_invention_of_the_ford_v8_engine_a/).



reproduce and maintain. This is what made the Ford V8 different than those that came before it. The new Ford V8 was designed with the intention of being mass-produced for a car that would sell in the millions. To accomplish this the engine block was cast out of iron in a single piece. As much of the engine as possible was included in the block, unlike other engines where the block served as the base and other parts are attached to it. Cutting costs this way made it affordable to own, simple to maintain, and more reliable. Ford had gambled wildly on this engine as its long and costly development strained company finances. In 1932 the Ford Model B was released with both a four cylinder and V8 option. The V8 engine really made a difference to buyers and was so popular that Ford ceased to provide the four-cylinder engine in 1934 due to low sales. The V8 was an additional \$50 which in 2018 would be equal to \$881. Demand was so high for the new Ford V8, people were willing to spend the equivalent of nearly \$900 to get it, even at the height of the Great Depression.<sup>12</sup> The average net income for 1930's was only 1,386 dollars. Spending that much on the V8 showed its value to the consumer. Fifty dollars would go a long way in the era of the Depression when for some families had much greater priorities than an option on a car.<sup>13</sup> Ford's design was unrivaled by its competitors, all of whom did failed to grasp the importance of this engine until years later. Competitors focused on four and six cylinders well into the 1950's. Chevrolet didn't produce a V8 until 1955 and most other domestic competitors implemented them around 1950.

What, then, caused such a demand for the V8 that led to consumers, to pay an additional \$50 for a car during the Great Depression? The V8 engine had some properties that made it superior to the other options available to the average consumer during the middle of the

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<sup>12</sup> Ford Motor Company, ed., *Details and Specifications of the Ford V-8 Car for 1934* (Dearborn, Mich, 1934).

<sup>13</sup> "Brother, Can You Spare a Dime?: The 1940 Census Employment and Income," National Archives, August 15, 2016, <https://www.archives.gov/publications/prologue/2012/spring/1940.html>.

twentieth century: balance, torque and size. It is vital for an automobile engine to be balanced to ensure it is dependable in the long term and performs well. With the pistons of an engine moving anywhere from one to six thousand revolutions per minute a small imbalance can be catastrophic to operations. There are two engine designs that are naturally balanced: the inline three- and six-cylinder. The V8 is not perfectly balanced but counterweights made for a smooth-driving and dependable car. This balance is much more difficult to achieve in the inline 4 and V6 engines even with counterweights. The inline six was the V8's biggest competitor due to its natural balance but the size of the engine often played a large part in automobile design. Because all six pistons perfectly lined up back to front, the engines were long. The V8 was much more compact. Having to stretch cars to fit an inline six can made them heavier and more complex, becoming an Achilles heel in manufacturing and sales.

This leads to the final argument for why the V8 was superior to other engines, power. Due to a lack of the technology and precision we have today the only way to make an engine more powerful for most of the 20th century was to make it bigger. The bigger an inline six gets the less reliable it gets. The V8 avoided these problems by being compact. Some of these advantages are displayed in a technical document from the 1934 Ford V8. The 1934 Ford V8 was capable of a power output of ninety horsepower and one hundred forty seven foot pounds of torque, compared to the four-cylinder in the 1932 Ford, which achieved only forty horsepower.<sup>14</sup> The V8 had a great effect on top speed as the four-cylinder could go no faster than sixty five miles per hour (mph) while the V8 could attain speeds exceeding 85 mph.”<sup>15</sup> As other companies began producing these engines and funding continual technical improvement and innovation they

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<sup>14</sup> For comparison: A modern Toyota Corolla's four-cylinder engine produces 132 horsepower and 128 foot pounds of torque. "Toyota Corolla," Car and Driver, <https://www.caranddriver.com/toyota/corolla/specs>.

<sup>15</sup> "1932 Ford V8 30 Specifications & Stats 65274," Carfolio.com, accessed October 10, 2018, <https://www.carfolio.com/specifications/models/car/?car=65274>.

grew more powerful. Once American consumers got the V8 they didn't want much else because it was suited very well to the needs of the average American.

The automobile became most widespread in Europe and the United States after World War II, with many families owning a car or in the U.S. case, some even owning two. One of the largest contrasts between these two places of automobile prominence was the size. Europe spans about 4 million square miles and the United States covers nearly the same at 3.8 million square miles. Although not far off from each other in total area, this does not take into account that those 4 million miles are divided up between fifty countries. All 3.8 million square miles are just the United States and so long-distance travel was often more common in the day-to-day lives of an American rather than a European. Traveling long distances in a four cylinder during the middle of the twentieth century could put too much strain on the engine and speeds were limited. Having a smooth running V8 for long trips where the car could cruise at higher speeds with ease was important to Americans.

The V8 was also well suited for the American lifestyle as the growth of suburbs spread rapidly in the twentieth century. With many Americans needing to commute often long distances as suburbs grew farther and farther from the city a car that could handle the long travel times was needed. This was fueled by the lack of public transportation, another difference between Europe and the U.S. Family was an important factor too as the birth rates increased greatly in the post war.<sup>16</sup> As the cars grew in size to fit larger families and more things, more powerful engines were needed to assure that the cars remained drivable.

Finally, the most important part of the V8's place in America is its contribution to our culture. The V8 has affected our sports, media and society. Motorsports have forever been

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<sup>16</sup> "American Generation Fast Facts," CNN, September 4, 2018, <https://www.cnn.com/2013/11/06/us/baby-boomer-generation-fast-facts/index.html>.

changed by the introduction of the V8. During the Prohibition era criminals used Ford V8s and other powerful cars to run moonshine and escape from the authorities. Along with the liquor runners many bank robbers and organized crime made use of the V8. Over time these criminals began to race each other when the police were not chasing them. These races became more organized over time and eventually led to the sport of NASCAR. The V8 was also a major part of hot-rodding in the postwar era, as owners began to tinker with their cars to make them faster, louder and cooler they too began to race. Many of these races were held originally on the salt flats in the deserts near southern California but eventually they would move into more organized events.<sup>17</sup> Enthusiasm led to the creation of the NHRA or the National Hot Rod Association, which today runs professional drag racing with some of the fastest cars in the world, many of which have V8s. This tradition of hot-rodding continues to this day as a large number of people continue to modify and maintain the legendary cars that have the V8 engine. People all across the country young and old still meet up decades later to continue to this postwar tradition of racing and car culture.<sup>18</sup>

Muscle cars and Pony cars would not exist without the V8. These classes of car are completely American with the first and longest running example, the Ford Mustang. The Mustang has been built continually from 1964. It is known around the world as a truly American car. The Chevrolet Corvette also has a long history in the US and around the world as America's sports car. While Europe had Ferrari and Alfa Romeo America had the Corvette and it continues to compete with the finest sports cars from around the world.

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<sup>17</sup> David N. Lucsko, *The Business of Speed: The Hot Rod Industry in America, 1915-1990* (Baltimore: Johns Hopkins University Press, 2008).

<sup>18</sup> Marc Fisher, "America's Once Magical – Now Mundane – Love Affair with Cars," *The Washington Post*, September 2, 2015, <http://www.washingtonpost.com/sf/style/2015/09/02/americas-fading-car-culture/>.

V8 cars have been used in countless movies and television shows were often they were just as famous as the actors. Movies like *Bullitt*, *Smokey and the Bandit*, and *The Fast and the Furious* all feature V8 power. They have been a part of TV shows, KIT from *Night Rider* and the General Lee in *Dukes of Hazard* were just as much characters as the actors who drove them. The V8 even found its way into music during the twentieth century, including The Beach Boys' "Little Deuce Coupe," Elvis Presley's "Pink Cadillac" and Commander Cody's "Hot-Rod Lincoln." Maybe the most influential affect it had on music was the song "Rocket 88" from 1951. The song, performed by Bill Haley and the Comets, reached the top of the Billboard charts and many attribute its success to helping to fuel the wave of Rock and Roll that followed soon after.<sup>19</sup>

What is the future of the V8? Automotive technology will continue to advance as the demand for making faster, cleaner and more efficient cars grows. It has been a massive part of the automobile industry: General Motors alone built their one hundred millionth small block V8 engine in 2011. According to their site that commemorates the milestone, "One-hundred million engines since 1955 is the equivalent of more than 1.78 million produced every year – or about 3.4 small-blocks produced every minute for the last 56 years."<sup>20</sup> That is a significant number of engines and is just the production record of one of the many companies that have participated in the manufacturing of V8 automobiles. The same year General Motors produced its one hundred millionth small block engine they sold around nine million cars.<sup>21</sup> Putting that against the

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<sup>19</sup> Jim O' Neal, "Rocket '88"—Jackie Brenston & His Delta Cats," (Chess, 1951)," The Blues Foundation, November 10, 2016, [https://blues.org/blues\\_hof\\_inductee/rocket-88-jackie-brenston-and-his-delta-cats-chess-1951/](https://blues.org/blues_hof_inductee/rocket-88-jackie-brenston-and-his-delta-cats-chess-1951/); "Rocket 88," Wikipedia, September 9, 2018, [https://en.wikipedia.org/wiki/Rocket\\_88](https://en.wikipedia.org/wiki/Rocket_88).

<sup>20</sup> "Small Block Fast Facts," *General Motors*, November 29, 2011, [http://media.gm.com/autoshow/small\\_block/2011/public/us/en/powertrain/news.detail.html/content/Pages/news/us/en/2011/Nov/100M/1129\\_100M\\_Facts.html](http://media.gm.com/autoshow/small_block/2011/public/us/en/powertrain/news.detail.html/content/Pages/news/us/en/2011/Nov/100M/1129_100M_Facts.html).

<sup>21</sup> "Number of General Motors Vehicles Sold Worldwide between 2010-2017," Statista, <https://www.statista.com/statistics/225326/amount-of-cars-sold-by-general-motors-worldwide/>.

statistic of 1.78 million engines per year means that nearly twenty percent of all General Motors cars sold had a V8 in them. This also does not include the production of big block V8's by General Motors. The use of the larger engines has slowly tapered off over time, but they are still produced today.

In the last ten years electric car technology alone has made massive strides against the V8. Companies like Tesla who build luxury electric cars that have all the power of a V8 but with far less impact on the environment threaten its place in the luxury automobile market. Many of the other manufactures are following like Chevy and Nissan, who both offer completely electric cars. Things are changing for trucks as well. Turbocharging advancements are making the V8 obsolete in working vehicles as all the torque required to haul can be achieved with smaller four and six cylinders that also get much greater fuel economy saving both the environment and money. A turbocharger is a turbine that can be run off the exhaust gasses of an engine, these turbines compress air which then is put into the engine to make more power. Where the V8 will remain viable is with the sports and muscle car enterprise. The sound they make can never be replaced and along with its usage in motorsports like NASCAR it has cemented a place in automobiles for the foreseeable future.

The V8 is America's engine. Only here in the United States will you find its usage so widespread. From its beginnings as a luxury item to Fords push into the affordable market and ever since the V8 has been the engine Americans wanted. America perfected its usage in normal cars leading to demand worldwide. It was uniquely suited to the American lifestyle and has become an influential part of our culture in the past one hundred years of its existence. From museums to your neighbor's Mustang, the V8 will always be in America.

Figure 1:



Figure 2:









# Chevrolets lower priced than any other full-sized car!

Leave it to these Jet-smooth Chevis to go easy on your family budget! All told there are 18 Chevrolets—V8's and 6's—priced lower than comparable competitive models\*. Sumptuous Impalas, sprightly Bel Airs, bottom-priced Biscaynes and a

whole stable of wonderful new wagons. And every one of them has a road-gentling Jet-smooth ride, Body by Fisher refinements and dozens of engineering details you'd expect only in the most expensive makes. Look them over at your Chevrolet dealer's one-stop shopping center and see how easy it is to drive out in just the one you want!



\*Based on comparison of manufacturer's suggested retail prices (including Federal tax) for models with 118 inch wheelbase or above.

IMPALAS	BEL AIRS	
 <p>Impala V8 Convertible</p>	 <p>Bel Air V8 2-Door Sedan</p>	 <p>Bel Air V8 4-Door Sedan</p>
 <p>Impala V8 Sport Sedan</p>	<b>WAGONS</b>	
 <p>Impala V8 Sport Coupe</p>	 <p>Normal Six 4-Door 9-Passenger Station Wagon</p>	 <p>Normal V8 4-Door 9-Passenger Station Wagon</p>
 <p>Impala V8 2-Door Sedan</p>	 <p>Normal V8 4-Door 6-Passenger Station Wagon</p>	 <p>Normal Six 4-Door 6-Passenger Station Wagon</p>
 <p><b>BISCAYNES</b></p>	 <p>Parkwood Six 4-Door 6-Passenger Station Wagon</p>	 <p>Parkwood V8 4-Door 9-Passenger Station Wagon</p>