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The Automobile and American Life

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BEGINNINGS: FROM A MECHANICAL CURIOSITY TO A PLAYTHING FOR THE WELL-TO-DO

Musicians, like poets, are often keen to comment on subtle changes that take place in everyday life. Frank Banta's ragtime instrumental "Kareless Koon, an Ethiopian Two Step" was released in 1899. Unwittingly, perhaps, it was one of the first cultural representations of the automobile in America.¹ The song's sheet music cover depicts a wealthy and well-attired Black couple riding in a new electric vehicle driven by a White chauffeur. Its occupants are shown throwing coins to a group largely comprised of White folks, in what was a total social reversal uncharacteristic of the age of Jim Crow.

It is doubtful, however, that the artist of this cover could have foreseen just how revolutionary the automobile would become, not only in terms of everyday life, but also in facilitating social change. The automobile would become a tremendous source of new wealth, and in the process elevate African Americans and Whites, but usually not to the extent projected on the cover. And while the automobile did not have its origins in America, it would transform her people and her land as no other technology during the twentieth century.

European by Birth, American by Adoption

An apt but worn-out cliché concerning the early history of the automobile is that "the automobile was European by birth, American by adoption." Indeed, the visionary idea of the automobile — in the words of James Flink, "the combination of a light, sprung, wheeled vehicle; a compact, efficient power unit; and hard surfaced roads" — gradually became a reality during the last half of the nineteenth century, primarily in Europe and to a lesser degree in America.² The idea was transformed into a complex artifact, one that quickly hardened in fundamental design. For example, the basic configuration of the modern automobile with the radiator and engine in the front, followed by the clutch, transmission and rear axle drive, the *système Panhard*, was devised in France in 1891.³ A decade later, the 1903 De Dion-Bouton followed this scheme with a honeycomb radiator, sliding design four-speed transmission, and a steel frame, clearly distinct from the horseless carriage. Most importantly, the De Dion used an ingenious rear axle that replaced the cumbersome chain drive with half shafts transmitting power to the drive wheels. And finally, the 1903 "Sixty" Mercedes, despite its chain drive, had a magneto ignition, six-cylinder engine, and a top speed of 60 miles per hour.⁴ In fundamental terms, the modern automobile crystallized technologically very quickly, and thus its origins are a most important object for study.

After the idea and pioneering artifact came the commonly-used term *automobile*. Tracing its introduction (a semantic history) tells us much about the early history of the *automobile* in America. As Patricia Lipski skillfully pointed out, the word was French, but key to its adoption in America was its acceptance by New York City's high society.⁵ The term "automobile" was first used in America in 1895 and fully adopted in the U.S. by 1899, but other words were proposed and debated during this time — horseless carriage, motorcycle, motor vehicle, automation, mogle, autom, polycycle. Members of high society in New York City, including William Rockefeller, George Gould, Edwin Gould, John Jacob Astor, Jacob Ruppert, C. P. Huntington, and Claus Spreckels, owned the first cars. This Gilded Age aristocracy paraded their vehicles at Newport, Rhode Island, in the summer of 1899, and influenced the editorial writers of the new magazines *The Automobile* and *The Automobile Magazine* to endorse *automobile* as a universally accepted term. In sum, while the beginnings of the automobile are often attributed to a group of visionary tinkerers, engineers, inventors, and mechanical geniuses, the upper classes were the consumers of this product, and they cast a lasting imprint on its place in culture in ways perhaps more complex than just the choice of a term.

The key innovations associated with this new transportation technology, its gradual diffusion and acceptance, first public impressions, and initial cultural responses are the most significant areas of research. These topics have received considerable scholarly attention, and indeed the present study must begin here, at the critical moment of creation.⁶

While the origins of a new technological system are undoubtedly important, historians often work backwards in time to fully trace strands of seminal ideas and techniques. That tendency can often prevent scholars from addressing more recent pressing and relevant matters. With the passage of time, perspectives become clearer, records are discovered and catalogued, and historical actors with a penchant to refute one's story die. Yet the recent past often has the most relevance for the living, despite the many methodological and practical obstacles in pursuing it.

Whatever the time frame under investigation, the tension between continuity and change challenges the historian in a unique manner. What distinguishes the historian from the sociologist or philosopher, however, is the scrupulous adherence to chronology and time.

Technological antecedents to the automobile included the work of Nicholas Joseph Cugnot between 1765 and 1770 on a three-wheel steam tractor for pulling cannons; Richard Trevithick and his experiments with a steam locomotive conducted during the years 1801 and 1803; and Philadelphia inventor Oliver Evans and his "Orukter Amphibolos" or "Amphibious Digger." All of these early efforts have been described in detail elsewhere, but are mentioned here to provide a sense of the long sweep of history concerning this form of transportation technology.⁷

Steam carriages appeared on the scene primarily in England beginning in the 1820s, although in 1865 horse-drawn transportation interests suppressed mechanical road vehicles with the passage in Parliament of the so-called Red Flag Act. This legislation limited the speed of "road locomotives" to 2 mph in towns and 4 mph on the open highway. It also required that an attendant walk 60 yards ahead carrying a red flag by day and a red lantern by night. Until its repeal in 1896 at the request of wealthy automobile pioneers, the act militated against the development of the automobile idea in Great Britain, for by 1890 there were light steam vehicles capable of speeds of 15 mph over long distances. David Beasley's *The Suppression of the Automobile: Skullduggery at the Crossroads* discusses this chapter in history, important in terms of British developments, but tangential to mainstream developments in the

emergence of the internal combustion engine (ICE) that would prove key to the automobile's acceptance in Europe and America.⁸

Technological Antecedents: The Bicycle

Concurrent to ICE technological advances were developments related to the bicycle that took place in America between 1880 and 1900. The bicycle created a widespread demand for flexible, personal transportation, and it brought freedom to both women and young people. While the nineteenth century railroads exposed Americans to rapid (for the day) land transport, the very fact that tracks limited transverse spatial mobility opened the door to possibilities for more adaptable movement on roadways. Bicycles, despite their shortcomings associated with muscle power, difficult terrain, and weather, put urban dwellers in motion. In particular, their introduction and diffusion raised important questions concerning the quality of roads, manufacturing techniques, social changes, and legislation. Without exaggeration, the bicycle set the stage for the automobile that followed.

The bicycle story began in Europe around 1819 with the introduction of a hobbyhorse design. Its historical evolution is traced in David Herlihy's beautifully illustrated monograph.⁹ The first mechanical bicycle is credited to the Scotsman Kirkpatrick Macmillan, who in 1839 constructed a home-built, treadle-driven device so that he could more easily visit his sister who lived some 40 miles away. This invention was for the most part ignored until the 1860s, when in France so-called pedal velocipedes were manufactured by carriage maker Pierre Michaux and his son Ernest. These designs were a cross between the modern bicycle and the wooden hobbyhorse. The velocipede's wheels consisted of wooden spokes and rims held together by a steel band. The front wheel was larger than the rear, and pedals were attached directly to the axle. With ivory handlebar grips, and a seat resembling an animal's spine, this awkward-looking device weighed sixty pounds. It quickly earned itself an appropriate nickname—"the bone-shaker"—as it traversed the rough roads of that era. In 1869 the velocipede made its way to American shores, where a number of American firms improved its design. An American version incorporated hollow instead of solid steel tubes, and a self-acting brake. To stop, the rider pushed against the handlebars, thus compressing the seat spring and causing a brake shoe to engage against the rear wheel. It was seat-of-the-pants driving at its best, more a curiosity and sport than everyday technology.

A brief velocipede craze followed in the late 1860s. At the same time, several social clubs were organized. It was difficult to ride the velocipede on the bumpy roads of the day, and one had to walk it uphill. But after 1871 interest in this less-than-practical device waned, in part because so many of the machines built were poorly designed. A radically new design was needed, and that would come as a result of the efforts of Englishman James Starley, whom, to this day, the British honor as the father of the bicycle industry.

In 1870 Starley introduced his Ariel bicycle. Like its predecessors, the Ariel featured front drive pedals. However, for greater efficiency Starley made the front wheel as large as it could be, limited only by the length of the rider's legs, and thus increased the wheel circumference and relative efficiency. Correspondingly, the rear wheel was reduced in size, making it just large enough to maintain balance. Thus, the era of the bone-shaker had ended and that of the "high wheeler" or "ordinary" began.

English production techniques soon incorporated steel tubes, ball bearings, and solid

rubber tires. One riding a high-wheeler could reach 20 mph, but it was dangerous and there was always the possibility of the rider "taking a header," and flying over the handlebars. It was awkward and precarious, but in Britain a wide following soon emerged as clubs of cyclists were formed.

The American ordinary craze was fueled by the efforts of manufacturer Colonel Albert A. Pope, a Civil War veteran from Boston who traveled to England, began importing British models, took the lead in establishing the American League of Wheel Men in 1880 and built his own models under the Columbia trademark. By 1884, Pope's firm made some 5,000 "Columbia" units, and the technological gap between the U.S. and the British narrowed.¹⁰ The inherent problem with the ordinary, however, was that its size was connected with the stature of its rider, and thus standardization was impossible. Therefore, economies of scale in manufacturing could not be truly achieved.

The greatest advantage of British bicycle manufacturers during the 1880s lay in superior metallurgical techniques. Birmingham's W.C. Stiff (an appropriate name given the technology he developed!) perfected a method of weldless tube manufacture that permitted the brazing of light tubing to solid forging. By limiting the use of heavy gauge metal to stress points, a considerably lighter bicycle could be made without any loss of strength. Throughout the 1880s, American manufacturers were forced to use English tubes if they aspired to build first-class products. The British also modified the ordinary's design by introducing gearing in the front of the vehicle, thus allowing the rider to pedal easier. These geared bicycles were called Dwarfs or Kangaroos, but most bicyclists saw them as no safer than the conventional design. If safety was an issue, and it certainly was for many women, they moved to a tricycle. American designers also attempted to reverse the large and small wheels of the ordinary, putting the large wheel in the back and gearing it, thus reducing the possibility of a rider going over the handlebars due to a sudden stop or maneuver.

Americans made valuable technical contributions to bicycle design, particularly during the 1880s and 1890s. Just as the Americans seemed to be taking a lead in bicycle technology, in the mid-1880s John Kemp Starley, nephew of the creator of the Ariel, came up with the concept of the safety bicycle. This design featured a triangular frame, two wheels of about 2 feet in diameter, and a rear wheel driven by a sprocket connected to a chain. While the idea was not totally new, it was the industrial commitment to this design that was so important. Indeed, what emerged was the notion that safety was important, so much so that high wheelers became market curiosities by 1890.

The social impact of the safety bicycle was enormous, particularly after 1888 when the design was coupled with John Boyd Dunlop's pneumatic tires. The cycling population expanded greatly, and women, who had shunned the earlier models, embraced the dropped frame safety bicycle design. The dropped frame was introduced in 1888, and shortly thereafter women bicyclists' skirts were shortened and their ankles exposed. Women began wearing bloomers, leading Elizabeth Cady Stanton to remark, "Many a woman is riding to the suffrage on a bicycle."¹¹ Further, young men and women could now go for rides without third party supervision. Patriarchal and matriarchal controls were increasingly being challenged by a machine, and as machines would become more complex with the coming of the automobile, so would the resulting social changes.

Sales leaped forward in the 1890s, and an acetylene flame lamp was introduced in 1895 so that cyclists could travel safely at twilight and in the dark. For several years during the trend-driven Gay 90s, bicycling became a full-fledged boom. Bicycle racing became a popular sport, and many colleges established bicycling teams. Further, the bicycle inspired sheet

music, trading cards, and board games. Undoubtedly the most famous of all songs inspired by the bicycle was Harry Dacre's "Daisy Bell," composed in 1892 with its chorus:

Daisy Daisy,
Give me your answer do!
I'm half crazy,
All for the love of you!
It won't be a stylish marriage,
I can't afford a carriage,
But you'll look sweet upon the seat
Of a bicycle built for two!¹²

By 1900, some 300 firms made more than a million bicycles in the United States, making it a world leader. Innovations that followed included the coaster brake, a springed fork in the front, and cushioned tires. The cost of the bicycle halved from \$100 to \$50 during the 1890s, and thus American industry liberated the bicycle from its status as a plaything for wealthy sportsmen to a far more popular tool for travel. In doing so, the bicycle in a sense paved the way for the automobile, including the innovations of Henry Ford that would follow in the first decade of the twentieth century.

Apart from raising consciousness concerning flexible travel and its impact on road improvements in the United States, no preceding technological innovation — not even the internal combustion engine — was as important to the development of the automobile as the bicycle. The bicycle was the object of scorn by horsemen and teamsters long before the appearance of the horseless carriage. Further, bicyclists gained the legislative right to use public roads in Massachusetts as early as 1879. Key elements of automotive technology that were first employed in the bicycle industry and then subsequently made their way into early automobiles included steel-tube framing, ball bearings, chain drive, and differential gearing. The bicycle industry also developed the techniques of quantity production using specialized machine tools, sheet metal, stamping, and electric resistance welding that would become essential elements in the volume production of motor vehicles.

An innovation of particular note is the pneumatic bicycle tire, invented by Dr. John B. Dunlop in Ireland in 1888.¹³ Dunlop was far from working in a vacuum, however, as numerous inventors patented similar designs during the late 1880s and early 1890s. Also, the rubber tire had a long history that Dunlop undoubtedly built upon. Solid rubber tires were first introduced around 1835, and in 1845 Robert William Thompson, a civil engineer from Middlesex, England, patented a pneumatic tire similar to Dunlop's design. An important issue was how to keep the tire on the rim, and it was not until the early part of the twentieth century that a system employing a wire-reinforced bead was widely adopted. Bicycle tires were the basis of automobile tires in France by 1895 and in the United States in 1896 when the B. F. Goodrich Company scaled up a single-tube bicycle tire for one of Alexander Winton's early vehicles.

The greatest contribution of the bicycle, however, was that it provided its owner with the ability to go when and where he wanted to. Sunday trips to out-of-the-way scenic places were now within the reach of the common man and his family. As one commentator of the period poignantly remarked, "Walking is on its last legs."¹⁴ Thus, the bike was the first freedom machine, as it remains to this day for younger children who want to travel beyond the watchful eye of an observing and controlling parent. It demanded, however, muscle power and a willingness to be exposed to the weather. To this day in many European cities the bicycle is an environmentally friendly alternative to the automobile.¹⁵

Compact Power: The Internal Combustion Engine

Along with the development of the bicycle, the internal combustion engine (ICE) was most critical to developments in early automobile history. Credit for the ICE is normally given to Belgian inventor Étienne Lenoir (1822–1900). Living in France, Lenoir patented a two-stroke engine in 1860 that used illuminating gas (gas derived from heating coal in large retorts) that was ignited by a spark generated by a battery and coil. Lenoir's engine was noisy and inefficient, and it tended to overheat. Used in stationary applications to power pumps and machines, some 250 were sold by 1865. And while the editor of *Scientific American* proclaimed in 1860 that with the coming of the Lenoir engine the Age of Steam was coming to an end, it took more than four decades before the ICE would eclipse the steam engine.¹⁶

In 1876, Nicholas Otto (1832–1891) developed a four-cycle engine (intake, compression, power, and exhaust), and Lenoir came up with a similar design during 1883 and 1884. Two engineers who had once worked for Otto, Gottlieb Daimler (1834–1900) and Wilhelm Maybach (1846–1929), designed a 1.5 horsepower, 110 pound, 600 rpm "high speed engine" in 1885, and built several experimental vehicles between 1885 and 1889. Maybach, one of the most important engineer-inventors of this early period, designed the modern carburetor for mixing air and gasoline in 1893.¹⁷



De Dion motor carriage #2, 1901. The French and the Germans were the true pioneers of the automobile in terms of technology and manufacturing (Library of Congress).

In the meantime, Karl Benz (1844–1929) built a tricycle in 1885 to 1886 and exhibited a design at the 1889 Paris Exhibition. By 1893 he had constructed an improved four-wheel car with a three-horsepower engine that sold well and was fairly reliable. More than 100 Benz vehicles were sold by 1898. An early leader, Benz was soon passed technologically, especially by French manufacturers.

James Laux, in his book *First Gear*, discusses in detail the French automobile industry before 1914.¹⁸ The key French inventor-engineer of the late nineteenth century was Émile Constant Levassor, who took Gottlieb Daimler's engine and placed it in the front of the vehicle. Before Levassor's untimely death, he proved the merits of his design — that a vehicle of his design could be practical — in the 1895 Paris-Bordeaux-Paris race. At first, and for only a relatively short time, Paris was the center of the nascent global automobile industry. Perhaps this was due to excellent French roads or social, economic, or political factors that remain to be explicated and are currently discounted. James Flink has argued that the importance of Paris was accidental rather than a crystallization of a complex network of relationships that included German, French, and Belgian inventors and businessmen.¹⁹

The importance of the early French auto industry is reflected in the following table.²⁰

TABLE 1: GROWING POPULARITY OF THE
AUTOMOBILE IN FRANCE, 1899–1908

<i>Year</i>	<i>Vehicles in Use</i>		<i>Year</i>	<i>Vehicles in Use</i>
1899	1,672		1905	21,543
1900	2,897		1906	26,262
1901	5,386		1907	31,286
1902	9,207		1908	37,586
1903	12,984		1909	46,000
1904	17,107			

While a number of entrepreneurs in England, America, and Germany were only beginning to catch up to the French by the end of the nineteenth century, there was a concurrent Darwinian-like competition among three rival technologies in terms of power — the ICE already mentioned, steam, and electricity. In the end the most economically efficient technology would prevail, but that was by no means clear to those living in 1900.

Choices Made: Competition from Steam Engines and Electric Motors

The early designs of the internal combustion engine were primitive to say the least, and thus these power plants were anything but reliable and smooth running. At the turn of the century steam cars dominated the automotive field. An alternative was the electric car, but they were expensive and limited in range and speed. As it turned out, there was a short window of time in which these three technological rivals were engaged in a contest that revolved around which would be the chief power source for this new form of flexible and personal transportation, the automobile. The end result would have enormous consequences for the remainder of the twentieth century, economically and environmentally. As Tom McCarthy has pointed out, during the first decade of the twentieth century, a number of experts warned of the environmental consequences of ICE-powered vehicles, including the issues of oil deple-

tion and toxic exhausts. However, McCarthy contends that the widespread adoption of the automobile by a consuming public allayed concerns at a time when adjustments could have been far more easily made than those that we, in the early twenty-first century, are now making.²¹

Steam had a long history going back to the eighteenth century as the chief power source for factories, railroad locomotives, and electrical generation. For automobiles, steam engines were quieter than internal combustion. With fewer moving parts, steam engines had been manufactured for generations, and with less exacting tolerances. In addition, a steam engine had remarkable torque, especially from a dead stop. Steam pressure could be built up and stored, to be released at full force on demand. An internal combustion engine must turn within a narrow range of revolutions per minute to operate efficiently. Additionally, as anyone who has looked at a schematic of a transmission or differential knows, gears and small parts result in a power transmission system that can only be deemed ingenious to the mechanically uninitiated. Moreover, in the cylinder of a gas engine, the greatest force is exerted at the explosive instant of ignition, with the power dissipating as the piston completes its stroke. But in the cylinder of a steam engine, the steam enters, expands and continues to push for as much as 90 percent of the stroke.

Steam engines had both limitations and advantages.²² With its extensive piping and metalwork, a steam car was heavier than an ICE car of comparable horsepower. Steam engines ran at lower thermal efficiencies than gas engines, losing much of their heat to the atmosphere. And while the working parts of a steam engine were quite simple and durable, the ancillary equipment—boiler, burner, and all manner of pumps, valves, and gauges—was dauntingly complex, demanding constant attention and maintenance. Most critically, the



A White Steamer is pushed across the finish line in a 1907 hill climb. Steamers were a very popular form of propulsion during the early days of motoring. Though reliable and fast, they were limited in range, expensive and heavy (Library of Congress).

popular steam cars of the early 1900s — Stanley, White, and Locomobile — took 10 to 30 minutes to work up adequate steam pressure from a cold start and then had to stop for water every 30 to 100 miles. By contrast ICE-powered cars started faster and had greater range, an advantage in rural areas where service stations were sparse.

After the turn of the century, steam car technology remained essentially stagnant for years until Abner Doble introduced advanced designs, while ICE-powered cars quickly improved. By the end of the first decade of the twentieth century, steam cars were technologically obsolete and economically unviable. Given these winds of change, White and Locomobile both converted to internal combustion by 1910, leaving only Stanley to fill a market with a curiosity that in recent times has been resurrected in as an interest in “buff” circles by car collector and comedian Jay Leno.

In addition to the ICE- and steam-driven automobiles, there were also electric models at the turn of the century, partly the consequence of work by Thomas Edison and others to improve battery design.²³ Electrics had several distinct advantages. They were especially attractive to those in the taxi business and women who wished to avoid the crank starting, noise, vibration, and pollution of ICE-powered vehicles. Low-end torque characteristics of electric motors ensured quick starts. However, in the early twentieth century any advantages were



Charging the battery of a Detroit electric automobile, 1919. It was the electric cord that ultimately limited the acceptance of the electric car in America during the first two decades of the twentieth century (Library of Congress).

greatly outweighed by the many serious liabilities. Electrics were far more expensive than the gasoline automobile to manufacture and about three times more expensive to operate. Batteries could weigh a ton or more. There was the ever-present wire or cord that had to connect to a discharged electric car. As late as 1910, their range was only 50 to 80 miles on a battery charge, charging facilities were virtually nonexistent outside large cities, the storage batteries of the day deteriorated rapidly, and hill climbing ability was poor due to the excessive weight of the batteries for the horsepower generated.²⁴ These relative liabilities have persisted to the present, despite recent improvement in storage batteries.

American Pioneers

The transition in national automotive leadership away from Europe and to the United States that took place during the first decade of the twentieth century is complex. One aspect that remains to be explored is the immigration of European automotive engineers to the United States. This matter of technology transfer certainly happened in the case of the Thomas Company located in Buffalo, New York, where a number of French engineers were employed, and may have occurred elsewhere as well.²⁵ Much of the automotive history literature published in the United States celebrates American innovation but ignores European influence on the early development of the industry, as if the American industry evolved out of virgin soil — a highly unlikely proposition given the nature of the trans-Atlantic connections of that day. Certainly the United States had its native pioneers who constructed prototype vehicles or produced cars in small numbers. It also had automobile manufacturers, who more often than not had previously been bicycle or carriage and wagon manufacturers.

The pioneers included Charles and Frank Duryea, who assembled their first vehicle in 1893.²⁶ The brothers would later engage in bitter priority disputes that continued to the early 1940s. Elwood Haynes and Edgar and Elmer Apperson built their first car in 1894 in Kokomo, Indiana. In 1895 Hiram Maxim installed a gasoline engine on a tricycle, and a year later Henry Ford demonstrated his Quadricycle.²⁷ Alexander Winton, a bicycle manufacturer in Cleveland, Ohio, would soon follow with an unoriginal design of his own, but he was also among the first to manufacture vehicles in some quantity, marking him as a leader in the early automobile business, along with the aforementioned bicycle manufacturer Colonel Albert A. Pope of Hartford, Connecticut.

While Pope's influence in the business would last only two years, to 1899, the Winton Motor Carriage Company flourished into the early twentieth century. Winton, like Henry Ford, raced his cars, and in 1903 a Winton became the first car to cross the continental United States.

Other manufacturers of the period included George N. Pierce in Buffalo and Thomas L. Jeffery, who built the Rambler. Most significant was Ransom Eli Olds, whose curved-dash "Merry Oldsmobile," built in Michigan, became an industry leader, with a production volume of 5,000 units in 1904. A dispute unfortunately followed — disputes were all too common among pioneer inventors and manufacturers of the era — and while Olds would later set up another company called REO, his influence on the industry diminished. Former employees of Olds who got their start there and then proved to be influential later in the automobile industry included Jonathan D. Maxwell, Robert C. Hupp, Roy D. Chapin and Howard E. Coffin.

During the first decade of the twentieth century, the number of firms active in the industry is staggering by today's standards. Some of the names of the early car companies were Orient, Monarch, Walker, Gale, Wolverine, Maxwell, Stoddard-Dayton, Wayne, Holsman, Logan, and Lambert. John Rae summarized the state of the infant industry as characterized by easy entry, virtually no government restrictions, literally hundreds of companies, and sources of capital varying from giants like J. P. Morgan to local banks and patrons.²⁸

As the superiority of the gasoline automobile was increasingly demonstrated over its steam and electric competitors, the geographic center of automobile manufacturing in the U.S. shifted from New England to the Midwest. The early, overwhelming choice of the internal combustion engine by Midwestern manufacturers was influenced by the region's poor roads, which were nearly impossible for electrics to negotiate, relatively vast spaces when compared to the East, and by the availability of gasoline for fuel in sparsely settled rural areas that lacked electricity. Since village blacksmiths were accustomed to repairing wagons and carriages, they can be considered the first generation of auto mechanics.

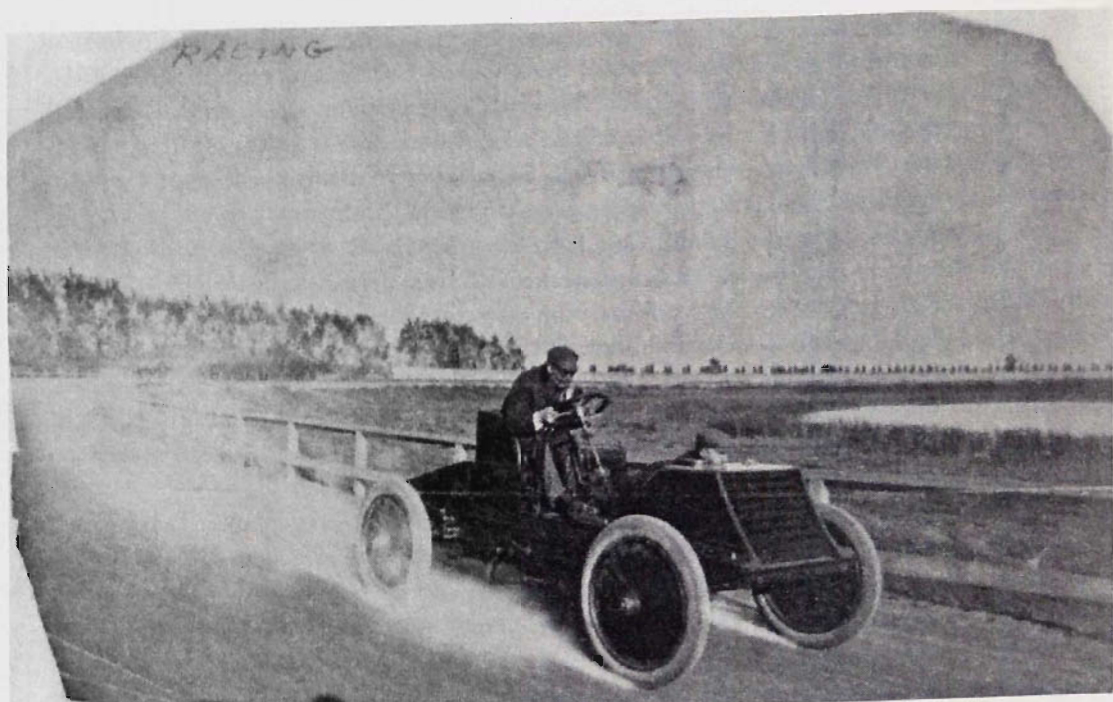
The presence of a vibrant carriage trade and other economic and geographic factors contributed to the emergence of Detroit as the hub of automotive manufacturing in America. Most certainly, however, the elusive factor of personality and the presence of the likes of Ransom Olds, Henry Ford, Henry Leland, and Billy Durant proved critical to the rise of Detroit as the "Motor City."

To make a single prototype of a car is one thing, but to make it with uniform quality and in quantity is a very different challenge. Recognition of the importance of high tolerance, uniformly machined parts like crankshafts and engine blocks is usually credited to Henry Leland.²⁹ Leland learned machine tool techniques from a craft tradition that can be traced back to Eli Whitney at the Mill Rock armory and was later diffused and improved upon by Simeon North at Springfield and Roswell Lee at Harpers Ferry. High volume and economies of scale would be the central achievement of Henry Ford and his key employees at Ford Motor Company after 1908. The spectacular rise in American auto production is reflected in Table 2.

TABLE 2: AMERICAN MOTOR VEHICLE
PRODUCTION, 1899-1910³⁰

<i>Year</i>	<i>Number</i>	<i>Value (\$)</i>
1899	600	1,290,000
1903	10,576	16,000,000
1904	13,766	24,500,000
1905	20,787	42,000,000
1906	23,000	50,000,000
1907	42,694	105,000,000
1908	49,952	83,000,000
1909	114,891	135,000,000
1910	200,000	225,000,000

Despite the presence in Cleveland, Ohio, of pioneering firms that included Winton, Stearns, Gaeth, Washburn, Marr, Owen Rogers & Hanford, and Pennington, Richard Wager made the argument that Cleveland's decline as the center for the automobile industry was the consequence of conservative bankers. In contrast, Detroit's financial institutions were far more willing to take risks.³¹



Alexander Winton driving his automobile on the racetrack, 1901. Winton was certainly one of the most important of the pioneer automobile manufacturers in America (Library of Congress).

Organization as Power

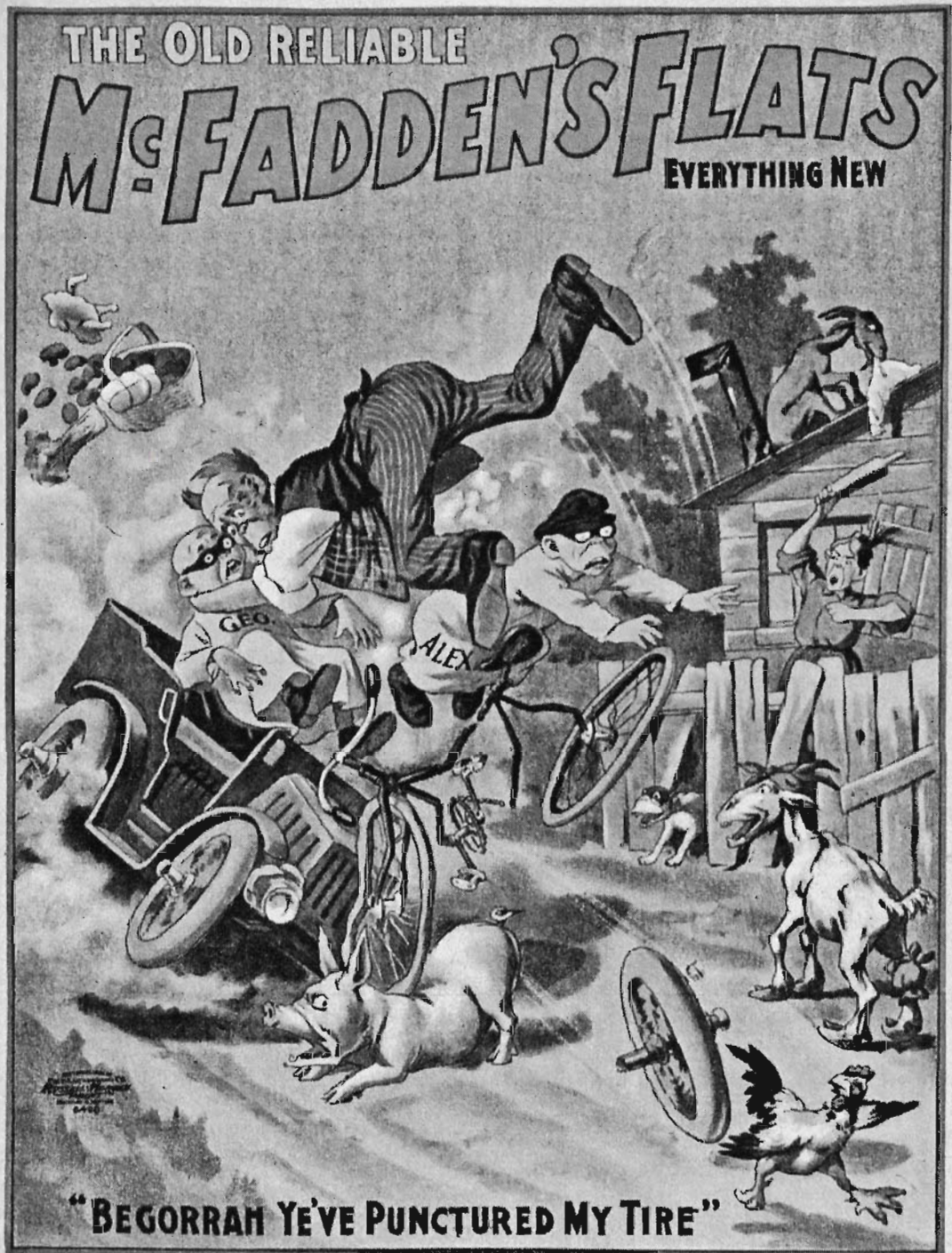
With the introduction of a small number of experimental vehicles and the realization that they had commercial possibilities, trade organizations were quickly established. In October 1895, the month before the first race of experimental automobiles that was to take place in Chicago, Charles B. King, a Detroit manufacturer, wrote to the editor of the new magazine *The Horseless Age*:

Realizing the fact we have already a large number of people in the country interested in the coming evolution, the motor vehicle, and in order to pave the way for this vehicle of the future, it is proposed to form a national organization which will have as its object the furtherance of all details connected with the broad subject, and hold stated meetings where papers can be read and discussions follow as to the respective merits of all points in question. Such an organization is needed now, and upon its formation would meet with the hearty co-operation of the newspapers, the friends of good roads and the public at large.

It is therefore proposed that such an organization be now formed and have as its name "The American Motor League."³²

The first meeting of this proposed group would take place November 1, 1895, in Chicago, with interested parties coming from Cincinnati; Philadelphia; Boston; Springfield, Massachusetts; Kokomo, Indiana; New York City; Canada; and Detroit. A draft constitution was adopted that called for this organization to "educate and agitate," to "direct and correct legislation," and to defend "the rights of ... vehicles when threatened by adverse judicial decisions."³³

The Association of Licensed Automobile Manufacturers (ALAM) proved to be a more



A 1902 theater poster from Cincinnati, Ohio. In addition to the challenges of the machine and the environment, flat tires were an all-too-frequent matter for the automobilist to deal with (Library of Congress).

significant and studied trade organization. Its basis and actions have been thoroughly examined elsewhere.³⁴ In short, the ALAM was the result of patent 549,160 granted to Rochester, New York, attorney George B. Selden for a road vehicle that was to use an internal combustion engine using liquid hydrocarbons. It was an egregious error on the part of the Patent Office to grant such a patent, but it led to the formation of a number of car manufacturers who charged a license fee to anyone making an ICE-powered car and then distributed the proceeds to a Selden, a group of electric car manufacturers, and the ICE vehicle makers who had joined the group and adhered to its policies. Many car manufacturers, including Henry Ford, disregarded the ALAM and fought it in court, eventually winning their case, which led to the disbanding of this retrogressive organization. The ALAM story, however, illustrates the place in the automobile story for a study of organizations, including the National Automobile Chamber of Commerce (NACC), the Automobile Manufacturers Association, and the Motor Vehicle Manufacturers Association, which remain to be more fully examined by scholars.

In addition to the trade organizations that emerged during the late 1800s, social organizations were quickly established once a critical number of automobiles fell into the hands of the well-to-do.³⁵ The most significant of these early automobile clubs was the Automobile Club of America (ACA), established in New York City in 1899. Its mission was clearly stated in its 1903 *Yearbook*:

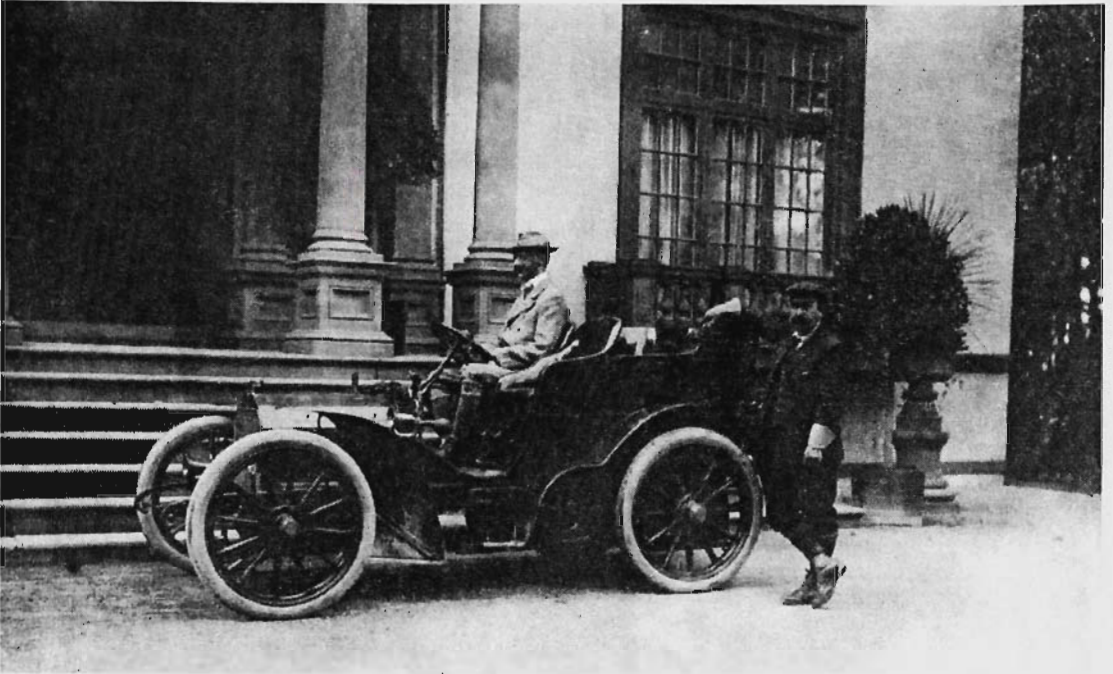
The objects of this corporation are the formation of a social organization or club, composed in whole or in part of persons owning self-propelled pleasure vehicles for personal or private use. To furnish a means of recording the experience of members and others using motor vehicles or automobiles. To promote original investigation in the mechanical development of motor carriages, by members and others. To arrange for pleasure runs and to encourage road contests of all kinds among owners of automobiles. To co-operate in securing rational legislation and rules governing and regulating the use of automobiles in city and country. To maintain the rights and privileges of all forms of self-propelled pleasure vehicles whenever and wherever such rights and privileges are menaced. To encourage the construction of good roads and improvement of the public highways. And generally to maintain a social club devoted to the sport of automobilism throughout the country.³⁶

In addition to the ACA and the American Automobile Association (AAA), by 1903 there were thirteen automobile clubs in the state of New York, nine in Massachusetts, five in Ohio and four in Pennsylvania, with nineteen in other states and the District of Columbia. The AAA was organized in Chicago in March 1902.³⁷ As a national federation of eight leading clubs, including the ACA, the AAA's key role was to lobby for improved public highways, protect the legal rights of drivers, and regulate auto racing and endurance trials. In subsequently pursuing those objectives, the automobile became less a plaything for the elite and more a necessity for the rural and urban middle classes.

The Automobile for Better or Worse?

The idea that the horseless carriage would have an enormous impact on American society did not escape the pioneers of that device. In a March 1896 article in the *Horseless Age* it was stated that the auto

will make the suburbs easier of access, improve the trade of country hotels in many places, and still further depress the business of horse-raising. Much of the land now used for horse-raising



John Jacob Astor, 1864–1912, with his chauffeur standing beside the car. Chauffeurs are a largely neglected figure in the early history of the automobile (Library of Congress).

and growing horse feed will in process of time find other uses more in harmony with the trend of progress.³⁸

The immediate social impact of the newly developed automobile during the first decade of the twentieth century was significant. The thoughts of a person first seeing this belching, stinking, noisy device making its way are difficult for a historian to recapture. To be sure, horses often reacted violently to an encounter with an early car. So did many people, especially rural folks who were fearful of change and urban dwellers who were concerned over their rights while walking the street. Rural residents often thought of the automobile as a “devil-wagon,” and as Lowell Julliard Carr demonstrated in a pioneering sociological study, their attitudes only changed when the car came to have a commercial presence in their community.³⁹

Of course, notions of the automobile’s rivalry with the horse surfaced quickly and comparisons between the horse and the car were common. The advantages of a machine over a horse prompted one inventor in 1895 to build his own horseless carriage. Ironically, given the carnage that would later be a consequence of the automobile, *The Horseless Age* reported

Carlos Booth, M.D. of Youngstown, Ohio had a terrible runaway last June, in which his wife came near losing her life and the horse was killed. Reading of the Paris Race about this time he at once made a design for a motor carriage, which he is now having constructed.⁴⁰

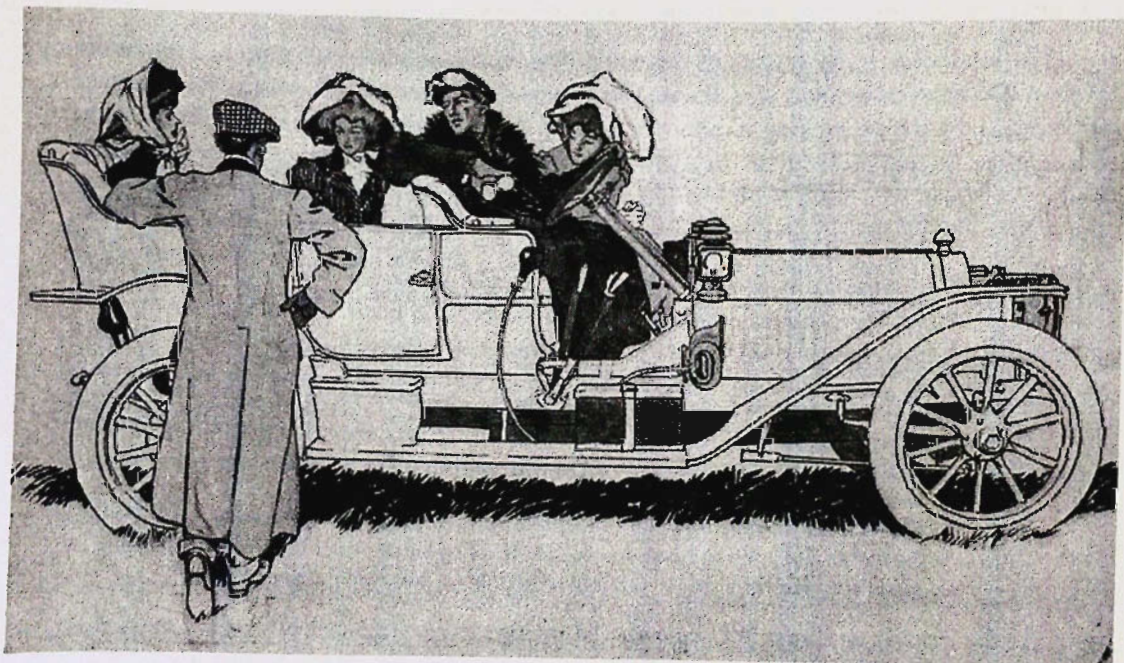
As it turned out, Booth’s vehicle would be completed by the summer of 1896. Made by Fredonia Manufacturing of Youngstown, Ohio, it weighed more than 1,000 pounds and earned Dr. Booth the distinction of being the first physician in America to own an automobile.⁴¹

The cost of a car with upkeep contrasted to maintaining a horse was a key question that

early automobile advertising often addressed. For example, an advertisement in the *Ford Times* in September 1913 depicted a scale with a horse and a Model T on the two pans, the weight of the horse far exceeding that of the car. The ad further read, "Old Dobbin, the family coach horse, weighs more than a Ford car. But — He has only one-twentieth the strength of a Ford car — cannot go as fast nor as far — costs more to maintain — and almost as much to acquire." Cars also eliminated the horse manure problem on city streets.

While an exact date cannot be ascertained, sometime during the second decade of the twentieth century the automobile became a primary article of consumption for middle America, and no longer a plaything for the rich summering at Newport, Rhode Island, or the sporting set on Long Island. After initially finding the auto a "devil wagon," rural Americans in particular embraced the car as essential to improving their lives. Booth Tarkington's 1918 *Magnificent Ambersons* captured the social and economic complexities of that transition as well as any contemporary account of the day.⁴² The novel is a love story involving the Ambersons, the Morgans, and the Minafers, set in a Midwestern town at a time of profound economic and social change. With the widespread diffusion of the automobile, landed elites, complacent and spoiled, who were living in prosperous mid-sized towns, lost their economic power at the expense of the new auto-centered manufacturing class comprised of investors, entrepreneurs and engineers.

The automobile gradually knitted urban and rural areas more tightly together, although evidence indicates that initially city and country folk really did not want to partake in this kind of social togetherness. During the first decade of the twentieth century city folk began to go for country rides, at times trespassing on farmers' property while picnicking, and eating the farm's fruits and vegetables as well. Some individuals and rural communities took



A 1915 advertisement design study for Pierce Arrow automobiles showing a man talking to three women and a man in a car. Early automobiles were largely for the rich, at least until the coming of Henry Ford's Model T (Library of Congress).



Poster of a woman wearing a driving coat, gloves and a hat secured by a scarf, with a car in the background, 1906. Just as clothing was fashionable, so was the automobile to millions of status-conscious Americans (Library of Congress).

appropriate steps to discourage these upper middle class urbanites from intruding.⁴³ An extreme reaction was the spanning of roadways with barbed wire, sure to cause injury to the unsuspecting automobilist. And there was also the ever-present speed trap to worry about, along with laws calling for a red flag to precede the car or even requiring calling ahead to the next town warning of the car's appearance on local roads.

This was a time in American history when farmers perceived themselves to be exploited by city-based institutions like banks and corporations, and thus resentment spilled over to those taking Sunday drives, with excessive repair and towing charges, food bills, and gasoline purchases often the result. On the other hand, those living in rural areas soon recognized that there was an economic benefit to having these urbanities take excursions to the country. Thus, travelers were often welcomed because of the money they brought with them.

The automobile slowly but surely diffused into rural America and with it came many improvements in the quality of life. By World War I, the automobile enabled physicians to make their rounds more efficiently and rural areas established hospitals to serve surrounding communities. A decade later the one-room schoolhouse gradually gave way to centralized schools, and thus the automobile improved education. While some church leaders railed against the car because of Sunday drives that would decrease church attendance, in reality the auto enabled once-isolated members to attend worship services. On economic terms, the appearance of the automobile broadened the market of farm goods for farmers, and in general made life easier.

Music Galore

Culturally, the automobile was featured prominently in popular music as early as 1899, when the first promotional song, "The Studebaker March," was released.⁴⁴ A number of these early songs about automobiles had no words, but rather were composed in a manner that imitated automobile noises — fast, slow, jerky, and droning. "The Motor Car," released in 1903, and "The Auto Race," published in 1904, were of this variety. As automobiles became a fixture in American life, so were songs about them, for in 1905 some 29 songs appeared, 40 in 1906, and 53 in 1908. Romance was at the heart of this early genre of song (see chapter 5 for more on this topic), but so then was the Ford, in lyrics either about Henry or his car. Indeed, more than 60 songs about Ford were written between 1908 and 1940:

"Love in an Automobile." 1899. By Alfred Dixon.

"My Automobile Girl." 1900. Lyrics and music by R. J. Morris.

"My Auto Lady." 1901. By George S. Atkins.

"Jes Come Aroun' Wid an Automobile." 1902. Lyrics by R. Melville Baker, music by Josephine Sherwood.

"When Isabella Green Went Automobiling." 1902. By Harry Marshall.

"The Girl on the Automobile." 1905. Lyrics by Sam Lewis, music by Joe Nathan.

"In My Merry Oldsmobile." 1905. Lyrics by Vincent Bryan, music by Gus Edwards.

"On an Automobile Honeymoon." 1905. Lyrics by William Jerome, music by Jean Schwartz.

"Take a Little Ride with Me." 1906. Lyrics by Jack Drislane, music by Theodore Morse.

"The Gay Chauffeur." 1907. By F. L. Valentine.

- "The Ford." 1908. By Jarry H. Zickel.
- "I'd Rather Have a Girlie Than an Automobile." 1908. By William A. Dillon.
- "The Motor Girl." 1909. Lyrics by Charles J. Campbell, music by Julian Edwards.
- "Motor King." 1910. Lyrics by Jack Drislane, music by Henry Frantzen.
- "Keep Away from the Fellow Who Owns an Automobile." 1912. By Irving Berlin.
- "He'd Have to Get Under — Get Out and Get Under." 1913. Lyrics by Grant Clarke and Edgar Leslie, Music by Maurice Abrahams.
- "The Packard and the Ford." 1915. Lyrics by Harold R. Atteridge, music by Harry Carroll.
- "On the Old Back Seat of the Henry Ford." 1916. Lyrics by Will Dillon, music by Lawrence Dillon.
- "Don't Take Advantage." 1919. Lyrics by Howard Rodgers, music by James V. Monaco.⁴⁵

The Mechanical Arts and the Coming of the Machine Age

Modern culture as we understand it owes much to the concurrent emergence of the automobile and motion picture. Introduced at roughly the same time, cars and film grew in a synergistic relationship with one another. One would be hard pressed to find a film depicting modern life where the automobile does not carry some significance in the progression of the story. From simply transporting people from one place to another to conveying nostalgia, creating the elaborate chase scenes found in so many modern action films, or enabling characters to converse while in an isolated space, the automobile has an established role in film.

Thus, it is virtually impossible to understate the significance of the automobile in the evolution of film. From being a vehicle for transporting characters from scene to scene to a weapon in the hands of a demented driver, much drama, comedy and tragedy in film have taken place in and around the automobile. Despite this, the topic of automobile and film has rarely been addressed systematically or comprehensively. Film can sell automobiles and automobiles can sell a particular film. The automobile strongly influenced the film industry, from being a major "character" to shaping film techniques involving motion and camera angle.

Several decades ago, film scholar Julian Smith drew on the vast collection at the Library of Congress to survey hundreds of films made before 1920. Smith's work uncovered short documentaries like *Automobile Parade* or the 1902 one reel *A Unique Race Between Elephant, Bicycle, Camel, Horse and Automobile*. Each of these short films featured mechanical novelty associated with the early automobile.⁴⁶ The first film to depict the automobile was Thomas Edison's 1900 short, *Automobile Parade*. It featured cars driven by Newport, Rhode Island's motoring elite, along with stray pedestrians, horse-drawn carriages, and bicycles and tricycles.⁴⁷

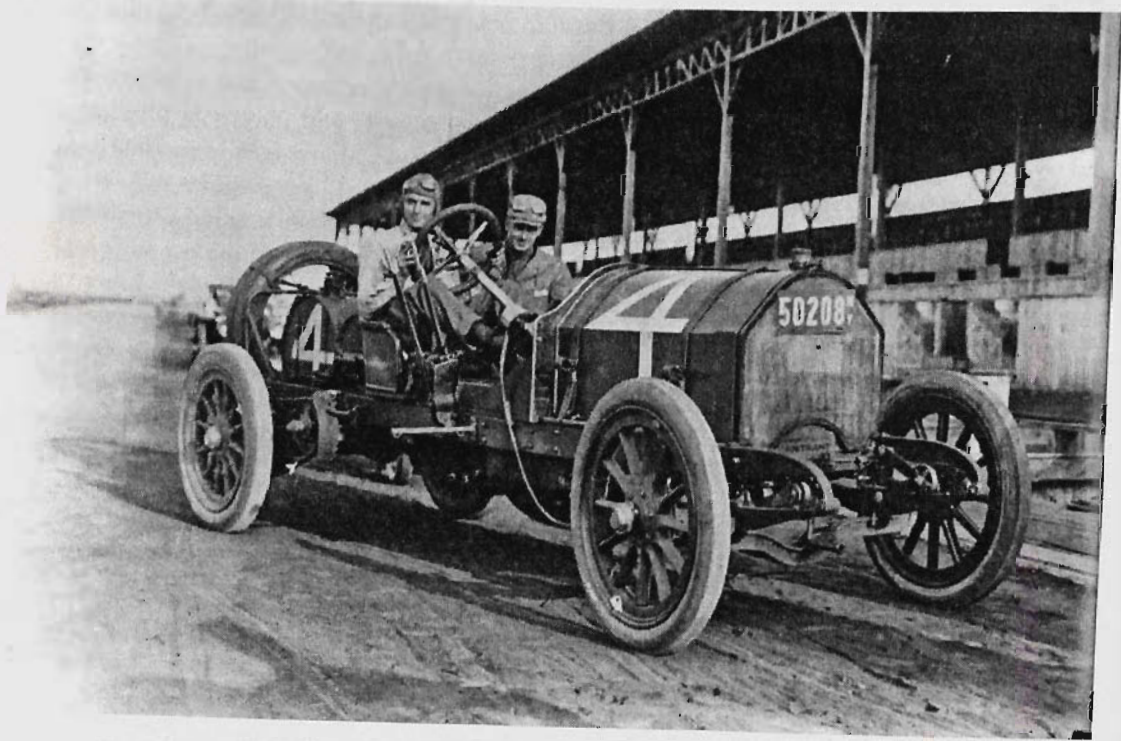
Cars were first featured in the 1903 narrative film *Runaway Match*. This work employed a theme that was to recur again and again — a rebellious couple elopes in a car to avoid the insensitive opposition of her rich father to their intentions to marry. Because of the car, young lovers, characteristically never thinking of the long term, escaped from a father who was perhaps more wise and practical than given credit for. Thus, traditional courtship patterns were challenged by the possibilities of flexible transportation. Now a middle-class man had the same freedom as one more affluent, and glandular impulses were triumphant.

Racing was critical to early technological developments, enhancing a manufacturer's rep-

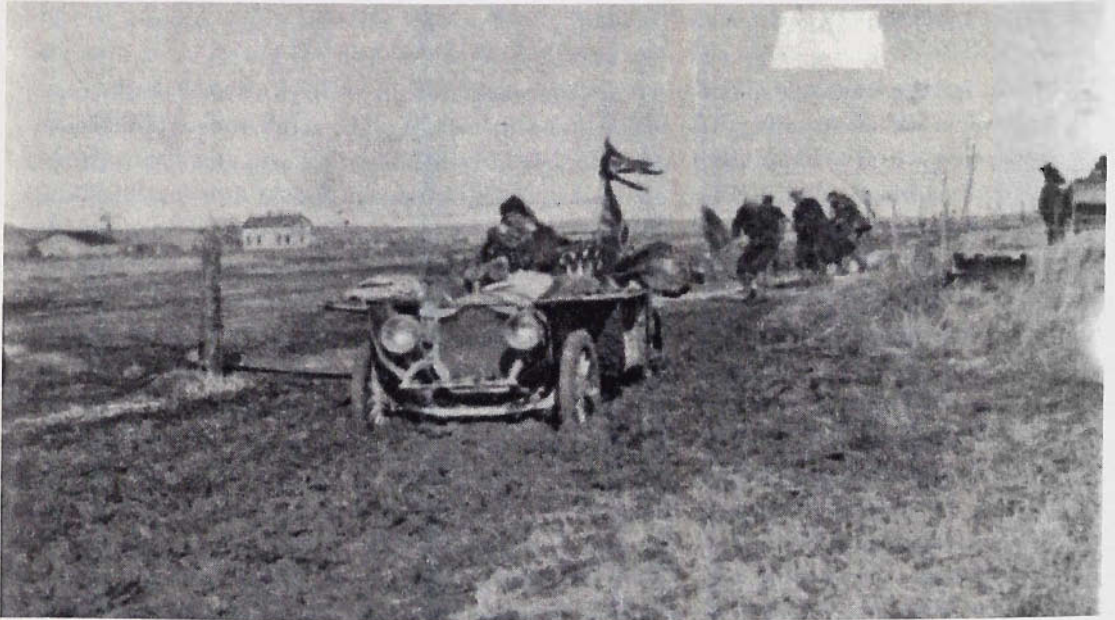
utation as well as fueling popular enthusiasm for the automobile among all classes. In October 1904 the Vanderbilt Cup races on Long Island, New York, were filmed for the American Mutoscope and Biograph Company. The scenes in this film are remarkable and include an international cast of cars, what appeared to be a challenging road course, and a variety of camera angles. It set the standard for the hundreds of racing films that would follow.⁴⁸

Early films played off the dangerous side of the automobile. The portrayal of risky accidents evidently enhanced a sense of adventure; however, crashes as depicted in the 1909 Edison film *Happy Accidents* rarely killed anyone in action-adventure films and certainly not comedies. With few exceptions, the villain got what he deserved. Slapstick accidents, a staple of early comedy like Mack Sennett's Keystone Kops series, trivialized crashes — they resulted from clear incompetence rather than automobile design, and driver and passengers were never killed or seriously injured.⁴⁹

One such example was Sennett's *Gussle's Day of Rest*, produced in March 1915 and featuring a Ford Model T. The day at an ocean resort begins with an accident in which Gussle's plain-looking, overweight wife is run over by a Model T driven by a middle-aged man with a beautiful young companion at his side. Perhaps the first message of the film is that a car — even a Ford Model T — can take you far with attractive women. But this blonde has eyes elsewhere, including for Gussle, who ends up trying to escape from his wife and the woman's friend by taking the Ford on what becomes a rollicking chase. A second theme might be that while you can attract girls with a car, you might not be able to keep them. Ultimately, Gussle and his blond companion are buried in a landslide, and the story ends with a grin.⁵⁰



Ralph Beardsley and J.D. Coote in a 1910 Simplex. One can never underestimate the significance of racing in the broader context of technological developments and the diffusion of the automobile (Library of Congress).



Five men trying to pull an automobile out of mud during the New York to Paris automobile race, 1905. Early endurance races demonstrated the supposed reliability of this relatively new transportation technology (Library of Congress).



Crowd at the start of the New York to Paris race, New York, 1905 (Library of Congress).

The Quest for Speed

In real life, however, an out-of-control automobile could easily prove to be deadly, especially when it came to racing. The origins and early history of the automobile in America are closely tied to competitions, including endurance and reliability runs, road racing, hill-climbs, and oval track events. Indeed, the automobile took on new significance in American life when, on November 28, 1895, "The Race of the Century" took place in Chicago.⁵¹ Sponsored by the *Times-Herald* and run during a snow storm, the race ran from Chicago to Evanston and back, a distance of 53 miles. Frank Duryea won with a time of just over 10 hours. While rival newspapers were harshly critical of the event, the race sparked America's fascination with the automobile. Racing resulted in considerable publicity and this fact did not elude many of the early manufacturers, including Alexander Winton, Henry Ford, and Ransom Olds. Match races, high-speed runs, competitions on the glass-smooth beaches at Daytona and Ormond Beach, Florida, and the Vanderbilt Cup races on Long Island that began in 1904 became very popular during the first decade of the twentieth century.⁵² The first generation of American race heroes included Willie K. Vanderbilt, Bob Berman, and Barney Oldfield, whose name would become a household word ("Who does that guy think he is, Barney Oldfield?").⁵³ The Glidden Tour, which took place on public roads between 1905 and 1913, emphasized relia-



Automobile racing on a curved wood track, probably at or near Washington, D.C., ca. 1922 (Library of Congress).

bility over speed, and enabled the leading luxury marque (Pierce-Arrow) to establish an enviable reputation among the well-to-do. Events became transnational as well; the 1908 New York to Paris race featured seven cars from France, Germany, Italy, and the United States, with a Buffalo, New York-made Thomas winning the 17,000-mile event.⁵⁴ And while road racing's popularity would decline somewhat by 1910, the construction of large wood plank circular racetracks across the country beginning in 1913 ensured that automobile racing was here to stay as an important spectator sport in America.⁵⁵ That same year the mass-produced Ford Model T was introduced. With its low cost and reliability, even an Alabama farmer at the wheel of a modified Model T at the local county fair could at least think he was driving like Barney Oldfield.