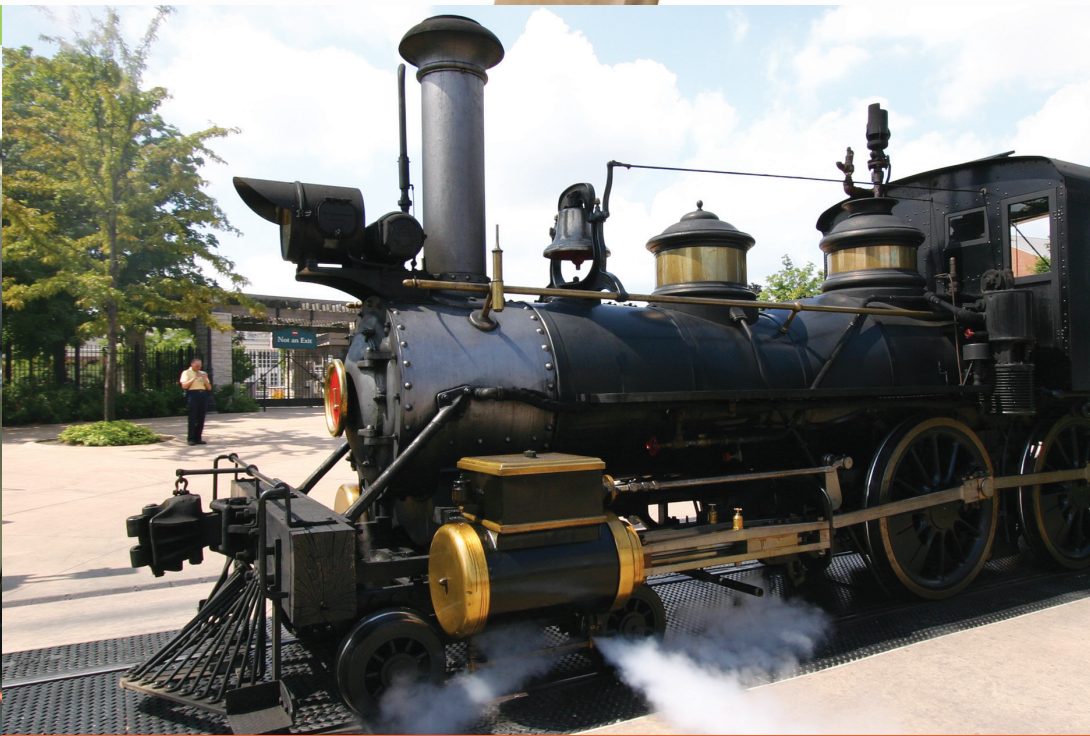


Transportation: Past, Present and Future

“From the Curators”



Transportation in America

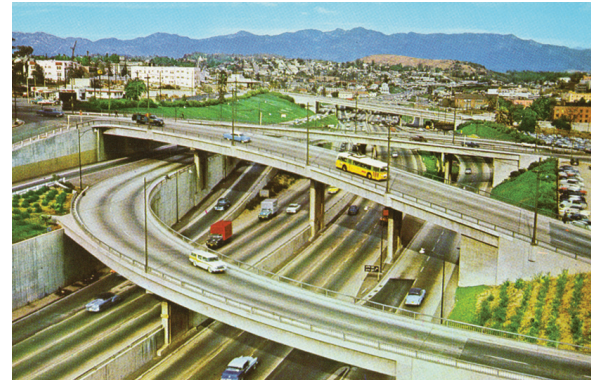


Table of Contents

PART 1

- 03 **Chapter 1**
What Is “American” about American Transportation?
- 06 **Chapter 2**
Government’s Role in the Development of American Transportation
- 10 **Chapter 3**
Personal, Public and Commercial Transportation
- 17 **Chapter 4**
Modes of Transportation
 - 17 **Horse-Drawn Vehicles**
 - 30 **Railroad**
 - 36 **Aviation**
 - 40 **Automobiles**
 - 40 **From the User’s Point of View**
 - 50 **The American Automobile Industry, 1805-2010**
 - 60 **Auto Issues Today**
Globalization, Powering Cars of the Future, Vehicles and the Environment, and Modern Manufacturing
- 74 **Chapter 5**
Transportation Networks
- 81 **Bibliography**

PART 2

- 85 **Chapter 1**
20th-Century Migration and Immigration
- 92 **Chapter 2**
Immigration Stories
- 99 **Chapter 3**
The Great Migration
- 107 **Bibliography**

PART 3

- 101 **Chapter 1**
Pleasure Travel
- 124 **Bibliography**

© 2011 The Henry Ford. This content is offered for personal and educational use through an “Attribution Non-Commercial Share Alike” Creative Commons. If you have questions or feedback regarding these materials, please contact education@thehenryford.org.

Chapter 1

What Is “American” About American Transportation?

A society’s transportation system reflects the society’s values, attitudes, aspirations, resources and physical environment. Some of the best examples of uniquely American transportation stories involve:

- The American attitude toward individual freedom
- The American “culture of haste”
- The American attitude toward democracy
- The American attitude toward risk
- The American attitude toward natural resources
- Characteristically American vehicles

Transportation and Individual Freedom

One of the driving forces in American history is the concept of personal or individual freedom. It is no accident that the best-remembered line in the Declaration of Independence is the one about God-given rights to “life, liberty and the pursuit of happiness.” One manifestation of these rights is unfettered freedom to travel, to move wherever the urge and economic opportunity lead. This, in turn, has produced an American fascination with personal vehicles.

Prior to the 19th century, personal vehicles usually meant horse-drawn carriages, but during the 19th century, cheaper, lighter vehicles were developed. Designed to be pulled by a single horse, they were less expensive to maintain than a coach. Though based on European designs, the light two-wheeled chaise evolved into the American shay. New England builders developed the four-wheeled pleasure wagon before 1825. It could carry light freight and be used for passengers. The pleasure wagon presaged the appearance of one of the characteristic American horse-drawn vehicles, the buggy. The one-horse buggy — light, strong and designed to bounce over bad rural American roads — was also cheap.

Large cities like Cincinnati and smaller ones like Flint, Michigan, and Mifflinburg, Pennsylvania, turned them out by the thousands, often utilizing special-purpose woodworking machines from the burgeoning American machinery industry. By 1900, buggy makers were turning out over 500,000 each year, and Sears, Roebuck was selling them for under \$25. “In a sense, then, the cheap, factory-made buggy became to 19th-century Americans what the Model T Ford would become to their children and grandchildren” (Kinney, 2004, 22–23).

When the bicycle arrived in the late 1880s, Americans embraced it for similar reasons, as a vehicle that offered great personal mobility at low cost. As soon as the automobile became cheap enough for large numbers to afford, Americans adopted it with a vengeance.

While it is true that Americans also quickly took to travel in railroad trains in the 19th century, one observer reacted to the rise of trains by articulating where Americans’ hearts really lay: “After all, its old fashioned way of five or six miles an hour, with one’s own horse and carriage, with liberty to dine decently in a decent inn, with the delight of seeing the country and getting along rationally, is the mode to which I cling, and which will be adopted again by the generations of after times” (Rae, 1971, 22).

Transportation and the American “Culture of Haste”

When Europeans arrived on the American continent, they saw it as a vast, empty space that needed filling with people, buildings and farms. Early on, colonists developed a sense of urgency to clear land, plant crops and build a society. Impatience became an American characteristic. Historian Daniel Boorstin called it a “culture of haste.” One reason that railroads were embraced so readily was their potential for conquering distance and time. The lure of fantastic 30-miles-per-hour speeds proved irresistible.

But haste has other manifestations. It led to hurried building of roads and vehicles with an emphasis on quantity over quality. As one English observer put it, “Let it go at that seems written all over the face of the land. You see it in the wretchedly laid railway and tramway tracks, in swaying telegraph poles and sagging wires . . . in streets unscavenged, in rubbishy cutlery . . . in scamped and hurried work everywhere. There seems to be a disdain of thorough workmanship and finish in detail” (Ferguson, 1979, 13). The rapidly built carriages, bicycles and, later, automobiles are manifestations of this impulse. The quality of mass-produced Model Ts may not have lived up to that of low-production European vehicles, but Americans wanted their cars cheap and wanted them now. Ironically, the lingering effects of this attitude may today be hampering the very automakers that had once profited from it.

Transportation and Democracy

We have been conditioned to think of democracy as a political concept, but in America it has played itself out in other ways. Daniel Boorstin has commented that the widespread production and consumption of goods is an expression of American democracy. The sheer volume of stuff turned out by American factories had a leveling effect. Not for nothing did American carriage makers claim that they were making “Rich Men’s Vehicles at Poor Men’s Prices.” The railroad made travel available to a wider group of people, but it was the automobile that really democratized travel. The auto truly moved from being a rich man’s toy to being everyman’s conveyance. Throughout automotive history, the characteristics of expensive cars have steadily migrated down to the common vehicles – from big engines (Ford’s V-8) through amenities like radios and power windows, to advanced technical features like antilock brakes and stability control.

Transportation and Risk

From its very beginnings, America has attracted risktakers. The risk-averse did not make hazardous ocean voyages in small ships or, in later years, did not leave familiar surroundings to go to a new country where they did not even speak the language. Risktakers built or invested in steamboats, canals, railroads, streetcar systems, cable car systems, stage lines and automobile companies. One historian credits the rise of Detroit as an automobile center to the presence of a number of entrepreneurs who would rather go broke building automobiles than get rich doing something else. For users of transportation, risk is often balanced with speed and convenience. In the 19th century, steamboats exploded with distressing regularity and railroad accidents were common, yet getting there quickly and cheaply was deemed worth the risk. Since automobiles became widespread, 40,000 to 50,000 Americans have died annually in auto accidents, a fact that seems not to lessen our enthusiasm for the vehicles.

Transportation and the American Attitude Toward Natural Resources

The first Europeans to arrive in America were astonished by its natural abundance. Land, water, fish, game and eventually minerals like coal and iron ore were available in “inexhaustible” supplies. And they were used as if they really were inexhaustible. Game was slaughtered for food, hides, fur and sheer sport. Land was farmed, depleted and abandoned for new fields. Nowhere was this pattern more typical than in the use of wood.

For farmers, wood was a nuisance, and clearing the land of trees was one of their main tasks. Trees fed the American (and the British) shipbuilding industry. The shortage of labor and abundance of trees led to the development of water-powered sawmills while the British still relied on hand sawyers. The explosive growth of American railroads was literally built on and fueled by wood. Wood ties underlaid the rails (in contrast with the stone blocks favored by European railways); bridges and trestles were built of wood (again, in contrast with the masonry structures favored across the pond); railroad cars were built of wood; and the locomotives burned wood long after European railroads switched to coal.

Wood was also essential to the development of highway transportation. Light, strong woods like hickory allowed American carriages to develop the light, spidery construction that surprised European observers. As on the railroads, wood was used for bridges, from the classic covered bridge to spectacular achievements like the 330-foot Colossus bridge spanning the Schuylkill River at Philadelphia. Wood was also used as a paving material. Logs laid side by side created “corduroy roads.” Various types of wood blocks were used to pave city streets (including Detroit’s), and for a few years in the mid-19th century, plank roads were a mania. Lacking good preservation techniques, wood pavement deteriorated rapidly, but the fact it was used at all is testimony to the American conviction that wood was cheap and inexhaustible.

When the automobile arrived in the early 20th century, it was, fortuitously, followed by the great oil strike at Spindletop in Texas. Images of gushing wells, combined with low oil prices, set Americans on a course they are still following. Cheap gasoline is now regarded as a basic right, an essential component of the “pursuit of happiness.”

Characteristic American Vehicles

We have mentioned vehicles such as the pleasure wagon, the shay and the buggy, but American conditions gave rise to other vehicles as well.

The **Concord coach**, built primarily by Abbot-Downing in Concord, New Hampshire, but also in places like Troy and Albany, both in New York, was designed for rough American roads. Though associated in the popular mind with the American West, this stagecoach was originally used in the East, until railroads made it obsolete. Its ruggedness resulted in its successful export to places like Australia and South Africa.

The American **buckboard** wagon was among the simplest of vehicles. Light and cheap, buckboards utilized horizontal slats as a combination frame and spring.

With the birth of the Model T Ford, the **family car** became characteristically American. Like the Concord coach, it was rugged and simple. Like the buggy, it was light and cheap. European autos generally did not incorporate all these characteristics. Over the years, American family cars became bigger, more powerful and more luxurious, and were fueled by cheap gasoline. American design drew further and further away from European design. In the 1980s, the family car’s place began to be supplanted by the sport utility vehicle – a sedan on steroids – and by another American design, the pickup truck.

Chapter 2

Government's Role in the Development of American Transportation

Despite our great national myth of individualism, government at all levels has been a key player in shaping American transportation. There are three major ways in which government has played a role:

- Directly owning and operating transportation routes and vehicles
- Granting franchises and monopolies to private builders and operators
- Regulating rates, safety, vehicle specifications, etc.

Direct Government Ownership

The most familiar government-owned transportation facilities are roads and streets. They are the property of villages, towns, cities, townships, counties, states and the federal government. Yet, throughout the 19th century, government at all levels avoided spending large sums of money on roads. Construction often involved little more than cutting trees and clearing a path. Rural roads were typically maintained by calling on local residents to donate a few days each year to roadwork. Farmers, with plenty of other things to do, generally did not approach the task of roadwork with seriousness or enthusiasm, and the quality of the roads suffered accordingly.

There was comparatively little road-building done by the federal government, largely because of the continuing, unresolved debate over the constitutionality of federal funding for such internal improvements. The great exception was the Cumberland Road, also known as the [National Road](#). When Ohio was admitted to the Union in 1802, a portion of the revenue from the sales of public land in the new state was set aside for roads connecting the Ohio and Potomac rivers. Not until 1811 was this money used for what became the National Road. Over the next two and one-half decades, the road would be pushed on through Ohio and Indiana.

The last federal appropriation came in 1838, to complete construction into Illinois.

Nineteenth-century city governments often did little better than their rural counterparts. Cities paid for streets via special assessments on the owners of property fronting on the streets. The abutters, as they were legally known, often had little interest in good paving that would only encourage wheeled traffic and make their streets noisier and more dangerous. They often opted for the cheapest pavement they could get away with.

Serious nationwide government efforts to build and maintain roads and streets really did not come about until the early 20th century, with the explosion in popularity of automobiles. One key to new government activism was the gasoline tax. Oregon instituted the first gasoline tax in 1919. Within ten years, all states and the District of Columbia had added such a tax. The new tax transformed the financing of roads. In 1921, property taxes and general funds provided three-quarters of the money for road construction and maintenance. By 1929, gasoline taxes were covering the lion's share of road costs, and 21 states had ceased to use property taxes or general funds for main roads. The gasoline tax was not only effective, it was actually popular. As the man in charge of collecting Tennessee's gas tax put it, "Never before in the history of taxation has a major tax been so generally accepted in so short a period." It was remarkable, he thought, to what extent Americans "were willing to pay for the almost infinite expansion of their automobility" (Flink, 1988, 171). This American willingness to subsidize automobile transportation would have profound consequences for all forms of rail-borne transportation.

The federal government did not impose a gas tax until 1932, but it began funding highways much earlier. The Federal Aid Road Act of 1916 appropriated \$75 million for rural post

roads. The fact that the money was administered by state highway departments forced states to create such departments. The 1921 Federal Highway Act focused the national government's efforts on interstate roads that formed a national network.

One of the greatest influences on government highway policy from the 1920s through the early 1950s was a man most Americans have never heard of—Thomas H. MacDonald, head of the federal government's Bureau of Public Roads (BPR). He worked tirelessly and effectively to build support for highways in Congress, forged partnerships with state highway departments and spread the gospel of highways. The BPR also studied construction methods, analyzed failures and worked to improve the way roads were built. MacDonald promoted the idea that the use of public roads was a human right, while the use of private railroads was a privilege based on a fare. Thus he validated the public's willingness to subsidize roads in preference to rails.

Surely the greatest government highway project in this or any other country is the 41,000-mile [Interstate Highway System](#), authorized in 1956. Expanding on the gas-tax idea, the system was funded by a dedicated trust fund from taxes on fuel, tires, new buses, trucks and trailers, as well as operating trucks. Americans had come a very long way from the days when they asked if federal funding of roads was constitutional.

If it took Americans a long while to convince themselves that tax-funded roads were a good idea, it took even longer for them to accept the notion of government-owned and -operated rail systems. Horsecars, electric street cars, and interurban and long-haul railroads were all privately owned. Despite populist agitation for a federal takeover of railroads, such an expansion of government power was not in the cards. But in the early 20th century, attitudes began to change in cities. Trolleys, once so new and so popular, had become the object of many complaints. Service in many

cities had deteriorated, motormen and conductors were often surly, cars were in bad condition, and companies wanted to raise fares. Reformers began to agitate for municipal ownership of the streetcar systems.

The political battles were long and fierce. Ironically, one of the leaders in the movement was Detroit Mayor James Couzens, who had become a millionaire as Henry Ford's right-hand man. Couzens finally achieved his goal of municipal ownership of the streetcar system in 1922. City-owned systems would eventually become the norm, but it would not save the trolley from extinction. Today some cities are reviving the streetcar idea under the name "light rail." Such systems are government-funded, for private rail passenger service simply cannot pay for itself any longer.

The federal government's willingness to subsidize highways would eventually contribute to its entry into the railroad business. In the years after World War II, rail passenger traffic declined as people took to the highways. The advent of smooth, straight interstate highways accelerated this trend. It also accelerated a shift of freight traffic from rail to truck. To keep passenger service alive, Congress in 1971 created the National Rail Passenger Corporation (Amtrak), which absorbed the shards of nearly all remaining long-haul passenger trains. Officially a private corporation, Amtrak nevertheless depends on federal appropriations to make up its operating losses. The Amtrak tiger may be weak and nearly toothless, but the government does not seem to be able to dismount. Amtrak continues to lose money but retains enough political clout to prevent its demise.

The federal experience with rail freight service was happier. Like Amtrak, the Consolidated Rail Corporation (Conrail) was formed to operate failing rail lines but concentrated on freight service. Unlike Amtrak, Conrail eventually became a profitable system, so profitable that it was finally sold to other, fully private, railroads.

Granting Franchises and Monopolies

If 19th-century Americans were uncomfortable with direct government funding of roads and rails, they were quite comfortable with something that 21st-century Americans would find highly irregular: [granting private companies franchises and monopolies to build roads or bridges](#).

The first private turnpike corporation in the United States was chartered by the Commonwealth of Pennsylvania in 1792. The resulting Philadelphia and Lancaster Turnpike opened two years later. It was a first-class road, with a stone surface. It set the pattern for future turnpikes. A private corporation was granted the right to build the road, and the corporation sold stock to finance the construction. Then the corporation charged tolls to use the finished road. The tolls were supposed to cover maintenance of the highway and produce a surplus that would pay dividends to the stockholders.

The potential for profit seemed so great that states were soon chartering turnpikes by the score. Pennsylvania chartered over 80, while New York had 278 companies. In a few states, like Indiana and South Carolina, turnpikes were actually owned and financed by the states. Far more often, however, the state was simply one of the stockholders. The turnpikes were closely regulated, with tolls fixed by contract and standards of construction specified. Unfortunately, this business model turned out to be flawed. Revenues rarely met expectations, and maintenance costs generally exceeded estimates. Few companies actually made any money. Gradually, most turnpikes were abandoned, and the companies were liquidated.

The 1840s and 1850s saw a revival of turnpikes in the form of plank roads. As the name implies, these were roads surfaced with sawn boards. They were cheap to build and smooth when new. But the elements of weather quickly rotted the wood, and plank roads were no more successful than their older stone-paved cousins.

Cities granted franchises to builders of street railways. Horse-car lines, cable car lines and electric car lines were all encouraged in this way. As with the turnpikes, the privilege of operating a line over an exclusive route came at the price of regulation. Streetcar companies were told where they could or could not operate, when they could operate, how many cars they must provide and how much they could charge. The last requirement was the most serious sticking point. The nickel fare became sacrosanct, and hardly any politician was willing to risk supporting a fare increase. In the end, many politicians came to support a complete takeover of streetcar systems, with taxes subsidizing the nickel fare.

The Watchful Eye of the Regulator

Americans generally dislike government regulation – except when they like it. After the turnpike and trolley companies discussed above, the next great transportation industry to be subject to a growing net of laws and rules was railroading.

In the years after the Civil War, the railroads were the great driving force of the American economy. Large numbers of people worked for the railroads, many more rode the trains and even more regularly depended on railroads to bring them some item they used or something they ate. But many railroad users were not happy. Farmers and other shippers complained of monopoly pricing. When the railroad came to a town, the town would grow. But if the railroad rerouted its traffic and bypassed a town, the town could die. Organizations like the National Grange of the Patrons of Husbandry and the Populist Party agitated for the regulation of the railroads. The initial attempt at regulation, the 1887 Interstate Commerce Act, created an Interstate Commerce Commission (ICC) that had little real effect on the industry. Yet over the next decades, the regulatory net would gradually tighten until rates, routes and employee hours were all subject to federal law. The regulations curbed the worst railroad abuses but left the carriers poorly equipped to deal with the changing realities of 20th-century transportation. Ultimately, Congress was forced to loosen regulations in the 1980s to allow the remaining railroads to survive.

By comparison, the automobile and the motor truck were relatively unregulated. States gradually realized that operating a motor vehicle required some minimum qualifications and adopted licensing procedures, but they were hardly restrictive. Laws and speed limits were written to promote the smooth and safe flow of traffic, but placing restrictions on motor vehicles was not what most Americans wanted.

Changes would come, however, in the 1960s. The publication of Ralph Nader's indictment of auto safety, "Unsafe at Any Speed," coupled with General Motors' ham-fisted attempts to discredit him, helped spur federal safety regula-

tions. A growing concern with air pollution prompted the Clean Air Act of 1970, placing increasingly stringent limits on tailpipe emissions. In the early 1970s, gasoline shortages induced by OPEC (Organization of Petroleum Exporting Countries) raised concerns about gasoline mileage in vehicles, giving rise to fuel economy laws. In a relatively short span, one of the least regulated modes of transportation had become one of the most regulated.

Chapter 3

Personal, Public and Commercial Transportation

A Preference for the Personal

In 1910, the United States had one of the world's great public transportation systems: 353,000 miles of railroad track knitted states and cities together, carrying over 970 million passengers. Within cities, a network of electric street-railways provided popular, efficient transportation. Yet, within 40 years, long-distance railroad passenger service was dying and streetcars were disappearing. Private automobiles became the method of choice for moving people on land. Historians and policy makers have debated the reasons for this change over the last several decades. It becomes clear, however, that the American public was extraordinarily receptive to the notion of and was well prepared for the concept when the automobile arrived at the end of the 19th century.

Horse-Drawn Vehicles

For much of American history, ownership of vehicles for private transportation was restricted to the rich. While farmers might use their wagons for both work and personal transportation, they could rarely afford a vehicle dedicated only to hauling people. A large variety of four-wheeled carriages, both open and closed, were developed to meet the market, but they still sold to a select clientele.

The whole city of Boston had only 145 wheeled vehicles in 1798. Philadelphia, then the principal city of the United States, had only 827 wheeled vehicles in 1794. In both cases, the majority of these vehicles were carts and wagons for hauling commercial goods or light two-wheeled vehicles, such as sulkies and shays. The real breakthrough for personal transportation was the buggy. Appearing in the 1830s, buggies underwent the classic cycle of increasing demand and decreasing prices. In the 1860s, a good-quality buggy would cost a tradesman \$125 to \$150, several months' wages. By 1900, the application of factory methods had dropped the price to about one month's wages. In that year, over 660,000

buggies and road wagons (the buggy's sleeker, more stylish cousin) were sold, some 72 percent of total carriage production. Most carriages were sold to farmers, who could now afford a dedicated people-carrier.

Bicycles

In the late 1870s, an English import heralded the next revolution in private transportation. **Bicycles** offered great personal mobility – first, the awkward “high-wheelers” and then, in 1887, the chain-driven “safety” bicycle. The public responded by buying bicycles in droves. The bicycle also brought the personal transportation revolution to the cities. Private ownership of horses in a city was expensive and inconvenient, so few city dwellers owned buggies. But bicycles needed neither stables nor feed and left behind no unpleasant residue. Like the buggy industry, the bicycle industry responded to demand by vastly improving production techniques and driving down prices. But the bicycle did something else. As inventor Hiram Percy Maxim, looking back in 1937 put it, the bicycle “created a new demand which it was beyond the ability of the railroad to supply. Then it came about that the bicycle could not satisfy the demand which it had created. A mechanically propelled vehicle was wanted instead of a foot propelled one, and we now know that the automobile was the answer” (Hounshell, 1984, 214).

Automobiles

Hounshell goes on to note that, “The ‘demand’ which the bicycle created was, of course, the desire for swift and cheap personal transportation. . . . With the mass production of the **Ford Model T**, this demand was not only met but for almost two decades was enlarged and sustained” (ibid.). Henry Ford was hardly the first to realize the mass potential of the automobile. Ransom Olds, with his \$650, one-cylinder, “curved-dash” Oldsmobile, became the country’s largest automaker. But the Oldsmobile was a fragile horseless carriage. A vehicle was needed that combined the low cost of the Olds car with the reliability and capability of larger, more expensive cars. As Hounshell indicated, the Ford Model T was that car. At its introduction in 1908, it sold for \$850, but by the time Ford’s engineers developed the assembly line in 1913, the price was already down to \$600. Ford sold over 15 million Model Ts between 1908 and 1927, but he missed the implications of his own success. Once the buying public could purchase a relatively competent, cheap car it wanted more: more power, more comfort and more style.

It was Alfred Sloan at General Motors who saw what the next phase of the auto market would be, and by the late 1920s, he was putting in place his “ladder of consumption,” with the inexpensive Chevrolet at the bottom, the luxurious Cadillac at the top and a group of increasingly more comfortable and expensive cars (Pontiac, Oldsmobile, Buick) in between. Yet none of these cars was fundamentally different from the other. They were all designed to haul families, and all were based on the same basic engineering. Features such as electric starting, windshield wipers, heaters and more powerful engines tended to move down over time from luxury cars to less expensive vehicles, but for some 30 years the fundamental nature of the American car did not change. Autos simply got larger, fancier and more powerful. The buying public rewarded this pattern with steadily increasing sales.

In the 1950s, cracks began to appear in the seemingly solid edifice that was the American passenger car market. A growing number of buyers were attracted to distinctly “un-American” imported cars like the MG and Jaguar sports cars from Britain and, especially, the quirky, cheap, reliable German Volkswagen. Struggling U.S. automakers American

Motors and Studebaker had success with “compact” cars like the Rambler and Lark. By 1960, the Big Three American automakers (Ford, Chrysler and General Motors) were ready with their own compacts – the Ford Falcon, Plymouth Valiant and Chevrolet Corvair. Over the next decades, these cracks in the stolid, solid family-car market multiplied and widened as buyers focused on an increasing array of ever-narrower market niches. Eventually dealerships were filled with “intermediates” (Ford Fairlane, Olds Cutlass); sporty “pony cars” (Ford Mustang, Plymouth Barracuda); “muscle cars” (Pontiac GTO, Chevrolet SS396); “personal luxury cars” (Ford Thunderbird, Buick Riviera); and “subcompacts” (Chevrolet Vega, Dodge Omni). In 1984, American Motors introduced the Jeep Cherokee, a smaller version of its four-wheel-drive Jeep Caravan. Buyers who had no intention of taking the vehicle off-road embraced its roomy, boxy body and its rugged image, and soon a new term entered the marketing lexicon – “sport utility vehicle” (SUV). All the while a quiet revolution was going on as pickup trucks, once the province of farmers and construction workers, attracted a larger audience. By the early 1970s, the best-selling American vehicle, bar none, was the Ford F-100 pick up. It retains that position today. By the end of the 20th century, buyers were confronted with a vast array of trucks, cars, SUVs, minivans and “crossover vehicles” (something between a car and an SUV) from both foreign and domestic makers.

Another trend has been the questioning of the whole idea of personal transportation. The personal motor vehicle is credited/charged with destroying cities; creating suburbs; destroying older suburbs and creating newer ones; contributing to global warming; causing dangerous dependency on foreign sources of oil and thereby having a deleterious effect on American foreign policy; creating generations of underexercised, overweight Americans; and causing tens of thousands of preventable deaths annually – the list could be extended indefinitely. Are there limits to the American fascination with personal mobility? Or will Americans retain “a certain defiant insolence that would fiercely protect one’s right – anybody’s right – to use up the automobiles, the highways, and yes, the natural beauty, too, in pursuit of unquestioned personal ends” (Ferguson, 1979, 17)?

Public Transportation

In centuries past, public transportation was far more important (though much more uncomfortable) than it is in most parts of the country today. The horse had its place – hauling goods and people throughout towns and thereby lightening the load for those who could afford horse power. However, in terms of impact on our American culture, electric trolleys and the railroad are often credited with greatly expanding, if not actually creating, our American suburbs.

The Stagecoach: An American Icon

One of the most evocative horse-drawn vehicles of all time is the [stagecoach](#). Forever associated in American minds with the West, it was in fact designed, built and used first in the East. Only after railroads had made it obsolete there did its Western heyday begin.

The first stagecoaches – so called because they moved on a defined route from relay station to relay station in stages – were most often really wagons fitted with seats and perhaps a frame for a roof and leather curtains. Later, purpose-built stage wagons used leather thoroughbrace suspensions that made them somewhat more comfortable for passengers. About 1795, lighter, shorter vehicles called “coachees” began to be used on shorter routes. By 1817, post coaches or post chaises or oval stages, with an oval profile, began to be used. In the 1820s, makers in Albany and Troy, New York, introduced ruggedly designed coaches that were the precursors to the famous Concord coaches. In 1827, J. Stephens Abbot, then employed by Lewis Downing of Concord, New Hampshire, built the first of these famous vehicles. The body was fully enclosed, with large windows covered by roll-down leather curtains. A leather thoroughbrace suspension allowed the body to accommodate the rough roads of the period. The driver sat outside, up front, while a rear-mounted boot carried luggage. The design was so successful and well adapted to its purpose that it changed little until the company ceased making stagecoaches in 1915.

Stages were an important component of the developing 19th-century transportation network. They carried the mail, newspapers and passengers, and spurred the improvement of roads. For instance, between 1800 and 1820 the travel time between Boston and New York dropped from six days to 36 hours; between Philadelphia and Petersburg, Virginia, from seven days to two days; and between Baltimore and Washington from a day to six hours.

Taverns were an important component of the stage network, providing food and lodging for passengers, stabling for the horses and often attracting a cluster of related business such as stores, blacksmith shops and post offices. Tavern keepers were generally respected members of the community.

After the 1850s stage routes declined east of the Mississippi as railroads carried more and more passengers and mail. But the stage moved west, serving its original purpose until railroads superseded it there also.

Railroads

In the early and mid-19th century, steamboats and other watercraft were tied to bodies of water, and overland travel was slow, uncomfortable and unpredictable. The development of the railroads completed the national transportation system and transformed American mobility in the 19th century. More than any other mode of transportation, railroads epitomized American technological and commercial development.

The first successful railroads in America were actually imported from Great Britain, including the famous John Bull in 1831. But early on, American inventors enthusiastically adapted this technology to the unique conditions of the American continent. Railroads quickly outstripped canals as the nation’s primary overland mode of transportation and, for many years, brought an end to any overland road development.

Early innovators include:

- Peter Cooper, considered the inventor of the first American locomotive
- John B. Jervis and John Harrison, developers of the characteristic form of the American [locomotive](#)
- William Norris, developer of the standard locomotive engine
- Robert L. Stevens, Ezra K. Dodd and Henry R. Dunham, early American locomotive builders

After the Civil War, railroads expanded at an unprecedented rate, with financial aid and support by the U.S. government, individual inventors and enterprising capitalists and entrepreneurs. But no railroad initiative captured the public's imagination more than the building of the transcontinental railroad, completed in 1869. What started as an engineering project became, in typical American fashion, a race for completion. After numerous accidents, financial greed and corruption, and endless controversies (including the use and sacrifice of Chinese laborers to lay track), the Central Pacific and Union Pacific railroads met at Promontory Point, Utah, where the Golden Spike was driven. Despite its problems, the transcontinental railroad was considered a marvel of innovation, a distinctive American design adapted to the American landscape – quickly put together, yet light and flexible, able to take sharp turns and run on steep grades and over light wooden trestles.

Major contributors to creating the transcontinental railroad were:

- Engineer Theodore Dehone Judah
- Entrepreneurs Charles Crocker, Collis P. Huntington, Mark Hopkins and Leland Stanford, the Big Four, who financed and created the Central Pacific Railroad
- Oakes Ames, Thomas C. Durant and Major General Grenville M. Dodge, the Big Three, who were instrumental in building the Union Pacific Railroad

Between 1870 and 1920, America constructed the largest railway system in the world. These were mostly financed by wealthy railroad barons like Jay Gould and Jim Fisk. Fierce competition led to the development of faster and larger railroad cars and improved service. Great engineering marvels, such as bridges and tunnels, paralleled the development of the railroads.

Later innovators include:

- George Westinghouse, who in 1898 developed a brake system using air under pressure and thereby greatly helped improve railroad safety
- George Pullman, who in 1875 developed elegant railroad cars for tourists and businessmen; the cars converted from daytime to nighttime use, making long cross-country trips both comfortable and practical

Public Transportation in the City

Horse-Drawn Vehicles

Horse-drawn omnibuses were the first great public conveyances in American cities. In 1831, Abraham Brower began omnibus service in New York City between Bond Street and the Battery at a fare of 12.5 cents. Within a few years, omnibuses were adopted by Philadelphia, Boston and other cities. Omnibuses, however, had many disadvantages. Rough streets made their trips hard on both horses and passengers. As historian Kenneth Jackson says, “Unpadded benches, poor ventilation, and rude, bad tempered drivers did cause fatigue and exposed the limitations of ground level transportation” (Jackson, 1988, 34). An observer in the *New York Herald* of the time noted that “Modern martyrdom may be succinctly described as riding in a New York omnibus” (ibid., 35).

The first great improvement in the omnibus was the horse railway. Iron wheels on iron rails made an easier pull for the horse and a smoother ride for the passengers. The first street railway in the United States, the New York & Harlem, began

operating in 1832. It was a steam railroad but used horses within the city, running on buried rails along the Bowery, from Prince to 14th streets. New Orleans opened the next horsecar line in 1835, but it was not until the 1850s that horsecars spread to Brooklyn, Boston and other cities.

The horse-powered street railways became an important part of the urban transportation mix, but they were subject to all the problems endemic to horses in cities. In 1872, an epidemic of equine influenza devastated the railways' horse fleets. Under the best of circumstances, horses lasted only three to five years in horsecar service before dying or being sold for less demanding work.

Mechanical Alternatives

Throughout the 1870s and 1880s, cities explored various mechanical alternatives to horsecars, including steam dummies (so called because they were disguised to look like horsecars) and systems powered by compressed air, ammonia and naphtha. Only steam dummies gained some widespread use, but they were still unpopular because of the smoke and sparks they produced.

In 1868, the first cable car system in the United States, designed by Charles T. Harvey, began operating as an elevated line in Manhattan. By end of 1870, service had ceased and the system was sold.

The first successful cable car line in the country was opened on Clay Street in San Francisco in 1873 by Andrew Smith Hallidie. In 1882, the opening of the Chicago City Railway demonstrated that cable systems could work in ice and snow, making way for the spread of the systems throughout the country. At the peak of the cable car boom, there were systems in San Francisco; Chicago; Philadelphia; Kansas City; Cincinnati; New York City; Louisiana; Binghamton; Hoboken; St. Louis; Oakland; Brooklyn; Omaha; St. Paul; Newark; Grand Rapids; Pittsburgh; Seattle; Denver; Butte; Sioux City; Spokane; Providence; Portland; Washington, D.C.; San Diego; Cleveland; Baltimore; and Tacoma. Between 1892 and 1913, most cities replaced cable lines with electric streetcars. By the end of 1913, only San Francisco, Tacoma and Seattle had

cable lines, and all ran on streets with steep hills. Tacoma (1938) and Seattle (1940) replaced the cable cars with buses. Only the San Francisco line survives, with a mere 4.7 miles remaining from the once 52-mile-long system.

Electric Railways, Subways, Trolleys

The replacement for the horsecar would be powered by the great magical power source of the late 19th century – electricity. A variety of inventors experimented with battery-powered trains during the 19th century, but the first successful attempt to build an electric railway supplied by a generator was in 1879, when Ernst Werner von Siemens built and displayed a small demonstration line at the Berlin Industrial Exhibition. In 1881, Siemens opened the world's first commercial electric railroad at Lichterfelde in Berlin. The first American experiment was by Thomas Edison, with a small line at his Menlo Park laboratory in 1880.

In the 1880s, Leo Daft and Charles van Depoele constructed electric street railroads in various places, including Baltimore and Montgomery, Alabama. Van Depoele's Montgomery line was the most successful, but all lines suffered many problems. The first really successful [electric streetcar](#) system in the United States was opened in Richmond, Virginia, in 1887-1888 by Frank Sprague. After many teething problems, Sprague's system became the model for other systems, and streetcars spread throughout the country. By 1890, U.S. streetcars carried two billion passengers per year, twice the rest of the world combined.

In a few cities, such as New York, Boston and Chicago, a combination of electric subways and elevated trains were successful, but most cities lacked either the resources or the population density to make subways feasible. Trolleys dominated in American cities until approximately 1920, when competition from autos began to take a toll. Cost-cutting measures like the Birney one-man cars and modern President's Conference Committee (PCC) design cars could not halt the streetcar's decline. In the years after World War II, most American cities replaced them with buses.

Electric trolleys are often credited with greatly expanding, if not actually creating, American suburbs. Trolley companies made much of their money by running lines through sparsely developed areas and then selling building lots along the lines. They unquestionably made it possible for city workers to live increasingly farther away from their jobs. But some observers have concluded that something deeper was at work in the American psyche. The desire for an individual home, with a bit of ground around it, is a powerful motivation. In 1899, Adna Ferrin Weber published a study of cities in North America and Europe (“The Growth of Cities in the Nineteenth Century”) in which he noted that the population density of 15 American cities averaged 22 people/acre compared with 157.6 people/acre for 13 German cities. “It has sometimes been argued,” says Weber, “that this is largely the result of the development of the electric street railway in America, but the causal connection is not apparent. . . . It should rather be said that the American penchant for dwelling in cottage homes instead of business districts after the fashion of Europe is the cause, and the trolley car the effect” (Jackson, 1985, 43).

Buses

One of the great, continuing American transportation myths is the story that General Motors, in cahoots with tire and oil companies, bought up viable streetcar systems and replaced them with buses all across the country. The most complete statement of the conspiracy theory is David St. Clair’s “The Motorization of American Cities,” heavily based on the work of Bradford Snell, assistant counsel to a U.S. Senate antitrust subcommittee. The most popular statement of the story came in the Disney movie “Who Framed Roger Rabbit?” Historians from James Flink to Scott Bottles to Robert Post have discredited the story, but it is alive and well because it serves to explain a complicated phenomenon that is hard to understand.

Buses took business away from existing modes of transportation that were limited by running on track (e.g., streetcars, trolleys, railroads). They were convenient and flexible, able to reach areas not accessible by track, and with routes and schedules that could be readily adjusted to meet changing

needs. They were also cheaper to build and operate than streetcars, and it was easier (and safer) to load and unload passengers at the curb rather than in the middle of the street.

Regularly scheduled bus service, involving set points of departure and arrival, may have started in Hibbing, Minnesota, as early as 1913. Many early bus services were started by taxi and jitney operators. Sometimes early buses were simply luxury sedans enlarged to carry more passengers. Bus lines evolved to meet perceived needs, especially tours, linking small towns to larger places and connecting metropolitan areas to the surrounding hinterlands.

Crude early bus bodies designed to set on and attach to truck chassis were replaced in the late 1920s with more integrated bus designs. With new, more efficient designs, the bus business took off, as many small entrepreneurs scrambled to form independent bus services. In 1929, there were about 6,200 bus carriers with a combined total of about 35,250 buses, covering approximately 350,000 miles. Bus routes connected most parts of the country, and route patterns were quite dense in many cities and states. But the low costs involved in building and operating a bus service caused dangerous, unsafe vehicles and conditions, leading to state regulations and the ultimate consolidation of the state bus systems. The national Greyhound system consolidated in 1929, affiliating with several existing bus systems to form America’s largest bus line.

Bus travel thrived during the Great Depression as a practical alternative to cars. By 1933, Greyhound boasted 844 buses, with a seating capacity for 27,000 passengers. National Trailways organized in 1935, focusing on transcontinental travel.

Buses ran best on hard-surface roads, and highway building through the 20th century encouraged local, regional and cross-country bus travel. Bus lines could easily meet commuter needs, connect with regional and long-distance rail networks, and provide access to previously inaccessible parts of the country. By the 1950s, Greyhound and Trailways together controlled nearly half of the nation’s bus market, as measured in terms of miles driven. Meanwhile, small bus companies continued to thrive, especially within cities.

However, the convenience of automobiles (for shorter distances) and airplanes (for longer distances) inevitably surpassed the popularity of buses, especially by the 1980s, with deregulation and increasing competition within the bus industry. Bus travel continued to be popular primarily in cities where congestion deterred car travel and parking, but it was also popular among those who couldn't afford cars. Buses continued to provide important connections to other public transportation systems, such as subways and light-rail systems.

Commercial Transportation

To today's automobile driver, the interstate highways often seem dominated by long-haul trucks. In fact, over 75 percent of all freight goes by truck. But this dominance is a post-World War II development. Indeed, until well into the 20th century, roads were not a very good means of moving heavy goods over any appreciable distance.

Conestoga Wagons

One of the most famous early American vehicles was the Conestoga wagon. Developed in Lancaster County, Pennsylvania, about 1750 to be pulled by teams of horses or oxen, it was for decades the great American overland freight hauler. (Note: The heavy Conestoga is not to be confused with the lighter, Western "prairie schooner" that made up pioneer wagon trains.) Over a good road, the Conestoga could haul up to three tons of cargo about 15 to 20 miles per day, or about two miles per hour. But hauling goods in a Conestoga or any other cart or wagon was very expensive. As a U.S. Senate committee report noted in 1816, a ton of goods could be carried 3,000 miles from Europe to America for about \$9. Moving the same ton 30 miles over an American road also cost about \$9. Little wonder, then that Americans

relied on rivers and coastal shipping whenever possible. This price difference also helps account for the alacrity with which Americans adopted first the canal and then the railroad. The advent of the motor truck in the early 20th century finally began to change this reality.

Trucks

Truck traffic grew slowly, carrying small loads relatively short distances between locations that were not served by other modes of transportation. Often trucks directly replaced horse- or mule-drawn vehicles. Even into the 1920s, long-distance trucking was not practical due to the poor quality of American roads.

The semitrailer – a two-wheeled trailer designed to be pulled by a four-wheeled truck – appeared before World War I but did not begin to have a great impact until after World War II. Truck efficiency was enhanced by the general adoption of diesel engines. The creation of the Interstate Highway System was the last piece of the puzzle. The diesel-powered semitrailer became the dominant means of transporting goods that were not bulk commodities, like wheat and coal, which were more often transported by railroad.

Chapter 4

Modes of Transportation

- Horse-Drawn Vehicles
- Railroad
- Aviation
- Automobiles
 - From the User's Point of View
 - The American Automobile Industry, 1805-2010
 - Auto Issues Today: Globalization, Powering Cars of the Future, Vehicles and the Environment, and Modern Manufacturing

Horse-Drawn Vehicles

Introduction

In this country of "magnificent distances," we are all, more or less, according to the requirements of either business or pleasure, concerned in the use of riding vehicles.

— The New York Coach-Maker's Magazine,
volume 2, number 4, 1860

The period from the late 17th century until the first decades of the 20th century has been called by many transportation historians the "Carriage Era." In the 17th and 18th centuries, carriages were extremely expensive to own and maintain and consequently were scarce. Because roads were poor and vehicle suspension systems rather primitive, riding in a carriage or wagon was not very comfortable. As the 19th century advanced, industrialization profoundly affected the production, design and use of horse-drawn vehicles. In the United States, the combination of industrialization and the ingenuity of individual vehicle designers and makers made possible the production of a wide range of vehicles, some based on European styles but many developed in the United States.

The Horse as a Living Machine

The horse is looked on as a machine, for sentiment pays no dividend.

— From W.J. Gordon, The Horse World of London, 1893

For most of the Carriage Era, business owners regarded horses primarily as machines whose principal value was in the profits that could be derived from their labor. One pioneer of modern breeding, Robert Bakewell, said that his goal was to find the best animal for turning food into money. The vehicles themselves really make up one-half of a machine. The other half, the half that makes the carriage or wagon useful, is the horse itself. In engineering terms, the horse is the "prime mover."

Thinking of a vehicle and a horse as two parts of the same machine raises many questions, such as:

- What sort of physical connection is needed between the horse and the vehicle? How do we literally harness the power of the horse?
- How do we connect more than one horse?
- How is the horse controlled – how does the driver get him to start, stop and change direction?
- How are vehicles designed to best take advantage of the horse's capabilities?
- Are some vehicle styles or types harder to pull than others (assuming the same weight)?
- Are horses bred for specific purposes, for pulling specific types of vehicles?
- How much work can a horse do?

But despite what horse owners of the Carriage Era thought, horses are not merely machines – they are living, sentient beings. They have minds of their own; they feel pain; they get sick, and they experience fear, excitement, hunger and fatigue. Today we would blanch at regarding the horse as simply a means of turning food into money. How and when did this change in attitude come about? The 19th century saw the rise of modern, science-based veterinary medicine that replaced older, folk-based medicine. What brought about this change? We are well-equipped to address all these questions.

The Aesthetic Dimension and Unique American Traits of Horse-Drawn Vehicles

A carriage is a complex production. From one point of view it is a piece of mechanism, from another a work of art.

—Henry Julian, “Art Applied to Coachbuilding,” 1884

Horse-drawn vehicles were created with aesthetic as well as practical objectives. Aesthetics are asserted in the broadest connotation, expressing social position, concepts of beauty, elevation of sensibility and the more formal attributes of design and details of construction. Horse-drawn vehicles travel at slow speeds – from 4 to 12 miles per hour. This allows intense scrutiny, as evidenced by 19th-century sources ranging from etiquette books to newspaper articles. From elegant coaches to colorful commercial vehicles, pedestrians as well as the equestrian audience judged aesthetics, design and detail. In many respects, carriages were an extension of a person, like their clothes.

During the 19th century, there were many arenas for owners to display their horse-drawn vehicles. New York’s Central Park included roads designed for carriages. The park was a work of landscape art, and architects Frederick Law Olmsted and Calvert Vaux saw elegant horse-drawn vehicles as essential, mobile parts of that landscape. Other cities developed similar parks on a smaller scale. But a park was not necessary. Any street or road was an opportunity to show off.

Central to horse-drawn vehicle aesthetics was the “turnout.” This meant not only the vehicle itself but also the horses,

the harness, the drivers and often the passengers. Horses were chosen to harmonize with the size and color of the vehicle, and their harness, the drivers’ uniforms and even the passengers’ clothes were expected to harmonize as well. Elegant turnout was not limited to the carriages of the rich. Businesses knew that their vehicles sent a message about the business itself. A smartly turned out delivery wagon or brewery wagon told everyone that the company that owned the vehicle and team was a quality operation. Even the owner of a simple buggy could make an impression by hitching up a good-looking horse and wearing his best clothes.

Many things influenced the styling of vehicles. In the United States, one of the unexpected influences was natural resources. The country had abundant supplies of strong, light wood, like hickory. After 1850, more and more hickory began to be used in vehicles. American vehicles gradually took on a lighter, more spidery look, characterized by thin wheels and slim running gear. European observers were astonished at how light American vehicles were. Many American vehicles also moved away from smooth curves to adopt a sharper, more angular look. This had nothing to do with function. It was simply an expression of fashion.

Diversity of Vehicle Types

When Alfred Sloan used the words, “A Car for Every Purse and Purpose,” he was describing General Motors’ goal of making a range of automobiles that filled every need and fit every budget. But substitute “horse-drawn vehicle” for “car,” and the statement could apply to the Carriage Era.

The sheer variety of horse-drawn vehicles is astonishing. There were elegant private carriages, closed and open, designed to be driven by professional drivers. At the other end of the scale were simple, inexpensive buggies, traps, road wagons, pony carts and buckboards, all driven by their owners. Most passenger vehicles had four wheels, but some, like chaises, gigs, sulkies and hansom cabs, had only two wheels. Commercial passenger vehicles included omnibuses and stagecoaches and passenger wagons that came in several sizes and weights. Horse railway cars hauled people for decades before giving way to the more familiar electrically powered streetcar.

Work vehicles included simple drays for hauling heavy cargo as well as freight wagons like the Conestoga and its lighter cousin, the prairie schooner. Delivery vehicles came in many sizes and shapes, from heavy beer wagons to specialized dairy wagons. Horses drew steam-powered fire engines and long ladder trucks. Bandwagons and circus wagons were familiar adjuncts to popular entertainments, and hearses carried people to their final reward. Ambulances carried people to hospitals, and specially constructed horse ambulances carried injured horses to the vet or perhaps to slaughter if the injury was grave enough.

On the farm, wagons came in many different sizes and were part of a range of vehicles that included manure spreaders, reapers, binders, mowers, seed drills, cultivators and plows. Huge combines required 25 to 30 horses each. Rural vehicles often featured removable seats so they could do double duty, hauling both people and goods. Special vehicles called breaks were used to train horses for pulling carriages and wagons. In winter weather, a large variety of sleighs were available, and many vehicles could be adapted to the snow by the substitution of runners for wheels.

With these themes in mind, let us look at how they play out when applied to horse-drawn vehicles in the city and in the country. While there is some overlap between these two groups – vehicles made for city use can often be used in the country and vice versa – the differences between the two groups are sufficiently clear to make such a division useful.

Horse-Drawn Vehicles in the City

Eighteenth- and 19th-century American cities were horse-powered. Relatively few individual city dwellers owned horses, because the animals were expensive to keep. But freight and passengers moved through cities pulled by horses. By the 1840s, American cities were filled with horse-drawn omnibuses, street railways, stagecoaches and delivery vehicles. Census data for the 19th century did not include horses, but as late as 1900, Manhattan had 130,000 horses; Chicago, 74,000; Philadelphia, 51,000; and St. Louis, 32,000. The life of these animals was not pleasant. One traffic analyst estimated that a city horse would fall on average every 96 miles it traveled.

In the 1880s, the New York City Sanitation Department was removing 15,000 dead horses from the street each year. Living horses deposited between 800,000 and 1,300,000 pounds of manure each day, along with thousands of gallons of urine. The filth made city streets unpleasant and unhealthy. Disease was also a problem for the horses. In 1872, a flu-like epidemic swept through Northern cities, killing horses by the thousands and bringing commerce to a virtual standstill. The conditions led to the creation of the American Society for the Prevention of Cruelty to Animals (ASPCA), led by the crusading Henry Bergh. The combination of electric streetcars and gasoline-powered motor vehicles eventually drove the majority of horses from the city.

Public Transportation

Horse-drawn omnibuses were the first great public conveyances in American cities. The first omnibus was used in New York in 1831, and within a few years, omnibuses were adopted in Philadelphia, Boston and other cities. Omnibuses were functional, but the rough nature of city streets made them hard on both horses and passengers. A contemporary observer in the *New York Herald* noted that “modern martyrdom may be succinctly described as riding in a New York omnibus.” Omnibuses were generally highly decorated to make them visible to potential riders.

The great improvement over the omnibus was the horse railway. Iron wheels on iron rails made an easier pull for the horse and a smoother ride for the passengers. Again, New York led the way in 1832, and by the 1850s, horsecars had spread to Brooklyn, Boston and other cities. Horse-powered railways helped reshape American cities. They allowed people to move farther from their place of work, facilitating the growth of suburbs. As city centers gradually emptied of residences, they became devoted to business. The modern pattern of separate, business and residential neighborhoods can be traced to the horse railway.

Alternatives to the crowded omnibuses and horsecars were the ancestors of today's taxicabs – four-wheeled vehicles called hacks and two-wheeled vehicles called cabs. New York issued its first hack license in 1692. Though more expensive than omnibuses and horsecars, hacks and cabs offered greater convenience and privacy for those who could afford the ride.

Delivering Goods

All manner of goods had to be moved in, out and within cities. Coal, oil, beer, hay, milk, machinery – the list is endless. The vehicles that moved these goods probably constituted the majority of vehicles in the urban traffic mix. In large cities, department stores owned large fleets of vehicles and large herds of horses in order to meet the demand for home delivery of purchases. For example, in 1875, Chicago's Marshall Field's department store owned 50 wagons and 100 horses. Delivery vehicles were often especially well turned out so as to reflect well on the owners. No customer of Marshall Field's wanted a grubby van pulled by a broken-down horse showing up to drop off a fashionable dress or piece of furniture.

Fighting Fires

One of the smallest but most romantic groups of vehicles was fire-fighting vehicles. The earliest fire vehicles were pulled by the volunteer firemen themselves, who also supplied the manpower to operate the pumps. When much heavier steam-powered fire pumps were developed, they required horses to pull them. Fire horses were among the best-cared-for horses in the city. Special harnesses were developed for firehouse use that could be quickly installed on the horses, allowing fire vehicles to leave the station within 20 seconds of receiving the alarm.

Personal Transportation

Because of the cost of keeping horses, ownership of private vehicles was not widespread. Wealthy city dwellers could afford both the horses and the coaches, and vied with one another for the most stylish, fashionable turnouts. But if most citizens wished to drive a vehicle themselves, they resorted to livery stables, where horses and simple buggies or gigs could be rented.

Growth of Veterinary Medicine

One surprising result of the importance of horses in urban life is that cities, not farms, gave rise to modern veterinary medicine. In 1850, only 46 Americans called themselves veterinarians, but 26 lived in New York City. Most of these individuals were not trained in schools but were folk practitioners who relied on traditional methods. A series of equine epidemics during and after the Civil War that swept through crowded urban stables spurred efforts to improve veterinary knowledge. The American Veterinary College, affiliated with Columbia University, was the first scientific veterinary school in the United States. Veterinarians adopted Pasteur's new germ theory of disease more quickly than did doctors who practiced on humans. By 1890, there were 6,954 veterinarians, almost all located in big cities.

City Vehicles in The Henry Ford's Collection:

1881 Horsecar (28.810.1) The horse railway is an American innovation. Its distinctive appearance is rooted in practical considerations. The inward curve of the lower sides allows the use of shorter, and therefore lighter, axles. The spoked wheels are also lighter than solid wheels. The raised clerestory roof is raised only over the center of the car, not where passengers sit along the side. This also lowers the weight of the car, so the horse pulls more paying passengers and less dead weight. The clerestory is lit with blue and red glass, and the endpoints of the car's route are clearly painted, for the benefit of potential riders. This car is a small one, intended to carry only 15 passengers and to be pulled by a single horse. It was used by the Brooklyn City Railroad between 1881 and 1897. In 1892 the railroad had 142 horse-drawn cars serviced by 5,500 horses.

Ca. 1797 Chariot (29.1126.79.1) One of a handful of 18th-century American carriages that have survived unrestored, this vehicle is a magnificent example of a vehicle intended for showing off. Chariots were closed vehicles that held only two people and were driven by coachmen. This one was built for Angelica Bratt Campbell, whose husband, Daniel, was one of the richest men in New York State. It features silver-plated trim, rich carvings, stylish C-spring suspension, and an interior trimmed in leather, baize, coach lace and silk. It should be noted that the C-springs, while visually quite striking, actually put more load on the horse when putting the chariot in motion from a standing start. Two horses pulled the chariot.

1890 Landau (30.1542.113) Over 90 years newer than the chariot, this landau reflects changes in taste, style and methods of manufacture. Its lines are sharper and squarer, but the wheels and undercarriage are also lighter than those of the chariot. Its beauty depends more on its well-drafted shape than on applied ornament. Even though the landau is a very expensive vehicle, it was built utilizing powered machinery and many standard parts rather than being handmade like the chariot. The landau was made by Brewster & Company of Broome Street, New York City, perhaps the most famous of American carriage makers. James Brewster established a small carriage shop in 1804 and taught the trade to his sons Henry and James B. The brothers each set up his own company, but James' faltered in the late 1890s. Brewster & Company of Broome Street was Henry's enterprise, and it survived into the 20th century under the leadership of his son William. This Brewster landau was owned by wealthy industrialist and mayor of New York Abram Hewitt.

Ca. 1905 Veterinary Ambulance (00.574.1) Wealthy New Yorker Henry Bergh was appalled at the often cruel, callous treatment of horses (they were merely means of turning food into cash, remember). Inspired by anti-cruelty groups in London and Paris, Bergh founded the American Society for the Prevention of Cruelty to Animals (ASPCA) in 1866. The organization aimed to speak for all animals, but its focus was on horses. It successfully lobbied for anti-cruelty laws, and Bergh himself often chastised teamsters who mistreated horses, sometimes making a citizen's arrest. Bergh also designed an ambulance for hauling injured horses or for removing dead ones. It featured a movable floor that could be cranked out and slid underneath a downed horse. The ambulance was eventually adopted by other anti-cruelty organizations and veterinarians. This one was used by Detroit veterinarian Dr. Elijah E. Patterson, who practiced from 1890 to 1940. It is set up to be pulled by two (healthy) horses.

Ca. 1885 Hansom Cab (25.1.2) The two-wheeled hansom cab was developed in England in the 1830s but was not adopted in American cities until the 1880s. Having only two wheels allowed the vehicle to be pulled by only one horse. The driver sat outside, perched above the back of the cab, giving him an excellent view of the street and of any potential customers at the curb. Although named after its originator, a Mr. Hansom, the cab is also a “handsome” vehicle, with C-springs, round windows, and large carriage lights.

Ca. 1900 Beer Wagon (29.2048.1) Brewers used vehicles like this one to deliver kegs of beer to taverns. The wagon is heavily constructed to bear the weight of the kegs. The brewer fully utilized what little space is on the wagon for advertising. At the rear of the vehicle is a half-round metal back with a 10-pointed star, painted in yellow and black on a blue ground with yellow and black trim. The undercarriage is red with black and yellow striping, and the brewer’s name is clearly painted in yellow. This was an up-to-date company, for a telephone number is painted on the seat support. At least two horses pulled this heavy wagon, perhaps four. They would have been carefully matched and outfitted so as to give any observers the best possible impression of the brewery.

Ca. 1875 Hearse (36.520.127) This hearse was designed to carry the deceased to the cemetery in dignity and style. It features large oval glass sides through which the casket could be seen, along with curved glass doors at the rear. It has a pair of large silver-plated lamps at the front and other silver trim inside. Two horses drew this hearse.

Horse-Drawn Vehicles in the Country

While large American cities were crowded with horses, rural areas had fewer animals, but horses were just as important. In the country, horses were much less likely to be used for hauling people and more likely to pull farm equipment such as plows and reapers or to haul wagons loaded with hay, grain, cotton or freight. In large parts of the South, mules (the offspring of male donkeys and female horses) were preferred over horses. Mules are sterile and so cannot reproduce on their own. They live longer than horses. Southerners believed that mules withstood heat better than horses, though

they are smaller and weaker than the large draft-horse breeds. Unlike horses, mules will refuse to be overworked. Their famous “stubbornness” is in reality a self-preservation method – when tired they simply stop and will not resume their labors until their energy is restored.

Farm Work

At the beginning of the 19th century, horses were primarily employed in literally tilling the soil. They pulled plows, harrows and cultivators. But later in the century inventive minds rolled out a steady stream of new farm equipment – reapers, rakes, binders, mowers, seed drills and manure spreaders. Implements that could be pulled with one or two horses gave way to 4-horse plows, 8-horse disc harrows and giant combines pulled by 25 mules. In addition, every farmer needed one or more wagons for hauling crops to market or supplies from town.

Dedicated People Carriers

For much of the 19th century, most farmers could not afford vehicles whose only purpose was hauling people. The family could always ride in a wagon. But by mid-century, light people-hauling buggies were being produced that were cheap enough for some to afford. Mechanization caused the price to fall steadily so that by the end of the century one could mail-order a buggy from Sears or Montgomery Ward for \$25. Well before Henry Ford’s Model T automobile, cheap carriages had whetted people’s appetites for inexpensive personal transportation that did not depend on public conveyances running on fixed routes and fixed schedules.

Training Horses

Horses had to be trained to pull vehicles and farm implements. A whole class of vehicles called breaks was created for this purpose. Individual farmers would likely not have breaks, but breeders would have them so they could break their animals to the harness before selling them.

Commercial Transportation

A good deal of commercial transportation moved through the countryside. Stagecoaches carried passengers between towns and cities. Freight wagons hauled goods from depots to towns not served by railroads. Commodities like kerosene were distributed by wagon.

Stationary Power

With the aid of treadmills, sweeps and whims, horses could become portable motors for powering sugar cane mills, corn shellers, small grain elevators and so forth.

Country Vehicles in The Henry Ford's Collection:

Ca. 1900 Farm Wagon (75.77.1) This is a typical, all-purpose farm wagon with a basic square-box body and a seat mounted on leaf springs. Wagons like these were usually drawn by two horses, and thousands were made by many companies across the country.

Ca. 1890 Hay Wagon (81.41.13) This is an example of a special purpose wagon. It has flared sides to increase its load-carrying capacity and includes tall end racks, called “hay ladders,” to assist in tying down large loads of hay. In a horse-powered world, hay was an essential crop. While much hay was used on farms, huge quantities were also transported to cities on wagons like this and sold at central hay markets.

Ca. 1885 Buckboard (26.45.2) The buckboard is an American innovation. It is essentially a pair of axles connected by springy floorboards mounting a seat. The floorboards provide a springing action in place of a heavier, more complex spring system. Buckboards were developed in the first third of the 19th century and could carry both people and goods. This rather elaborate buckboard with a pair of seats was used by a Massachusetts physician, Dr. George E. Woodbury. It was drawn by two horses.

Ca. 1902 Mail Wagon (34.150.1) One of the major innovations that helped break down rural isolation was Rural Free Delivery (RFD), instituted by the Post Office Department in 1896. Prior to 1896, farmers had to pick up their mail at the post office. Rural mail carriers were required to provide their own vehicles, and many chose light mail wagons like this one. Its wood and canvas construction keeps its weight down, and it features pigeonholes for sorting mail. It is even outfitted with a coal-burning stove to keep the mail carrier warm in winter. The wagon was used by August Edinger to deliver mail in Kimmswick, Missouri, from 1902 to 1925. In 1925, he bought a Model T Ford and retired his horse-drawn wagon.

Ca. 1892 Oil Tanker (65.13.1) Standard Oil of Indiana used wagons like this one to distribute kerosene and lubricating oils throughout the Midwest. By 1902, some 6,000 such wagons plied the rural roads. This one served the region of Michigan between Chicago and Detroit. It was pulled by two horses.

Ca. 1820 Pleasure Wagon (28.415.1) The pleasure wagon is an American innovation developed in the early 19th century. The idea was to create a light wagon suitable for carrying both people and goods. The seat is mounted on long pieces of wood that serve as springs; the seat can be removed to increase the carrying capacity. The wagon is suspended on leather thoroughbraces and is highly decorated with paint. It was drawn by a single horse.

Ca. 1900 Skeleton Break (00.3.6902) This vehicle takes its name from its purpose – to break, train, and exercise pairs and teams of carriage horses. Heavily built to give animals the feel of a heavy carriage, it can also stand the abuse that unruly horses might give it. An unbroken horse was usually matched with a steady, reliable horse during training.

Ca. 1900 Stage Wagon (36.520.188) Lighter and less expensive than the more famous Concord coach, stage wagons served much the same purpose. They carried passengers and mail over designated rural routes on a regular schedule. This one ran between Julian, a California mining town, and Foster Station, where passengers caught a train for the 25-mile trip to San Diego. This wagon was pulled by two, and possibly four, horses.

Ca. 1888 Treadmill (28.543.2) Not all horse power was used to pull vehicles. Treadmills could be used as small stationary power sources. This two-horse model is typical: The horses walked on an endless belt, turning wheels that could power machines, like threshers or corn shellers.

1876 Runabout (40.216.1) An example of the light, relatively cheap passenger vehicles that appeared in the last quarter of the 19th century, this runabout features James B. Brewster's patented sidebar suspension and extremely light, steam-bent hickory wheels. It exemplifies the light construction that came to characterize American carriages. It weighs just 96 pounds and was pulled by a single horse.

Horse-Drawn Vehicles for Fun

As leisure and recreation came to be seen as necessities in Americans' busy lives, vehicles played an important part. The earliest of these were horse-drawn. A variety of horse-drawn vehicles that used horses as a power source for show, and during competitions incorporated innovation in their design, operation and use.

Horse Racing and Harness Racing

Horse racing was America's first popular spectator sport, dating back to colonial days. The fashionable standards and sporting traditions established by wealthy Southern planters influenced the future acceptance and organization of many American sports, and of the wide variety of sporting diversions in which these people engaged, horse racing was the most popular. Subscription races were held in larger towns in Virginia and South Carolina (sponsored by the gentry, but spectators came from every class), while quarter-races (informal quarter-mile matches) were a universal feature of Southern country life at the time.

The Southern planters' enthusiasm for horse racing in the mid-17th century was soon matched by that of the wealthy gentry living along the Eastern Seaboard. The popularity of horse racing in the East, especially the spontaneous quarter-races between neighboring settlers' horses, also spread rapidly

to the frontier. By 1788, a circular racetrack had been constructed as far west as Lexington, Kentucky. English thoroughbreds were imported in large numbers during this time, establishing new and dominant bloodlines. Heavy betting accompanied these races, which is why horse racing was widely prohibited in many areas until well into the 19th century.

People working and living in the growing cities craved diversion. In the 1820s, highly organized horse-racing meets took place in cities as new courses and larger grandstands were built for paying customers. Rules were standardized, schedules published and racing times recorded. Early sporting periodicals – including the most popular of this era, *The Spirit of the Times* – spurred the growing enthusiasm. Although betting continued, horse racing had achieved some degree of respectability by the 1850s. It flourished in all parts of the country except New England and was especially popular in the South, the West and on Long Island in New York State.

Horse racing also became a major feature of agricultural fairs, to the annoyance of those who had supported the earlier, noncommercial character of these events.

During the mid-19th century, the distinctive American sport of trotting (also called harness racing) largely replaced thoroughbred racing at fairs. This sport gained popular support because of its “democratic” nature – a trotting horse with a rig was far less expensive to buy, train and maintain than a thoroughbred racehorse. It was considered “common to all...open to every one who keeps a horse for his own driving . . . the butcher, the baker, or the farmer.” It was “the people's sport, the people's pastime” (as stated in Frank Forester's *Horse and Horsemanship of the United States and British Provinces of North America*, 1857). Moreover, many people considered harness racing more respectable than thoroughbred racing since it was not as closely associated with gambling. Thousands upon thousands who cared not a whit for running horses were eager spectators of trotting matches.

Trotting continued to fascinate a wide general public. Commercialized trotting races were thoroughly entrenched features of county and state fairs. A National Trotting Association, formed in the 1870s, brought uniform rules, national contests, and the publication of statistics and records.

From 1905 to 1909, the undefeated trotting horse Dan Patch became a national celebrity, with a speed so fast that other owners refused to race their horses against him. Dan Patch's fame subsequently led to using him in endorsements of numerous products, including toys, cigars, washing machines, and automobiles. It was decades before his record was broken.

Harness racing remained a popular spectator sport at county fairgrounds and at specially lighted racetracks that made night racing possible. Meanwhile, horse racing remained popular with both the wealthy and the gambling "sporting fraternity." The number of metropolitan courses increased, and races were highly organized. The Kentucky Derby, first held in 1875, gave national prestige to thoroughbred racing and encouraged the construction of racetracks across the country.

Leisure offers an exceptional opportunity for the display of wealth and the assertion of social importance. Horses were expensive, and some of the great industrialists' fortunes of the post-Civil War years went into breeding thoroughbreds for racing. Especially during the 1880s and 1890s, the wealthy joined exclusive country clubs where they might attend horse races at ultrafashionable courses, play polo or go fox hunting in the English manner. The first of these social spots is believed to be the Brookline Country Club, near Boston, but it was soon followed by the Westchester, Essex, Tuxedo, Philadelphia, Meadowbrook and Chicago clubs.

During the 1930s, the hope of great fortunes combined with the publicity surrounding colorful thoroughbreds (like Seabiscuit) and new technical advances (like automatic gates and electric timers) helped revive the sport of horse racing at rebuilt and new courses.

Horse racing and harness racing continue to be extremely popular spectator sports today.

Horse- and Harness-Racing Vehicles in The Henry Ford's Collection:

Ca. 1865 Horse-Drawn Sulky, High-Wheeled (36.520.160)

This sulky was used for trotting and was reportedly used by harness racehorse Guy Wilkes and brought to California in the 1880s. High-wheeled sulkies were lightweight, strong and efficient, allowing the racehorse to move as swiftly as possible.

Ca. 1892-93 Horse-Drawn Sulky, Low-Wheeled (00.204.22)

This sulky was used for trotting; it was made by A. Bedford of Coldwater, Michigan. The low-wheeled sulky, introduced in 1892 by the Massachusetts bicycle factory of Sterling Elliott, created a revolution in the sport of harness racing. The low wheels and pneumatic tires reduced friction, especially around turns, and enabled horses to improve their speed dramatically. These sulkies were also lightweight, to help the horses increase their speed around the track.

Ca. 1890 Breaking Cart (36.520.76) U.S. Senator Leland Stanford (who helped build the Central Pacific Railroad and was also governor of California) trained and exercised two of his finest trotting horses, Sunol and Palo Alto, with this breaking cart. At his 11,000-acre ranch in Palo Alto, California, Stanford developed original methods of training horses that were later adopted by other breeders. By the mid-1880s, he had achieved recognition as the foremost trotting-horse breeder in America. The speed of his 2- and 3-year-old horses startled the world of harness racing.

Ca. 1895 Speeding Cutter (31.553.1) This speeding cutter was made by A. E. Perren of Buffalo, New York. Speeding cutters (sleighs) were hitched to trotters and pacers for horse-racing enthusiasts who found winter no obstacle to their activities. This cutter was used by Everett L. Smith of Westborough Massachusetts, for trotting races, then by Frank P. Knowles, who built a private track at his cattle farm in Auburn, Massachusetts, upon his retirement from his position as vice president at Crompton & Knowles Loom Works.

P.T. Barnum, Entertainer to the World

During the early and mid-19th century, education was considered a primary responsibility of all citizens. The urge for self-improvement manifested itself in libraries, public lectures and the creation of public museums.

P.T. Barnum emerged as the key figure in developing, promoting and popularizing museums. He recognized the potential market in the restless urban masses, sensing what they wanted (or could be made to want) and gave it to them. In 1841, he purchased the American Museum in New York and transformed what had been considered an unimpressive collection of historical and scientific curiosities into an entertaining diversion that was patronized by viewers of all classes and ages.

At a time when the theater was still widely regarded as somewhat disreputable, Barnum marketed his Grand Colossal Museum and Menagerie as highly educational and strictly moral. In its 3,000-seat “lecture room,” dramatic performances and variety acts were staged under the guise of “chaste scenic entertainments.” By 1850, Barnum claimed to have amassed more than 600,000 curiosities in his museum, including living serpents, waxwork figures, models of new machines and of Niagara Falls, and fortune tellers. His offerings were infinitely varied and always changing. They were “democratic,” geared to everyone at a time when this idea was highly esteemed – much like Andrew Jackson’s politics.

Barnum also sent major exhibitions out on the road, and promoted such personalities as General Tom Thumb and singer Jenny Lind to the status of national (and even international) celebrities.

General Tom Thumb, a dwarf, was born Charles Sherwood Stratton in Bridgeport, Connecticut. He was taken under Barnum’s wing at the age of 4, and Barnum renamed him. He learned to sing, dance and do impersonations. When fully grown, he was slightly more than 3 feet tall. Barnum exhibited him at his American Museum and toured him through part of the United States and then Europe. General Tom Thumb created a sensation wherever he went. In 1863, Stratton married another of Barnum’s dwarfs, Lavinia Warren, at a much-publicized wedding in New York City.

P.T. Barnum Vehicle in The Henry Ford’s Collection:

Ca. 1875 General Tom Thumb’s Brougham (35.687.1) This carriage was made in England; it was said that Queen Victoria presented it to General Tom Thumb and his diminutive wife when they were visiting Aberdeen, Scotland. It was drawn by small ponies and was one of at least six miniature horse-drawn vehicles used by Tom Thumb during his lifetime. It was used in Barnum & Bailey circus parades until Thumb’s death in 1883.

The Circus

The formal circus, which evolved into a distinct entertainment form in the mid-19th century, combined three different types of traveling performances: staged equestrian shows, animal displays and acrobatic performances. When the three finally merged, the more prominent troupes set up large tents that provided seating for their audiences and used specially constructed wagons for transportation and parades. Circuses would continue to grow in number and scope during succeeding decades.

Circus Vehicle in The Henry Ford’s Collection:

1917 Circus Calliope (30.1623.1) This calliope was made by Bode Wagon Works of Cincinnati, Ohio for Mugivan and Bower’s American Circus, Peru, Indiana. The “steam organ” or calliope, which made its first appearance in American circuses in the 1850s, attracted tremendous crowds to circus parades with its colorful appearance and resounding musical productions. The keyboard and whistles at the top of this calliope were originally inside the vehicle.

Outings

City people have always craved escape from the crowds, the noise and their own busy lives, even if only for an afternoon. This is how early picnic grounds and later trolley parks and amusement parks evolved. In the mid-19th century, the recognition of this need for escape in the city led to the development of city parks.

Parks were the perfect place for a refreshing, rejuvenating and often invigorating outing. City parks like New York's Central Park, created in 1858, were designed to encourage the urban public to socialize and at the same time to refresh and calm their "hurrying, workaday lives" with beautiful and "reposeful" sights and sounds. Central Park had designated places where people could walk, drive horse-drawn vehicles, ride, row, skate and engage in various other sports and recreational activities. During its first decade (1860-70), a substantial majority of Central Park's regular visitors arrived by carriage or horse to take advantage of the 9 miles or so of carriage and bridle paths.

Inspired by this and other great urban parks, the public demand for formal outdoor recreation areas gained momentum during the late 19th and early 20th centuries. Other early parks with special pathways, as well as new parkways around cities, were designed for people to take out and show off their vehicles.

In the winter, a sleigh ride could provide some of the same exhilaration and fresh air. Sleighing was not just for the upper class. Grocers and butchers would affix runners to their wagon boxes and employ their draft horses to take their families for rides.

Outing Vehicles in The Henry Ford's Collection:

1893 Horse-Drawn Brougham (30.1165.2) This carriage was used for outings in Central Park by Byram L. Winters, a lawyer, politician and newspaper publisher; it was made by Brewster & Company of New York City and originally made to exhibit at the 1893 Chicago Columbian Exposition. When driven in Central Park, this brougham was likely one of several thousand stylish carriages circling the park during an afternoon's horse-drawn "promenade."

Ca. 1900 Pony Wagonette (29.2042.) This wagonette, made by Eagle Carriage Company of Cincinnati, Ohio, and other similar vehicles were designed to be drawn by ponies, so they were well-suited for use by governesses in taking children for drives. This particular pony wagonette, which could accommodate several children, was equipped with brakes, which transferred most of the effort of stopping away from the light animal. The fitting at the back is a holder for an umbrella top.

Ca. 1865 Albany Cutter (31.873.1) This pleasing design was developed by James Gould of Albany, New York over a period of years between about 1813 and 1836. Its design was widely copied by other builders and retained its popularity to the end of the horse-drawn era.

Sport Coaching

In the late 19th century, wealthy Americans imported from England the sport of coaching, which was enjoying a huge revival there. Horse-drawn coaches, long ago replaced by railroads as a regular mode of travel, once again came into vogue.

The fine art of driving a four-in-hand (referring to driving a team of 4 horses from the seat of a well-matched carriage) appealed to the newly affluent. And the opportunity to display one's wealth by driving in the park before an admiring group of strollers added additional appeal.

Those proficient in four-in-hand driving established exclusive coaching clubs, which set high standards of performance and taste. Rules governing etiquette, driving form and seating arrangement of the passengers were strictly adhered to.

And stringent specifications were provided for the smallest details of the turnout (the complete assemblage of the vehicle) that included the accoutrements, the horses and the harness, as well as the clothing of the driver, the coachmen and the grooms.

The real growth of sport coaching came after several members of the elite Knickerbocker Club in New York founded the Coaching Club in 1875. Membership in such a club was by election, and gentlemen eagerly sought to belong. Clubs held regular coaching events or undertook journeys to members' homes.

Some coaching club members were intrigued by the challenge of competing – racing against time or timed competitions in which horses were changed out. Others enjoyed driving on a schedule. The ultimate sporting achievement for these individuals was to own and drive a “public” coach running regularly between two locations as far as 70 miles apart. These wealthy coachmen put coaches on regular runs between various cities and resort areas, selling tickets to make expenses. As late as 1908, anyone could ride in such a public coach from a fashionable hotel in New York to Tuxedo Park or Lakewood, New Jersey.

Coaching was predominantly a social exercise, with park driving constituting the greatest use of a coach-and-four. As the season progressed, great rallies were held at the watering places of the elite, such as Newport, Rhode Island. The annual coaching club parade up Fifth Avenue and through New York City's Central Park was a much-anticipated event for participants as well as for the thousands of spectators the parade attracted. Coaching parties also drove out from the city for sporting events, dances, teas and hunt balls. Coaching vehicles were also seen at horse races, providing their passengers with an excellent view from the seats on the top of the vehicle.

When automobile racing began in the 1890s, it was taken up by the same well-to-do crowd that had been involved in sport coaching.

Today, sport coaching is experiencing another revival – with its combination of elegance, tradition and horsemanship. Women have taken up the sport along with men.

Sport-Coaching Vehicles in The Henry Ford's Collection:

1893 Park Drag/Private Road Coach (36.520.71)

This coach was made by C.P. Kimball & Company of Chicago, Illinois, and was originally exhibited at the World's Columbian Exposition (Chicago World's Fair) in 1893. It was later used by George Newhall, active for many years in civic affairs, business and social life in San Francisco, California. This was the classic type of carriage driven for sport by well-to-do gentlemen. Coaches like this one often were seen at horse races, where their passengers enjoyed an excellent view from seats on top of the vehicle. Servants frequently occupied the inside seats.

1906 Private Road Coach (29.706.6) Made by Brewster & Company of New York City, this coach was used by Patrick A. Valentine (previously a high-ranking executive with Armour & Company) on his lakeside estate in Wisconsin. This type of vehicle was a classic form used for sport coaching.

1896 Wagonette Break (36.520.67) This vehicle, made by Brewster & Company of New York City, was used by Walter Scott Hobart, a noted horse breeder who kept an estate in San Mateo, California, complete with stables, racetracks and polo field. The clock in the vehicle gives evidence to Hobart's interest in sport coaching, particularly in keeping to a schedule or racing against the clock.

Resort Vacations

As modes of transportation and roads improved in the early 19th century, pleasure travel became more viable. Most visitors to resorts or watering spots arrived by private carriage or coach. Early pleasure travelers who went by commercial stagecoach did not find the experience particularly enjoyable. Passengers complained of being bounced around on bad roads in hot, dark, crowded coaches; hurriedly wolfing down meals at inns along the way; and being forced to get out and walk over particularly poor stretches of road.

By the 1830s, stagecoaches were also beginning to serve as links between steamboat and railroad lines or were transporting passengers from the end of a railroad or steamboat line to their final destination (our Concord coach served this purpose in its later years).

Through the 19th century, resorts enticed vacationers by offering a combination of pleasant climate, appealing scenery and structured activities like dances and sports activities. Most importantly, they provided a place to mingle with one's peers. The resort vacation reached the height of its popularity between about 1870 and 1920, when increasing accessibility by railroad and steamboat, as well as a greater desire by middle-class urbanites to get away from the pressures, dirt, clamor and ethnic mix of people in the cities, led to a proliferation and variety of resorts in natural and scenic areas.

Resort Vehicles in The Henry Ford's Collection:

Ca. 1880 Hotel del Monte Horse-Drawn Omnibus (36.520.116) Made by Andrew Wight Company of St. Louis, Missouri, this omnibus saw daily service at the Hotel del Monte in Monterey, California, a grand hotel for fashionable tourists located at the end of the western travel circuit. Reportedly the largest hotel omnibus of its time, this vehicle transported guests across the hotel's "twenty-six acres of paradise," which included a golf course, polo field, racetrack, tennis courts and glass-enclosed bathing pavilion. This omnibus remained in operation until 1928.

Ca. 1895 Ladies' Phaeton/Basket Phaeton/Morning Phaeton (36.520.119) This vehicle was used by Mary Kellogg Hopkins of San Francisco, California; it was made by Brewster & Company of New York City. These light, fashionable vehicles, driven almost exclusively by women, were popular at resorts, parks and beaches.

Ca. 1860 Horse-Drawn Carryall (27.177.1) The likely builder of this vehicle is William P. Sargent & Company of Boston. It was used at the Dana family's summer residence in Buzzards Bay, Massachusetts, around the turn of the century. The carryall, a New England term for a light rockaway, transported passengers and their baggage.

Railroad Stories

The railroad, animated by its powerful locomotive, appears to be the characteristic personification of the American. The one seems to hear and understand the other – to have been made for the other – to be indispensable to the other.

— Guillaume Tell Poussin, 1851

The American railroad achievement is fundamental – despite its apparent invisibility and purported decline – to the economic, technological and democratic might of the United States. The following three themes reappear over and over in the stories of railroads and railroad companies.

Adaptation and Innovators

We are all practical men on this road, and don't believe in thy gimeracks.

— Railroad official quoted in Journal of the Franklin Institute, January 1868

Much as Herman Melville claimed a whaling ship to be his Yale and Harvard, so ought the United States to claim the railroad as its engineering school. All manner of civil, mechanical and electrical engineering expertise can be traced to fundamental developments played out as a result of the possibilities and demands of American railroads: bridge builders, tunnel diggers, roundhouse workers, telegraphers and locomotive designers all played a fundamental role in the accumulation of know-how that formed the bedrock for America's industrial preeminence.

The ability to accommodate these possibilities and demands can be traced back to the 200+ steamboats that were plying the Mississippi and its tributaries in the late 1820s. The mostly anonymous tinkers, mechanics, and machine designers who built, operated and watched over these boats undertook an adaptation of steam technology that led to the United States' industrial preeminence: industrial might built on repair-on-the-fly demands plus sophisticated machine design and advanced engineering rooted in cut-and-try,

seat-of-the-pants sensibilities. These sensibilities and strategies were carried forward into the railroad arena, becoming equally crucial – second nature, even.

Capital and Entrepreneurialism

The benefits of the invention are so palpable to their good sense that they endeavor to make an application of it everywhere and to everything, rightly or wrongly. When they cannot construct a real, profitable railroad across the country from river to river, from city to city, or from state to state, they get one up, at least as a plaything or until they can accomplish something better, under the form of a machine.

— Michel Chevalier, March 15, 1834

American railroads were built quickly and cheaply, resulting from and adapting to American economic realities. Their role here – both physically (as infrastructure) and technologically – was distinct from railways in Britain: There the industrial revolution preceded and largely led to the development of the railway technology; here the railroad carried and to a great extent caused the revolution.

Low investment with an insistence on swift returns resulted in a cheaply made railroad system, poised on a peculiar pinnacle and balanced between super-sophisticated high tech and offhand disposability. Present-day expectations and attitudes regarding the affordability, longevity and rate of technological change can in large part be traced to these roots. The attitudes endure, even if the actual hardware of the railroad – cheaply built, worn out and ultimately scrapped – has not.

According to Carroll Purcell, the adoption of standardized time – prompted not by the government but by railroad operations – was “an omen of new standardizations and uniformities to come.” Standardizations, such as the development of accounting procedures, interstate commerce regulations and the corporation, all find fertile beginnings in railroad operations and investment.

Passengers and Workers

The very permanence of matter seems compromised and oaks, fields, hills hitherto esteemed symbols of stability do absolutely dance by you. The countryman called it “Hell in harness.”

— Ralph Waldo Emerson, Journal, 10 June 1834

A love of mobility, a passion apparently hardwired into the American character, found a perfect host in the railroad. Going somewhere is one thing – getting back another entirely: By offering an opportunity to go and return, over and over, the railroad became wedded to that restless something embedded in the American character.

The railroad industry was a massive employer: The numbers ballooned from 163,000 in 1870 to 1,700,000 in 1916, around 4 percent of the nation’s workers – and this figure does not include those employed in directly associated industries such as locomotive and car builders or foundries and other concerns that supplied the railroads.

The passenger became a willing commodity, a parcel – someone impassively registering the passing scene but no longer necessarily a part of it. It was a technology that virtually defined modernity – a technology that enveloped you. This pervasiveness was further ramped up in the era of streamlining – passenger and train as complementary venues for fashion and design, the train and passenger as projectile. The railroad as a harbinger and emblem of modernity (in terms of speed, reach and aesthetics) sets the stage for newer, more flexible choices in the quest for mobility and personal transportation.

The Henry Ford’s Railroad Collection: An Artifact-by-Artifact Exploration of Stories and Thematic Threads

1858 Sam Hill Steam Locomotive (28.680.1) This is, in many people’s eyes, an example of the quintessential American locomotive. No argument here – in fact, for this writer it is certainly, along with the Mississippi riverboat, one of the utterly and absolutely quintessential American mechanisms.

Why? Well, first, it captures a fundamental sense of youthful abandon hardwired into the American character. Locomotives like this were in their day the fastest and most glamorous mechanisms on Earth. The nature of their flamboyance captures a characteristically American engagement with technology’s possibilities – a machine as a canvas for the celebration of ambition, achievement and a brighter, faster future. The liberal application of gold pinstriping and polished brass – even in some instances the incorporation of landscape scenes and further personalization with antlers and weathervane-like figures – all capture a uniquely American manner of celebrating and owning what was in fact a highly advanced technology.

And second, from a mechanical standpoint, the Sam Hill represents a supremely innovative technology – one developed from and closely allied to the American railroad predicament. Its combination of flexibility, light weight and high poweroutput were the result of a distinctly American set of circumstances: The twisting, grade-heavy nature of our railroads – a situation that arose from the clash between low-investment/fast-return attitudes and American topography and distances – ensured that imported British locomotive technology would end up being transmuted into something entirely new. Locomotives such as Sam Hill are the direct result of that process. Also, the development of these locomotives did not come about through what we would now consider rational research methods; instead, they grew out of hands-on, seat-of-the-pants engineering knowledge – homespun advanced engineering, humanized high tech – characteristics at the core of, and crucial to, the American industrial experience.

1865 Bangor and Aroostook Day Car (25.80.1) This car – a very fine reproduction – captures the character and physical nature of the first generation of American passenger cars. Its finish and level of decoration suggest both the ambitions of early railroad enterprises and the expectations of early railroad patrons.

Historian Wolfgang Schivelbush has convincingly claimed that open cars such as this were “economically, politically, psychologically and culturally the appropriate travel container for a democratic pioneer society” – contrasting such vehicles with the European compartment cars that reflected the stratified social conditions there. While it is generally acknowledged that Mississippi riverboat accommodation provided the prototype for the open cars developed by American railroads, there can be no doubt that the increasing spread of the American railroad network, using open cars as the standard passenger vehicle, helped promote this democratic all-in-it-together approach to travel.

The open layout might appear to us practical, rational, and straightforward, but in many ways it was radical and socially innovative. And even if its layout simply reflects the social norms or attitudes of its era, it absolutely offers evidence of a social leveling largely unknown in other civilized nations. Not until the era of the cheap automobile did enclosed personal compartments become the transportation situation of choice for the general public.

1909 Bessemer Consolidation Steam Locomotive (83.190.1) Locomotives like this were designed to haul heavy freight trains at relatively slow speeds: a perfect example of the kind of anonymous motive power designed to haul apparently unremarkable materiel. This example was built for the Bessemer and Lake Erie, an Andrew Carnegie-owned railroad connecting the port of Conneaut, Ohio, on Lake Erie with Bessemer on the outskirts of Pittsburgh, Pennsylvania. Traffic on the B&LE consisted almost exclusively of southbound iron ore trains and northbound coal trains – a great example of an apparently modest connector railroad playing a limited but utterly crucial role in a nationally important heavy industry.

Visually, this locomotive stands in stark contrast to the Sam Hill, just 50 years its senior: no pinstriping to refresh, no bright paintwork to keep clean, no brass to keep polished – in fact, no superfluous details whatsoever. This is practical, brute technology designed for a single purpose: maintenance kept to fundamentals and aesthetics of no account whatsoever. While its technological origins lie in the confident improvisations of the 19th century, the overall design of locomotives in this period was increasingly informed by a better understanding of scientific principles.

Ca. 1901-1905 Combination Car (79.15.3) Combination cars were designed to carry passengers and baggage/freight. Although many were built for mainline express trains, they were particularly attractive on branch lines or other areas where passenger traffic was light and the need for flexibility was high.

This car has baggage, parlor and smoking areas, and was possibly converted from a plain baggage/parlor combine. There was no standardized layout for combines – they were made for railroads in many configurations according to their needs. Many combines were cars that had been modified from earlier cars by their owners – an approach that carries over to virtually all railroad equipment, subject as it was to constant modification, improvement and improvisation according to the changing needs of the railroad business.

1921 Fair Lane Business Car (96.112.1) Just as today’s captains of industry and business leaders consider an executive jet to be a crucial part of their tool kit, so in the period prior to widespread air travel was the railroad business car considered an essential amenity.

There are two basic categories of business cars, each with their equivalents in the modern world of business jets: the private car (at its most grandiose taking the form of “a palace on wheels”), owned by a wealthy individual or large corporation, and the chartered car, a well-appointed business car, available for hire by companies or individuals as needed. Business cars were attached at the rear of regularly scheduled passenger trains, according to arrangements made ahead of time with railroad companies. While the reliance

on existing timetables and the inevitable complexities associated with being switched from one train to another en route might seem cumbersome and time-consuming to us, the opportunity to conduct business on the go, with food to order and a place to sleep, all in fully staffed, well-appointed surroundings, made sense from a business standpoint: Work was accomplished, decisions were made and the individuals concerned arrived in a better state than if they had been prey to the pitfalls of the ordinary traveler.

This car, Henry Ford's Fair Lane, was one of the largest passenger railcars built when it was completed by Pullman in 1921. It is a private car and as such reflects the taste of its owner, one of the wealthiest men on Earth. Paradoxically, Ford's restrained taste and sense of occasion (think of the scale and finish of his house, given his wealth) resulted in a car that had more in common with the lower-key chartered cars – vehicles that incorporated the sumptuousness of the boardroom rather than the chairman's own particular taste. Even more paradoxically, traffic records reveal that the most extensive use to which Fair Lane was put was luxury transportation for Clara Ford and her close friends on shopping trips to New York City.

1923 Snowplow (91.400.1) Whether instantly recognized as a snowplow or simply admired for its immense curvaceous sculptural presence, it is this writer's experience that visitors of all ages connect readily with this artifact.

Brute force seems to play a large role in many areas of railroading – whether in sheer pulling power, in machine aesthetics or lack thereof, or in a variety of equipment assembly operations – but it is the battle with snow that offers the purest example of the use of unmediated force in the world of railroading.

Pushed by as many as eight locomotives, hitting drifts at speeds of up to 65 miles per hour, supported by “pull-out” locomotives, commissary cars and bunk cars for maybe hundreds of shovel-duty men – snowplows were crucial to railroads whose routes extended into the high passes of the Rockies or Sierra Nevadas. The operation of these heavy but rakish-looking machines was actually quite complex: Crews

stationed in its cupola deployed the pneumatically powered wings and rail-clearing forward edges according to changing conditions and the proximity of grade crossing timbers or signals; judgment was called for when attacking major drifts. Derailments, loss of life and damage to equipment could result if tried-and-true strategy wasn't deployed.

The snowplow provides evidence of our continuing battle with natural forces and offers a glimpse into one of the most arduous tasks associated with railroading. “Bucking” snow was – and remains – dangerous work, taking place in areas where the struggle could swiftly turn from straightforward railroad difficulties (very few tasks associated with railroading are pleasant) to a life-and-death struggle.

1924 Fruit Growers Express Refrigerator Car (87.207.1)

Serious experimentation with ice-cooled refrigerator car design began in the 1860s. Much of the early successful use of refrigerator cars was focused on the shipping of dressed meat from Chicago to cities in the East, but by the late 1890s, refrigerated shipping of all kinds of perishable products by rail had become big business. By the time this car was built, 150,000 such cars were in use.

This car was built and operated by Fruit Growers Express Company, a pioneer in refrigerator car service. Cooling was provided by ice, loaded through roof hatches into large bunkers at each end of the car. Fans, driven by the car's axles, helped to circulate the cool air. Insulation was provided by dry air trapped in fibrous material (such as mats of felted flax or cattle hair), sandwiched into the floor and walls of the car. A car like this was only as good as the infrastructure that supported it: A national network of company-owned ice-making and ice-loading installations provided the necessary ice (a car of this type can melt 45 to 55 pounds of ice per hour – more in very hot weather). Careful timetabling was also needed, and the necessarily strict schedules were such that the special all-refrigerator car trains usually received priority over all other rail traffic.

Refrigerator cars made it possible for regions with extended growing seasons, such as Florida and California, to market their produce in other parts of the country, thus greatly

expanding their agricultural industries while allowing people in cold climates the luxury of year-round fruits and vegetables. The rise of mechanically cooled refrigerator trucks began to seriously erode rail-transported perishable goods in the years following World War II. This car remained in service until 1971.

1925 DT&I Caboose (72.163.1) Most people imagine the engineer ensconced high in the cab of his powerful locomotive to be the man in charge of the train. He might be the most visible of railroad employees, but whether he's at the controls of a lowly freight train or a glamorous express, it was the conductor that he answered to.

The conductor made sure that the train was complete and protected. If he was in charge of a freight train, he tracked all the material on that train and ensured that each car was securely fastened. If he was in charge of a passenger train, he made sure that passengers had tickets and that they were in the proper cars. In both instances, he and his staff (brakemen on freight trains, assistant conductors on passenger trains) ensured that the brake systems were functioning correctly and the cars and all hookups were properly coupled. It was the engineer's job to ensure that the movement of the train was trouble-free, but it was the conductor's job to ensure the safety and integrity of the train.

On a freight train, the caboose provided the conductor with a base to undertake all his duties. It is ironic that both the lowly caboose and the well-appointed private car should find themselves at the end of the train, because, despite the dissimilarity in their appointments, their function was rather similar: They were both homes away from home and mobile offices. The caboose provided the conductor with a place to do the books, to cook and, on long stopovers in rail yards, to allow him and his staff to catch up on sleep. Along with a stove, bunks and a desk, the caboose was also outfitted with a combination of bay windows and cupola to allow the conductor and his brakemen to observe both their own train and others on the line. A huge proportion of the work undertaken on railroads was based on constant and well-informed vigilance – looking for evidence of damage

or overheating and making sure that loads hadn't shifted or that equipment hadn't loosened. Something as simple as an untethered chain or unlocked door could escalate into life-threatening situation. The caboose was also equipped with a large complement of tools to effect in-service repairs.

The "little red caboose" still looms large in the public's imagination, but the caboose was not always red. It all depended on the policy of the owning railroad. The caboose – and the freight conductor – are largely things of the past, superseded by computer monitoring and bookkeeping.

1926 Ingersoll-Rand Diesel-Electric Locomotive (70.96.1) Despite this artifact's virtually complete lack of visual charm (not a shred of rugged elegance here; this is the classic "box on wheels"), it is actually one of the most significant items in our railroad collections. This engine was part of a calculated and savvy business move on by Ingersoll-Rand (partnering with General Electric and American Locomotive) to produce a new locomotive type to challenge the steam locomotive – a deliberate attempt to break into the massive railroad market using internal combustion technology. While Ingersoll-Rand never really gained a foothold in the field, its venture played a successful part in the practical demonstration of this new form of motive power.

Hindsight suggests certain inevitability in the demise of the steam locomotive – an inflexible and inefficient mechanism compared with the modular, easily deployed workhorse diesel. From a 1920s perspective, however, the diesel had little going for it. Overly complex and unproven, it seemed a minor interloper in an industry with so much invested – both monetarily and intellectually – in what was then a mature and refined technology. Even then, however, there were factors starting to work against the all-pervasive steam locomotive, specifically the mid-1920s moves by New York City and Chicago to ban the use of steam locomotives within their city limits on account of pollution concerns – fertile soil for the growth of alternative technologies.

There is a touch of David and Goliath about this artifact when viewed in the context of the sheer numbers of steam locomotives then in service. This and other units like it were

the unassuming thin end of a wedge that was to revolutionize the railroad scene. In 1925, there was one diesel to 63,612 steam locomotives in mainline service in the United States; by 1945, there were 3,816 diesels to 38,853 steam locomotives; and by 1960, the final year for steam on Class I railroads here, there were 28,278 diesels to 261 steam.

1941 Allegheny Articulated Steam Locomotive (56.50.1)

Off at the back of the museum's power exhibit is a rangy apparatus – a water pump made mostly of wood, mounted on a granite plinth. Its business end, a clanking group of wrought- and cast-iron components, represent a beginning point for the technology seen in full flower in the Allegheny. Institutionally, we are fortunate in having both the world's oldest surviving steam engine and one of the most advanced examples of reciprocating steam technology as applied to railroads.

The importance of the Allegheny – both institutionally and historically – is hard to overstate. It is both straightforward and paradoxical: an overwhelming machine that has great human appeal; close at hand and yet impossible to fully take in; a blunt instrument of industrial efficiency enshrined on a teakwood floor in an approachable museum setting. In short, it is both plainly stated and chameleon-like – a perfect museum artifact.

Historically, it represents a technology played to the limit of tight physical constraints – those imposed by a railroad's right-of-way (sharpness of curves, size of adjacent structures, axle loading of track and bridges). The Allegheny represents a masterfully trim packaging of all the components necessary to make an efficient steam locomotive – a technology pushed to a particular limit with spectacular results. The refinements embodied by the Allegheny were the result of the Lima Locomotive Company's chief mechanical engineer, William Woodard, and his relentless pursuit of "superpower." His success was borne out by designs that demonstrated a 25 percent to 30 percent increase in efficiency – success that resulted in a steam design revolution that spread to all the American locomotive manufacturers.

1941 GG1 Electric Locomotive (2003.56.1) The GG1 represents a seamless marriage of design, engineering and ambitious marketing aspirations – an artifact that blurs the lines between those distinct disciplines. Raymond Loewy – responsible for the appearance and finish of the GG1 – was an industrial designer of the first rank, a consummate professional who saw no limit to the deployment of his skills. He virtually defined the profession of industrial designer, broadening its purview to claim a territory that incorporated everything "from toothpicks to locomotives." As a result, he redefined the role of the consumer, forever changing the way we appreciate and understand what we buy. His talent was such that his designs retain the same power to seduce that they did when they were new.

The GG1 and the Allegheny are the same age (they were both delivered to their respective railroads in December 1941); the contrasts between them, both visual and conceptual, are immense – the one pointing the way forward (electric railroads are at the forefront of present-day railroad operations), the other a distillation of two centuries of accumulated steam power knowledge. The GG1 was in front-line railroad service for around half a century – a locomotive class that was so well conceived and so well built that it outlasted the locomotives that had been purchased as replacements – a prime example of American technological preeminence and longevity. The Pennsylvania Railroad pursued its electrification program in the midst of the Great Depression; the GG1 was emblematic of American resolve and optimism in the face of economic anxiety.

Aviation (with a special focus on 1903-1939)

The Early Years

Never have I seen such a look of wonder in the faces of a multitude. From the gray-haired man to the child, everyone seemed to feel that it was a new day in their lives.

— Minister observing a crowd of more than 1 million people witnessing the first plane to fly over Chicago, 1910

No century began with as much promise for change as the 20th century did. The automobile, telephone, phonograph, motion pictures, the electric light and appliances, bottled soft drinks and canned soups – all so prosaic and common at the end of the century – were the new wonders at its beginning. At a time when many Americans still lived in rural, agricultural communities with shared traditions and values that had spanned generations, these new wonders must have been astounding. But none could have seemed more unbelievable than human flight. Unlike many of the new inventions more likely to be encountered in daily life, there seemed to be no words to describe an airplane flight except ones borrowed from the supernatural and mystical realms – words like “inhuman,” “wondrous,” “occult” and, most commonly, “a miracle.”

Through the 19th century, the steady accumulation of knowledge of the physical world had brought about new possibilities in the ways people thought about human flight. Tinkerers and enthusiasts combined their imaginations with practical research to create hot-air balloons, gliders, airships and even experimental engine-driven planes.

Into this universe came Orville and Wilbur Wright. The [Wright brothers brought with them not only an appreciation for the limits of the physical world and the work done to date](#) but also an extraordinary ability to imagine and work through the possibilities available within those limits. They also brought their passion. Like other early inventors of “flying machines,” Wilbur admitted in 1900 that he was “afflicted with the belief that flight is possible to man.” Their first short powered flights took place in 1903, although

at the time these received virtually no publicity. By 1905, their plane was a refined, fully controllable aircraft, capable of staying aloft as long as the tank had fuel and the pilot had stamina.

Of course, the Wrights were not alone in their quest for powered flight, either in America or elsewhere. In France, for example, several people were also solving the problems of human flight, and they were attracting much more attention than the Wrights. In fact, it was not until the Wright brothers proved the superiority of their plane in France that they received their first major publicity.

The Wrights and others pushed the boundaries of aviation during the pre-World War I years, setting records for altitude, distance, speed and duration almost weekly. But the American public and much of the press remained skeptical that human flight was even possible. The early wood-and-canvas planes looked rickety, not very powerful and downright dangerous. How could they possibly fly? People would have to see it to believe it. And, as the years went by, more and more of them did.

To show the public just what airplanes were capable of doing – and simply to stay in business during the early years – manufacturers staged traveling air shows and meets. Male and even some female pilots – courageous birdmen and birdwomen, as they were called – performed daring aerial feats as they “barnstormed” around the country. Crowds of the uninitiated flocked to circuses, carnivals, county fairs and other public events, eagerly shelling out hard-earned savings simply for the privilege of watching these wondrous acrobatics. Sometimes these shows did more harm than good for the aviation business, as the media – ever searching for dramatic story angles – tended to further the notion that airplanes were hazardous and that the pilots were daredevils and fools. In fact, much of the early public fascination with aviation was attributed to the “deliciously chilling prospect of an airplane smash-up.”

Still, as more people witnessed the “miracle” of human flight, they began not only to believe that it was possible but also to become enthralled with its potential. By 1910, a new branch of journalism – the aerial beat – had evolved to sup-

ply the demands of this public fascination. At the same time, a growing number of novels, popular magazine articles, songs and movies devoted to aviation subjects reinforced public acceptance and enthusiasm.

On the eve of World War I, human flight was still considered a novelty. Airplane design had changed very little. Planes had few instruments for safety and navigation, and flying continued to involve real life-or-death risks. No larger infrastructure was yet in place for airplane landing, storage, maintenance or continuing research and development. Moreover, the two major American airplane manufacturers – Wright and Curtiss – were locked in a bitter patent suit. And one major question still loomed large – what were airplanes really good for?

1914-1929

Who shall say that this new flying perspective, concerning old worlds and new, is not broadening mankind today?

— Pilot Norman Hall, 1920

During World War I, the American public’s romanticized vision of the “knights of the air” transcended the airplane’s functional military purpose. While Americans expressed revulsion at the introduction of new weapons, such as machine guns, tanks and poison gas, they somehow perceived air war as purer than ground war. World War I flying aces fought each other, individually, in dramatic dogfights or duels – much like the chivalrous knights of medieval times.

Meanwhile, the airplane industry was dramatically transformed during the war. Spurred by national pride and a sense of urgency, the U.S. government stepped in to boost airplane development, forging a permanent link between aviation and government. With vital aid and expertise from European immigrants such as Anthony Fokker and Igor Sikorsky, the aircraft that emerged from four years of combat was far more capable, durable and powerful than the fragile machines made in America in 1914. Cheap surplus aircraft became available for [airmail](#) and barnstorming after the war, often flown by pilots who had been trained for combat. The

most popular and least expensive of these was the Curtiss JN-4D, also known as the Jenny.

The growing public enthusiasm and support for aviation in the late teens and 1920s evolved into what contemporaries termed “airmindedness.” This meant not only having enthusiasm for airplanes but also supporting aviation developments and believing in their potential to better human life. As aviation was finding its place in American life, the public’s airmindedness had much to do with how people’s existing values related to larger social issues at the time. These included the desire to come to terms with the constant influx of new inventions; mass communication and new ways of thinking during this time of rapid transformation to a modern industrial society; the quest for knowledge and experience and the effective use of both to make the world a better and more civilized place; and a renewed search for community at a time of disillusionment, individual achievement and self-promotion.

The public’s growing airmindedness immediately after the war was helped by Hollywood’s enthusiastic embracing of it through both films and celebrity endorsements. But perhaps no group did more to foster and spread airmindedness in the twenties than the barnstormers. Unlike prewar exhibition fliers – who tended to perform where large audiences could be gathered – these aerial gypsies gave demonstrations or rides for any audiences anywhere. Charles Lindbergh himself began his aviation career as a barnstormer.

Americans watched excitedly as whole new concepts of time and distance were created. To great public acclaim in 1923, Lieutenants John A. Macready and Oakley G. Kelly of the U.S. Army completed the first nonstop cross-country flight, and in 1926, Lieutenant Commander Richard E. Byrd reached the North Pole (this claim was later contested). Hardly a year passed that male and female pilots – flying some newly invented plane – did not explore a new corner of the globe or cross another continent or ocean. Of course, no flight was more celebrated than Charles Lindbergh’s solo, nonstop flight from New York to Paris in 1927, which galvanized the nation and caused a celebration unlike anything ever witnessed in American public life. In fact, like

President John F. Kennedy's assassination and man's landing on the moon much later, the most memorable moment for many people who lived at that time was when they heard that Lindbergh had crossed the coast of France. Much has been written about the reasons why Lindbergh became such a larger-than-life – almost mythical – hero, including both his unassuming personality during an era of self-promotion and his flight's affirmation of America's pioneer instincts and virtues. Although Lindbergh did not singly cause the public's enthusiasm for aviation, his flight did much to reinforce the air-mindedness that already existed.

At the same time that individual flyers were testing their planes' and their own personal limits, the aviation industry was coming into its own. Although it still took years for myriad problems to be worked out, airplanes were proving themselves useful in dozens of ways. U.S. Air Mail Service commenced in 1918. The transfer of this service to commercial carriers in 1925 spurred the serious development of the fledgling airlines as well as encouraged new, safer airplane designs, new infrastructure developments and related industries. Government support provided a major boost to technical research and development, helping to advance the new field of aeronautics. It was through this research that the concept of aerodynamic, streamlined design to reduce drag was realized, which became a hallmark of airplane designs during the 1930s. The Air Commerce Act of 1926 established the authority of the federal government to regulate aviation routes, rates and safety standards.

Airplanes were also being designed to transport passengers, especially time-pressed business travelers. The Ford Tri-Motor, introduced in 1927, was considered state of the art at the time. It could carry 10 passengers in relative comfort along with a load of mail. Smaller private airplanes were also being enlisted for a variety of purposes, including training, pleasure, business, agricultural crop dusting, photography, air shows and transporting cargo. By the end of the 1920s, aviation was an increasingly accepted mode of modern transportation with enough momentum to weather the hard times of the Great Depression.

1930-1939

Announcing the New Aeroform, Flying-Powered Nash for 1935 Hupmobile's Air-Line Beauty Foretells True Air-Line Performance

— 1930s automobile advertising slogans

During the 1930s, aviation became instilled in American culture, as its daily functions became accepted in American life, and both its technology and styling became emblematic of people's hopes and dreams for the future. The Depression-era values of unity and group commitment also correlated with developments in the aviation industry during this time.

Record-breaking feats by individual aviators continued to make the news – particularly for speed and long distance. But, probably because they mirrored the larger drama of the Great Depression itself, it was the tragedies that particularly unified the American public at this time. These included the kidnapping of Charles Lindbergh's baby in 1931; Wiley Post's death in an airplane crash with Will Rogers in 1935; and Amelia Earhart's disappearance in 1937. Public enthusiasm for aviation filtered down to many people's daily lives through the mass media of news, magazine articles, fiction, movies and music. Many Hollywood celebrities owned their own planes, connecting flying with glamour and providing vicarious thrills for the star-struck public. Learning the rudiments of flying was also considered a highly desirable skill for young people, and model airplane clubs abounded. Children's toys, games, stories and comic books reinforced the popular mania for anything "aeroplane."

Commercial airlines prospered even during the Depression. More and more people were getting used to the idea of traveling by plane at the same time that airplanes were becoming safer, faster and more comfortable. The [Douglas DC-3](#) was the first in a new generation of trend-setting passenger airplanes of the 1930s. It carried 28 passengers and promised new standards in comfort. In 1936, in its use by American Airlines to transport passengers from New York to Chicago, the DC-3 became the first airline operation to make a profit by hauling passengers. By 1938, about 80 percent of passengers on U.S. airlines (and many foreign airlines) rode on

DC-3's, and it became the standard airliner for the next 20 years. By the end of the decade, increased features on all commercial airlines reflected the growing interest in and demand for passenger satisfaction and comfort, including hostesses and stylish, streamlined interiors.

Private flying and the light-plane industry flourished during the 1930s, stimulated by the "Lindbergh boom." Novice Lindberghs flew for the love of it or operated small private businesses. A popular vision that flourished during the time was that these planes would become so inexpensive and easy to operate that everyone would own an airplane. Eugene Vidal, director of the Bureau of Air Commerce, even spearheaded a "New Deal for Aeronautics," an initiative that presumed the stimulation of light aircraft sales would contribute to America's recovery from the Depression. Unfortunately, these planes needed so much skill, training and maintenance, and they proved so costly, that most of these grandiose plans were abandoned by the late 1930s.

The significant technical changes in aircraft during the 1930s were due to increased importance given to research by the U.S. government, by aircraft manufacturers and at universities. As the field of aeronautical engineering became established, aircraft went through significant changes during the decade. Although many of the disparate elements had originated in Europe, they were integrated into American aircraft in such a way that the United States came to dominate the market. Government agencies at all levels became very involved in aviation. Local and federal governments – recognizing the economic potential of air travel – built, regulated and maintained airports (some of them also beautifully streamlined). By the 1930s, the federal government was responsible for air traffic control, issuing weather forecasts and investigating air accidents.

Along with these developments came a growing professionalism and sense of fraternity among pilots. The early pilots, many of whom had been strongly individualistic barnstormers, were being replaced by a new generation of pilots who were more knowledgeable about climate, radio operations and navigation. Airplane flying was turning into a standard and regulated vocation, and its adventurous aspects were declining.

On the eve of World War II, aviation was no longer a dream. People not only believed it was possible, many of them had actually tried it. In the course of its evolution since the Wright brothers' first flight, aviation had become a viable and successful industry as well as a powerful cultural symbol. Over the course of some 40 years, this new, almost unimaginable invention had become an ordinary part of our culture, something most Americans would soon come to take for granted. The unprecedented public enthusiasm and adventurous spirit that had marked aviation for those four decades would, before long, be transferred to an even more remarkable and seemingly impossible feat – travel to outer space.

Since 1939

Aviation made great strides during World War II, leading to the rapid growth of both passenger and cargo traffic after the war. During the 1950s, passenger travel by air surpassed that of railroad, and by 1958, it surpassed travel by ocean liners crossing the Atlantic. Faster, more comfortable, less expensive airplane flights encouraged a preference for this mode of travel. Meanwhile, the florist, fashion and other industries realized that rapid transport by air reduced inventories, cut warehouse costs and simplified handling procedures, and businesses increasingly turned to this mode of transport. Radar, perfected during World War II, became the norm at airports to control increasing air traffic.

Although the British led in gas-turbine engine development, American progress in aerodynamics and airframe design moved quickly and impressively ahead until U.S. jet engines took the lead in jet aircraft design and technology. Both the first Douglas (DC-8) and Boeing (707) jet planes came on the market in 1958 and soon became the preferred choices of jet planes among international airlines. These jet-powered airplanes ushered in the "Jet Age," markedly advancing the capacity and range of commercial aircraft and greatly expanding both global production networks and the reach of tourism to and from the United States. In the 1970s, lowered airfares, a product of airline deregulation, attracted more non-business air travelers and introducing car renting to a much wider audience.

Increasingly larger, more fuel-efficient jet aircraft have made possible long-haul, nonstop services to previously unimagined distances around the globe. They linked places where geographical barriers had previously existed and were a factor in both the decentralization of major corporations and the evolution of conglomerates. However, along with these great advantages, staggering costs and terrorism threats remain major issues in the feasibility of aviation as a major mode of transportation in the future.

Automobiles

From the User's Point of View

This report explores the relationship between users and their motor vehicles – how they acquire, use, personalize, maintain and dispose of cars and trucks. It goes on to reflect upon why so many people chose to embrace motor vehicles. The report is organized around the four basic things that automobile users do with cars:

- Acquire them; for example, buy them, rent them, steal them
- Use them; for example, drive them, ride in them, park them, modify them
- Maintain them; for example, in repair shops or as “shade tree mechanics”
- Dispose of them and their by-products; for example, in junk yards or by sending combustion products out tailpipes

How do we acquire cars?

We buy them.

Early automobile buyers had to consult a variety of sources for information: newspapers, publications such as *Horseless Age* and *Cycle* and *Automobile Trade Journal*, automobile

shows, word of mouth, advertisements and observations of other people's vehicles. Cars were typically sold through existing merchants, like bicycle dealers, hardware stores or department stores. Buyers paid cash and often bought their cars without ever seeing an actual example. Auto manufacturers soon set up franchised dealerships and attempted to standardize product information and selling procedures. Potential buyers were increasingly confronted with ads and brochures appealing to their emotions – the desire for speed, prestige, freedom, comfort and modernity. Ads appeared in popular magazines, newspapers and eventually on the new medium of radio. In 1913 came the biggest single change in the buying experience when new cars began to be sold on credit. By 1924, 75 percent of new cars were bought “on time.”

From the mid-1920s through the 1940s, the buying experience changed little. But in the years after World War II, dealers became greedy, charging top dollar and often forcing unwanted options on eager buyers starved for new cars after years of depression and war-enforced austerity. When the buyer's market ended in 1953, dealers resorted to high-pressure tactics and a variety of hidden charges to move the metal. The sales were made, but most buyers came to view the process of purchasing a new car with distaste. In the 1990s, General Motors' Saturn division successfully sold a mediocre product by eliminating price haggling and generally treating the customer with respect. In the last two decades, leasing has become a popular way to acquire a car. But as a practical matter, the leasing experience differs little from the new-car-buying experience.

Not all autos are purchased new, of course. A used-car market had developed by 1905. Used-car buying acquired an even more dodgy reputation than new-car buying. The sleazy used-car salesman became a stock character in popular culture. Used-car operations tied to new-car dealerships have a somewhat better reputation. The advent of the Internet brought the rise of used-car websites like CarsDirect and AutoTrader that function much like nationwide classified ads. Other sites like CarFax provide histories of specific vehicles and aim to take some of the uncertainty out of the used-car-buying process.

We rent them.

It is not necessary to buy a car in order to use a car. Rental car industry tradition says that the rent-a-car business began in 1916 when Nebraskan Joe Saunders started renting out his Model T to traveling salesmen. But the true father of the modern car rental business was Walter Jacobs, who offered a dozen Model Ts for rent in Chicago in 1918. Demand was so high that by 1923 his annual revenues were \$1 million. Jacobs' company eventually morphed into Hertz. Unfortunately, car rental acquired a shady connotation, since many people believed the cars were often used by bootleggers, bank robbers and prostitutes. The repeal of Prohibition in 1933 allowed renting to become more respectable. Hertz and others tapped the business market by placing facilities at railroad stations. After World War II, the growth of airline travel boosted the popularity of renting. In the 1970s, lowered airfares, a product of airline deregulation, attracted more non-business air travelers and introduced car rental to a much wider audience.

Another form of car rental is the taxicab. The taxi patron rents only a seat and a ride. Horse-drawn cabs were long a part of the urban scene. Perhaps the first automotive taxis in the United States were electric cabs made by the Electric Vehicle Company (EVC) in 1899. Some 2,000 went into service in New York, Boston, Philadelphia and Chicago. EVC cabs proved to be poorly designed and unreliable, but the idea of motorized taxis was sound and continued to spread, especially in congested cities. In 1907, the New York Taxicab Company imported 600 gasoline-powered French Renault taxis. Taxi fares were high compared to public transportation, and thus taxi customers tended to be affluent. The taxi-riding experience has evolved steadily, from the advent of purpose-built cabs from companies like Yellow and Checker to the use of minivans and SUVs today to experiments with credit-card-based payment systems.

A more recent version of renting is car sharing. Car sharers typically rent the use of a vehicle for only a few hours. They reserve a vehicle, pick it up at a particular spot, return it to

the same spot and pay via a credit card. The growth of the Internet and other digital technologies has made reserving and paying for this service much easier. Some car share operations, like Zipcar, are for-profit ventures, some are nonprofit like I-GO and some are cooperatively owned by the subscribers.

We borrow them.

Borrowing has long been a favorite method for short-term use.

We steal them.

The first report of a stolen automobile was in St. Louis in 1905. Since then, car theft has been a continual worry for car owners and a continual opportunity for the dishonest. Some car thieves are merely joyriders, some are criminals needing getaway cars and some are agents for chop shops. Theft has become so sophisticated that some thieves will steal to order, acquiring and delivering particular models, years and colors. Popular culture is full of car theft themes, from movies like *Bonnie and Clyde* to video games like *Grand Theft Auto* to Kerouac's "On the Road," whose hero, Dean Moriarty, was, among other things, a talented car thief. Car theft has spawned a variety of antitheft devices, from car alarms to The Club to Lojack.

We make them.

The earliest auto pioneers, like Carl Benz and Henry Ford, had to make their own cars. But even after factory-made automobiles became widely available, a small group of people were still attracted by the challenge and reward of building their own cars. It became possible to take parts of existing cars and assemble them into something unique and different. After World War II, a whole "kit car" industry grew up to meet the demand for building one's own automobile. Today it is possible to buy bodies, frames, suspensions and other necessary parts and create everything from a hot rod to a sports car.

How do we use cars?

We learn to drive them.

The earliest drivers were of necessity self-taught. A new owner might receive instruction from the person who sold him the car, assuming that person knew how to drive himself. Wealthy owners formed automobile clubs that allowed sharing of knowledge. In many cities, the YMCA worked with these clubs to establish training courses for both drivers and mechanics. Ignorance was an opportunity for entrepreneurs, who started private driving schools. Driver's education ("Driver's Ed") became part of the high school curriculum in the 1950s and 1960s but has now faded in popularity, leaving formal training to the for-profit driving schools.

Today most young people still learn to drive the way their grandparents and great-grandparents did – directly from their parents. One reason learning to drive is so informal is that in the United States driving has from the first been regarded as virtually a natural right and not a privilege. Thus, only the most rudimentary driving skills and knowledge of traffic laws are required to meet the licensing requirements. Yet the importance of drivers in the safety equation has long been recognized. Traffic laws, speed limits, rules for determining the right-of-way, driver education courses, driving-under-the-influence laws and traffic police all developed in response to the need to regulate driver behavior.

We drive them.

This may seem obvious, but driving a car is so common that we don't realize how much the experience has changed over time. In the early years, there was no consensus on how an automobile should be controlled. Steering was done first with a tiller, then with a wheel. Steering wheels were first put on the right side of the car but eventually moved to the left. Some throttles were controlled by foot, most by hand. Brakes and shifting controls showed similar variations. The present arrangement of pedals, levers and steering wheel did not become standard until the mid-1920s.

Driving the early, open horseless carriages was an adventure, exposing operators to dust, mud, rain, wind and a bouncing ride. Those cars had to be actively driven, requiring full mental and physical engagement on the part of the operator. The gradual adoption of closed cars, electric lights, electric starting, heaters, better brakes, windshield wipers and more comfortable suspensions made cars more capable and easier to drive. By the mid-1930s, a car was a weather-tight cocoon that allowed people to travel at 40 to 50 miles per hour for hundreds of miles. In the years after World War II, the driving experience became increasingly disconnected from the road and the car itself. Power brakes, power steering, automatic transmissions, radios and stereos transformed driving into something akin to aiming. This development even sparked a reaction as some buyers gravitated to sports cars that provided a more elemental driving experience. Today there is concern about the distractions of cell phones, and there is active research on "smart" cars and highways that will take over more of the operator's responsibilities.

We take "necessary" trips.

This may also seem obvious until we remember that, at the dawn of the auto age, no automobile trips were "necessary," because cars themselves were not necessary; people already had well-established ways of getting where they truly needed to go. The automobile extended the range of where people could go in a reasonable time. It freed people to live long distances from where they worked or shopped, and freed them from dependence on fixed public transportation routes. Indeed the rise of the private car helped put public transit systems out of business. Eventually driving to work or to buy groceries or to the doctor or to a PTA meeting became "necessary" because these places were too far away to walk and there was no public transportation that went there.

We take vacations and pleasure trips.

In the beginning, all automobile trips were pleasure trips. The simple pleasure of going where you wanted to go, when you wanted to go was hugely attractive. Before the coming of the automobile, only the wealthy could afford extended vacations away from home. Such trips required railroad journeys and stays in expensive hotels. But the combination of the Model T and better roads changed all this. Traveling by car was relatively cheap, especially if one camped out along the way. By the mid-1920s, private campgrounds that catered to automobile tourists appeared, as did “cabin camps” featuring one-room cabins. These were followed by more elaborate facilities eventually known as motels. After World War II came the franchised motel chains, led by Holiday Inn. As auto vacations increased in popularity, enterprising people created roadside attractions designed to capture the interest and money of passing motorists. Amusement parks, zoos, excavated Indian mounds, alligator farms, gardens and museums sprouted along major highways.

The ability to take motorized vacations depended on significant improvements to roads and highways. At the turn of the 19th century, American roads were perhaps the worst in the industrialized world. The growing popularity of automobiles eventually resulted in public pressure for better roads and a public willingness to pay for them. In the 1910s and 1920s, state and federal governments expanded spending on roads and highways. But the innovation that would transform highway financing was the gasoline tax. Oregon instituted the first such tax in 1919, and within 10 years, all states and the District of Columbia had one. Throughout the 1920s and 1930s, most of this new revenue stream went into improving existing roads rather than building new ones. By the late 1920s, the combination of improved cars, new roadside services and attractions, and improved roads made possible a new American institution – the road trip.

The highway network was steadily expanded after World War II, but nothing had greater impact than the Interstate Highway System. In 1956, the Federal Aid Highway Act

authorized the construction of 41,000 miles of express highways. One of the great public works projects in human history, the interstate system transformed and homogenized the highway traveling experience. Wide high-speed lanes and franchised gas stations, restaurants and motels took most of the adventure out of the road trip.

We ride in them as passengers.

Riding in early automobiles, like driving in them, was an adventure. Passengers were exposed to the same mud, dust, wind, rain and sun as drivers, and dressed accordingly. Owning and riding in an automobile meant also owning and wearing special gloves, coats, caps and goggles to provide protection from the elements. But the riding experience changed drastically in the 1920s. In 1919, nearly 90 percent of cars were open, with no fixed top. By 1929, nearly 90 percent were closed, making for a much more comfortable ride. By the mid-1930s, the introduction of heaters and radios made riding in a car a pleasant experience in all kinds of weather. Well into the 1970s, the only major changes for passengers were more entertainment options (stereo radios, FM radios, cartridge tape players, cassette tape players) and air conditioning.

The last 30 years have seen a dramatic transformation in the auto passenger experience. Mandatory seat belt usage, coupled with the popularity of bucket seats, has put an end to dating couples sitting side by side. Deploying air bags can be lethal to small children (and adults who happen to be “out of position,” as the engineers put it). So youngsters, who once sat up front talking with parents or luxuriated in a large backseat or played Monopoly on the floor of a station wagon are now lashed into a backseat-mounted safety seat, not to be allowed up front until they are past a certain size and weight. DVD players and individual climate controls have brought a living room atmosphere to the car.

We show off in them and personalize them.

The vehicle one drives inevitably makes a personal statement. It is a reflection of tastes, economic status and values. Automakers grasped this point fairly quickly and began building and marketing cars for specific groups and income levels. The wealthy purchased custom-built bodies for their luxury cars, but after-market parts manufacturers offered a vast array of accessories that allowed ordinary car owners to personalize their vehicles.

The late 1940s saw the rise of customizers, like George Barris and Detroit's own Alexander brothers, who would turn an ordinary production vehicle into something unique. There are both regional and cultural dimensions to these activities. The hot rod roadster with no hood worked well in sunny California but was not so popular in colder climes. Latinos developed a separate visual vocabulary that distinguished their "low rider" customized cars from those built by Anglos. Today the production and sale of specialty appearance and performance equipment is a multibillion-dollar industry.

We earn a living in them.

The earliest people to earn a living driving cars were chauffeurs hired by wealthy car owners. Chauffeurs both drove and maintained cars. As automobiles became easier to drive and cheaper to own, the number of chauffeurs declined, but there is still an active market for personal drivers, limousine drivers and car service drivers.

Doctors were among the earliest adopters of automobiles, because cars allowed them to make house calls more quickly (when doctors still made house calls).

Traveling salesmen also readily adopted automobiles, because cars freed them from railroads' fixed routes and schedules. By the late 1920s carmakers were targeting salesmen with "business coupes," low-priced, 2-seater closed cars with room to store sample cases.

The most familiar way of earning a living with a car is as a taxi driver. Some drivers own their own cars, but many more work for a company, driving whatever vehicle is available.

Contractors, landscapers and others whose work takes them to different locations often use cars or pickup trucks as mobile offices. Many vehicles now have power outlets allowing computers, cell phone chargers and fax machines to be plugged in. Modern communication technologies make the mobile office highly functional.

We live in them.

This is hardly a major use, but some homeless people do live in their cars. A recent Nissan commercial even touted the comfort of the new Sentra by featuring a person who purported to live in the car for several weeks.

We date, court and mate in them.

The automobile had an enormous effect on American courtship patterns. With access to a car, courting couples were no longer tethered to front porches, parks or other public places; they could get away and be alone. This aspect of automobility was so generally recognized that it became the subject of many popular songs - "Take Me Out for a Joy Ride," "Take a Little Ride with Me, Baby," "On the Back Seat of the Henry Ford," "I'm Going to Park Myself in Your Arms" - and the best-known car song ever, in which the singer invites his girl to "Come away with me, Lucille, in my merry Oldsmobile." As that song implied, it was not even necessary to have a destination; simply cruising in the car was an activity in itself. The advent of car radios in the 1930s only enhanced the vehicle's usefulness as a mobile entertainment center.

Cars not only allowed couples to get away, they also offered privacy. A popular legend (we have no evidence to back it up) spread that Henry Ford fixed the width of a Model T's backseat to 38 inches so as to limit the possibilities for love-making. Be that as it may, the growing popularity of closed cars in the 1920s, with heaters and larger, more comfortable interiors, meant that cars could be cramped, but serviceable,

mobile boudoirs. Some manufacturers even offered seats that could fold flat, ostensibly for use in auto-camping. The ultimate in rolling bedrooms were the customized vans popular in the 1970s. Featuring carpeted walls and floors, mirrored ceilings, elaborate sound systems, garish – even lurid – exterior murals and bumper stickers like “If It’s A-rockin’, Don’t Come A-knockin’,” they were the stuff of teenage male fantasies and parental nightmares.

The car also serves as a symbol of virility. Men, whether teenagers or adults, believe (often correctly) that some cars are “chick magnets” and some are chick repellants. The low-slung sports car, rumbling muscle car or overpowering 4x4 SUV all imply that their driver is stronger, tougher and more of a risk taker than the driver of a lumpy sedan or a wimpy economy car. Conversely, the woman who drives one of these can be attractive or a threat, depending on the man.

We park them.

Driving is what makes car ownership interesting, but parking is what makes it convenient. Ample, economical parking at destinations is essential to the automobile’s usefulness. Analysts have calculated that the average automobile spends some 400 hours per year in motion, which means it spends the other 8,360 hours parked. Parking for home storage only takes up 688,000 acres (approximately the land area of Rhode Island) and each car needs at least two spaces – one at home and one at its destination.

Words like “park,” “parking,” “parking lot” and “garage” are terms we take for granted. But in the early 20th century, they had to be invented. “Park” and “parking” were military terms that referred to the placing of artillery carriages side by side. Places where cars were parked were variously called stations, terminals and fields before “lot” became universal. “Garage,” like many automobile terms (including the word “automobile”), was borrowed from the French.

Parking first became an issue in the 1920s as the automobile population grew. Curbside parking was chaotic – some people parked parallel to the curb, some at an angle; some blocked driveways, entrances and fire hydrants. Cities and towns soon passed laws regulating parking. In 1935,

Oklahoma City installed the first parking meters to encourage turnover of parking spaces.

Owners of vacant lots saw commercial opportunities in charging for off-street parking, and city governments followed. Garages with multiple levels appeared by the 1910s, eventually evolving into purpose-built parking decks. Any business that could offer convenient parking had an advantage, and employers felt pressure to provide parking. In cities the principle of “highest and best use” (meaning the use that creates the greatest economic return) often led to tearing down buildings and using the vacant space for parking. Ironically, parking lots could also be a way of “parking” land until a more profitable use for it could be found.

The potential for providing cheap, convenient parking was a powerful factor in the growth of suburbs. Homes, factories, stores and stadiums built outside crowded city centers could all offer good parking. In the 1950s, the shopping center or mall, surrounded by a sea of paved asphalt, became the prime retail venue.

The need for parking gradually altered home architecture. Garages were originally accessed from alleys behind houses, then from driveways beside houses. Eventually the garage moved forward, closer to the street, often connecting directly to the house. The flat garage door became a major feature of residential architecture.

Parking can be a form of recreation. In the 1950s and 1960s, cruising teenagers gathered at drive-in restaurants, parked their cars and socialized. One of the major uses for sports stadium parking lots is for holding tailgate parties prior to the events.

We can be entertained in them.

When automobiles were new and all trips were for pleasure, simply riding in a car was entertainment. But once autos became commonplace and trips became longer, parents with children discovered the need to entertain the little ones. Books, puzzles, word games, even Burma-Shave roadside doggerel could all help keep kids, and their parents, sane on long trips.

Paul and Joseph Galvin changed the automobile riding experience forever when they introduced the first commercial AM car radio (branded Motorola) in 1930. Carmakers quickly made radios optional and then standard equipment. German radio maker Blaupunkt offered the first FM car radios in 1952. They offered superior reception, but the lack of FM programming retarded their spread. Eventually radio stations would create programming specifically for the auto-bound audience, such as traffic reports and the “drive time” shows aimed at commuters.

Carmakers knew that allowing drivers and passengers to chose their own music was desirable, but record players were impractical in automobiles, as Chrysler’s abortive mid-1950s “Highway Hi-Fi” units proved. The advent of tape cassettes and cartridges in the early 1960s opened up new possibilities for personalizing in-car entertainment, and the development of stereo offered enhanced listening experiences. Car audio followed changing recording technology, with CD players and changers, and now docking stations that accommodate MP3 players. Some new cars even come equipped with DVD players, although the screens are supposed to be positioned so as not to be distracting to drivers.

In the 1970s, CB radios were a short-lived fad, with drivers talking to one another and listening in on long-haul truckers’ conversations. The advent of cell phones made CB radios thoroughly passé.

In 1933, the first drive-in movie theater opened in New Jersey. The idea spread slowly during the Depression and World War II, but after the war, the popularity of drive-ins exploded. They peaked during the 1950s as parents with young children used them as cheap family nights out. When those young kids became teenagers, they went to drive-ins themselves, transforming the theaters into “passion pits.” The popularity of drive-ins fell off in the 1970s and 1980s, and more rapidly in the 1990s. Some 800 drive-in movie theaters still survive today.

We eat in them.

Contrary to popular opinion, fast food is not a product of the automobile age. Saloon lunch counters, soda fountains, lunch wagons, cafeterias, automats and quick-service railroad restaurants all preceded the advent of automobiles. The concept of eating quickly from a limited menu was well established when automobiles came on the scene. What was new was the idea of actually eating inside the car.

The first eateries aimed specifically at auto users were roadside stands. Initially these were little more than overgrown versions of the hot dog and ice cream stands found at amusement parks. By the mid-1920s, some stands employed “tray boys” to take orders and bring food to drivers in their cars. Stand operators eventually learned that since most drivers were male, “tray girls” would be better for business. The roadside stands became drive-in restaurants and the tray girls became carhops.

Drive-in restaurants peaked in the early 1960s. They were very popular with teenagers, but that popularity proved their undoing. Drive-in operators and their neighbors tired of racing motors, spinning tires, reckless driving, litter and customers who were more interested in socializing than eating. The drive-in idea gave way to modern versions of the original roadside stand. These establishments offered food in a bag, which the purchaser could either consume in the car or take home. Most of the famous fast food chains – McDonald’s, Burger King, Burger Chef, Dairy Queen – and many less famous chains – Burger Queen, Burger Jet, Whataburger – started this way.

While the chains eventually expanded to offer sit-down service inside their restaurants, the next development in in-car eating was the drive-through lane. Once again, this was an old idea, dating to the 1930s. The key innovation came in the 1950s with the speakerphone. This allowed customers to place their order before reaching the pickup window, allowing staff time to assemble the order and reduce drivers’ waiting time. Most fast-food restaurants with sit-down service also added drive-through lanes. The 1980s saw the advent of the double-drive through, with no sit-down service.

Two lanes of cars moved past speakerphones and pickup windows. With no need for large parking lots or large buildings, drive-throughs like Rally's and Checker's, could offer lower prices.

Not all innovation focused on buildings and fixtures. In the 1990s, the food itself was redesigned, featuring various flat-bread "wraps" that were easier to hold and less messy than traditional sandwiches. Car manufacturers cooperated by equipping vehicles with a plethora of cupholders designed to accommodate everything from Big Gulps to juice boxes.

We break the law with them.

New inventions offer new opportunities for both honest people and dishonest people. The automobile offered the dishonest a cornucopia of illegal opportunities. Cars could be stolen, they could be used as getaway vehicles in the commission of crimes, they allowed criminals to increase the radius of their activities and they could be used as murder weapons themselves. Purveyors of illegal alcohol, whether backwoods moonshiners or urban syndicates, depended on cars and trucks.

Some of the most notorious and most romanticized American criminals are closely associated with automobiles. The Great Depression saw motorized crime on a nationwide scale, with famous fugitives like Bonnie and Clyde, John Dillinger, Pretty Boy Floyd and Ma Barker. Gangsters invented the drive-by shooting. In the 1950s, Charles Starkweather and Carol Fugate terrorized a swath of the Midwest during a murderous road trip.

We wreck them.

Even in its early, rudimentary form, the automobile was the fastest, most powerful and potentially most dangerous device the average person had ever tried to control. Accidents were frequent, and by the time accurate statistics began to be kept in 1913, 6,700 people a year were dying in auto crashes. Given Americans' reluctance to demand a high level of skill from drivers, improvements in auto safety depended on 1) improving cars' ability to avoid accidents, 2) improving occupants' ability to survive accidents and 3) improving roads themselves.

There is little evidence that automakers made accident avoidance a conscious goal. Rather, incremental improvements to various components and systems resulted in gradually improved ability to avoid accidents. Some of those improvements were: acetylene gas headlamps; electric headlamps and tail lamps; four-wheel brakes; four-wheel hydraulic brakes; a gradual shift between 1919 and 1927 to closed cars, removing drivers from the weather; windshield wipers; and better suspension systems that enhanced vehicle stability.

Even with these developments American cars lagged behind their European cousins in accident-avoidance capability. In the 1970s and 1980s, increasing competition from Europe and Japan forced domestic makers to significantly improve the suspensions and brakes of their vehicles. In the 1980s, the microelectronics revolution brought features like antilock brakes systems (ABS), traction control and electronic stability control.

If there was little conscious effort to improve accident avoidance, there was even less effort devoted to improving occupants' chances of surviving accidents. The one notable exception was the adoption of laminated safety glass in the late 1920s. In the 1950s, research into what happens to car occupants in an accident demonstrated the value of seat belts, head restraints, padded interiors and improved door locks. The only auto company to draw on this research was Ford, which in 1956 made an energy-absorbing steering wheel and stronger door locks standard equipment while offering seat belts and padded dashes as options. Unfortunately for Ford, these "Life-Guard Design" features did not translate into higher sales. Ford and the remainder of the auto industry concluded that "safety doesn't sell."

But in the 1960s, public attitudes began to change. The passage of Lyndon Johnson's Great Society programs signaled greater public support for activist federal government. The publication of Ralph Nader's "Unsafe at Any Speed" in 1965 was the catalyst for passage of federal legislation. In 1966, the National Traffic and Motor Vehicle Safety Act required that new cars have seat belts, padded dashes, safety door latches and hinges, impact-absorbing steering columns, and other safety features.

Much of the safety debate over the next 25 years revolved around the question of how best to restrain occupants during a crash. Seat belts were simple, cheap and effective, but the public strongly resisted them. Elected officials were reluctant to pass laws requiring belt use but did try an interlock system that would not allow a car to be started unless the driver's seat belt was buckled. The resulting public outcry caused the regulation to be rescinded. As a result, government efforts focused on "passive" devices that protect occupants in spite of themselves. The eventual chosen instrument was the inflatable passive restraint commonly called the "air bag." Auto companies opposed them, but the public generally supported them. Real-world experience demonstrated that air bags are not an all-purpose solution and that seat belts and harnesses must be worn for the bags to be fully effective. Ironically, the public became more accepting of safety belts, and by the late 1980s, most states enacted laws requiring their use.

Another question still being debated is the relative safety merits of different size vehicles. Many people buy sport utility vehicles because they believe big, heavy vehicles are safer in a crash, while critics claim SUVs are less maneuverable and therefore more likely to be involved in a crash. Regardless of who is right, it is clear that the days of "safety doesn't sell" are gone forever.

How do we maintain cars?

We wash, wax and clean them.

Keeping a car clean and good looking was a great challenge when roads were mostly gravel and dirt and cars were mostly open. Early motorists had to deal with wooden automobile bodies whose varnish quickly lost its luster and with brass trim that needed constant polishing. Steel bodies, better paints and a switch to nickel trim made care easier. The first public car wash, the Automobile Laundry, appeared in Detroit in 1914. The rise of closed cars made drive-through, conveyor-driven washes possible. Coin-operated do-it-yourself washes appeared in the 1960s. A panoply of

car appearance products has been developed over the years, from waxes to tire paints to special cleaners to special polishes for modern clear-coat finishes.

We self-maintain them.

Early auto buyers found that their new vehicles were remarkably unreliable and required an amazing amount of routine maintenance. Owner's manuals were filled with elaborate instructions for regular lubrication and adjustment. Authors stepped into the information void with books like the 1903 "Diseases of the Gasoline Automobile and How to Cure Them" and publications, like *Automobile and Motor World*, offered advice on maintenance and repair. Over time, cars became more reliable, and many owners learned how to perform a variety of tasks, from changing oil to relining brakes. Many owners came to pride themselves on their mechanical ability, and learning about auto technology became a right of passage for teenagers, especially boys. But the microelectronics revolution began to affect the auto industry in the 1970s, bringing electronic fuel injection, antilock brakes, traction control, electronically controlled automatic transmissions and automatic stability control systems. These systems were beyond the ken of the average owner, and by the end of the 20th century, self-maintenance was as difficult as it had been 100 years earlier.

We purchase maintenance and repair services.

Early auto owners who lacked the time, talent or inclination to do their own repairs had few options. Some resorted to sending their cars back to the factory for maintenance, often at great expense and inconvenience. Others hired chauffeurs to drive their cars and maintain them as well, but many chauffeurs had only rudimentary mechanical skills.

Enterprising entrepreneurs opened independent garages, but trained auto mechanics simply did not exist. Garage owners hired machinists and millwrights who learned auto maintenance on the job. Many automakers established factory schools for chauffeurs and mechanics, and organizations like the YMCA worked with local automobile clubs to establish training programs in auto maintenance and repair. Finally, as

automakers began to establish dealer networks, they encouraged or required dealers to do repair and maintenance work, and after 1910, manufacturers began to provide better training and maintenance manuals. By the early 1920s, the situation had substantially improved. There were large numbers of trained, experienced mechanics; auto dealers had well-equipped service facilities; and the number of independent garages was growing rapidly. By the late 1920s, large oil companies were transforming filling stations that specialized in selling gasoline into service stations, offering repair and regular maintenance as well as fuel.

Unfortunately, much of the story of auto repair is a story of conflict and mistrust between car owners and mechanics. As early as 1901, writers to *Horseless Age* were complaining about the cost and slow pace of work on their cars. Such complaints continued to this day. For their part, mechanics complained about owners who failed to treat them with respect and who knew little or nothing about the inner workings of their cars. Those complaints also continue to this day. Auto companies and repair shop operators have tried a variety of techniques to improve service, control the natural independence of mechanics and enhance customer relations. Service managers who serve as buffers between customers and mechanics, flat-rate systems to regularize repair costs and emphasis on clean, orderly shops are all efforts that developed in the 1920s and 1930 and persist in today's shops.

How do we dispose of cars and their by-products?

Some ways we dispose of cars and their by-products have already been discussed because they are inherent in how we acquire and use cars. For example:

We sell them.

We return them from lease or rent.

We lose them by theft.

We destroy them in accidents.

In addition,

We abandon them.

This is often a problem in cities when people simply abandon vehicles whose resale value is negligible. This includes:

Destroying them on purpose – Car owners sometimes destroy their own cars in an attempt to fraudulently collect an insurance claim. Another way to perpetrate a fraud is to abandon a car and report it stolen.

Scrapping them – The mass production and consumption of cars soon produced a need for the mass disposal of wrecked and worn-out cars. One solution was junkyards where scrapped cars were stored so that reusable parts could be salvaged. Junkyards were especially popular among car owners who did their own maintenance or who modified their cars. Still, so many cars were being scrapped that crushing and recycling back to steel mills began in the 1920s. Increasingly stringent regulations and the decline of self-maintenance have reduced the number of junkyards. Rising scrap prices and changing steelmaking technology mean that most of the 11 million cars junked each year will ultimately be melted down and recycled. More difficult to deal with are the 20 million tons of lead-acid batteries, 240 million worn-out tires and 1 billion gallons of used motor oil discarded each year.

Dumping the by-products (emissions) in the “great away” – For the first 50 years of the automobile age, hardly anyone cared what happened to the products of combustion that came from an automobile engine. But in 1943, a yellowish haze, eventually dubbed “smog,” began appearing in the Los Angeles area. The cause – a photochemical reaction of the various gases emitted by internal combustion engines – was not identified until 1950. Throughout the 1950s, the problem grew worse, and smog appeared in other cities.

California wrote the first laws regulating automobile exhaust emissions in 1963. Federal regulation came in 1965 when Congress passed the Motor Vehicle Air Pollution and Control Act, setting national exhaust emission standards similar to California's. For drivers, the early emission control technologies produced cars that ran poorly, were hard to maintain and gave poor fuel economy. It was not until 1975, with the introduction of catalytic converters, that cars could both meet the exhaust standards and run well. Improving technology produced dramatic reductions in the amount of carbon monoxide and nitrogen oxides coming from automobile tailpipes. But the steady increase in the numbers of

cars on the road and the number of miles driven means the air in Los Angeles and other cities remains dirty. In addition, none of these efforts reduce carbon dioxide, which is both the principle by-product of burning hydrocarbon fuels and the principle greenhouse gas.

The result has been the most vigorous exploration of alternatives to the gasoline-fueled internal combustion engine in over 100 years. Automakers are looking at battery-powered vehicles, hydrogen-oxygen fuel cell vehicles, diesel internal combustion engines, hydrogen-burning internal combustion engines and alcohol fuels made from a variety of agricultural products. To date the most practical new technology is the electric/internal combustion hybrid, which combines a small internal combustion engine with an electric motor and batteries.

The key to adoption of an alternative motor vehicle power source seems to be making the new source perform as much like internal combustion-powered vehicles as possible. Drivers are accustomed to vehicles that are equally adept hauling groceries a short distance or hauling five people to Yellowstone. The fact that grocery trips vastly outnumber Yellowstone trips does not seem to make much difference.

A minority of drivers are willing to alter their daily behavior. Lessees of General Motors' battery-powered EV1 actively accommodated their lives to the limits of the car and protested loudly when GM ceased production and recalled all the leased cars. GM contended that most potential users would not make the necessary accommodations, and thus there was insufficient demand for the car. The overwhelming popularity of large SUVs (until the recent run-up in gasoline prices) suggests that GM was right, at least in the near term. But we as a society have made huge adjustments to our lifestyles in order to accommodate the automobile because the auto offered things we wanted. Will people ever be willing to make similar adjustments to accommodate automobiles that offer different things that may be just as desirable?

The American Automobile Industry, 1805-2010

Origins

The idea of an automobile – a self-powered vehicle that runs along roads – goes much further back in time than most people realize. The earliest known example of a self-powered road vehicle was developed in France by Nicholas Cugnot in 1769. Cugnot's ungainly three-wheeled machine was not very successful, but it was a beginning. Since it was intended to pull artillery pieces for the French army, Cugnot's vehicle may be considered the ancestor of the truck as well as the car.

The earliest-known American example of a steam-powered vehicle dates from 1805. Inventor and millwright Oliver Evans built a steam-powered floating dredge intended for dredging Philadelphia's Delaware River wharfs. Evans' shop was not near the river, so he mounted his dredge on wheels, fashioned a chain drive to connect the wheels to the engine and drove his machine to the Delaware's edge. Evans did not pursue steam-powered road vehicles any further.

In Britain, a number of people experimented with steam on the road, and by the 1830s, large steam carriages, which might be thought of as the ancestors of buses, were running on British highways. Opposition from railroad and stage-coach companies resulted in Parliament passing the Road Locomotive Act in 1865, requiring a man with a red flag to walk in front of any automotive vehicle. The act was not repealed until 1896.

In the United States, the best-known early experimenter was Sylvester Roper, who built a series of [lightweight steam road vehicles](#) with both two and four wheels between the early 1860s and the mid-1890s. His vehicles represent the application of existing steam technology to basic horse-drawn vehicle forms. Roper's horseless carriages were widely exhibited at county fairs and other similar events. Most surprising to modern Americans is that those who saw Roper's vehicles seem not to have clamored for him to produce and sell them. Roper's paying spectators

apparently could not see themselves in the driver's seat. But forces were at work that would whet people's appetites for self-powered personal transportation.

New Forms of Personal Transportation

In the last half of the 19th century, the American carriage industry made rapid strides that both raised production and lowered prices. By the 1880s, it was possible for farmers to order inexpensive buggies through the mail from Sears, Roebuck or Montgomery Ward. Farmers, who were accustomed to using their farm wagons for trips to town or to church, could now afford a vehicle whose only purpose was carrying people. Some of the people and firms that made horse-drawn vehicles became important in the automobile industry. William C. Durant, who founded General Motors, first became wealthy building carriages in Flint, Michigan. The Studebaker Wagon Works of South Bend, Indiana, was the world's largest maker of horse-drawn vehicles long before it got into automobile production.

An entirely new form of personal transport evolved in the 19th century – the bicycle. Like the steam engine, it was developed in Europe, but by the 1870s, crude wooden bicycles were beginning to be produced in this country. The bicycle industry developed rapidly, with the Pope Manufacturing Company, founded by Colonel Albert Pope, primarily responsible for promoting the bicycle's popularity from the late 1870s onward. Bicycles were engines of freedom and mobility. Compared to horses and buggies, they were easy to store, required no feed and little care when not in use, and were relatively inexpensive. On the road, they were faster than walking and as fast as horses. Both men and women readily took to using them. The early high-wheeler bikes, with large front wheels, could be dangerous to ride, but the development of the "safety bicycle," with wheels of equal sizes and chain drive, opened up bike riding to even the most cautious.

Many aspects of bicycle technology were directly applicable to the motorcar, such as welded steel tubular construction, chains, sprockets, gears, precision bearings, wire wheel construction, pneumatic tires, band brakes, and rack and pinion steering. Thus it is not surprising that the bicycle

industry was a spawning ground for automakers. Albert Pope became a force in the early auto industry, as did Gormully & Jeffery, who made both the Jeffrey and Rambler automobiles. Charles and Frank Duryea experimented with bicycles before forming the first American automobile company. Other bicycle makers that played important roles in the auto industry included Alexander Winton and George Pierce.

The advent of the cheap buggy and the bicycle spread an appreciation of personal transportation to a wide audience. Large numbers of people now experienced the mobility formerly limited to those who could afford a carriage, several horses, stables and staff to care for them all. They appreciated independence from railroad and trolley schedules and routes. The next time these people saw a vehicle like Sylvester Roper's they would be inclined to want one for themselves.

Europe Leads the Way, America Follows

In Europe, things were happening that allowed self-powered road vehicles to move from curiosities to practical devices. In Germany, Nicolaus Otto's internal combustion engine, developed in 1876, was by 1885 adapted by Carl Benz and Gottlieb Daimler to power road vehicles. Both Benz and Daimler would go on to form companies to make and sell horseless carriages. The modern automobile industry traces its origins to them.

In the United States, a variety of inventors experimented with steam-, electric- and internal combustion-powered road vehicles toward the end of the 19th century. America's first production automobile appeared in 1896 – the Duryea Motor Wagon. The Duryea brothers drew on their knowledge of European developments as well as on their bicycle background and their knowledge of carriage construction. Their Motor Wagon Company was out of business by 1898, but many other firms entered the business. Forty years earlier, Roper's steam carriage had been a curiosity that many wanted to see but no one wanted to own. But the freedom and mobility offered by the cheap buggy and the bicycle had changed people's perceptions of what was feasible and desirable. By the end of the 19th century, many people wanted to own a horseless carriage, even if only a relative few could actually afford one.

Starting an automobile company was fairly easy at this time. Budding auto entrepreneurs didn't actually manufacture cars. They simply assembled them from engines, wheels, springs, bodies and other parts made by outside suppliers. If the entrepreneur's basic designs were good, and if he was a good salesman, he stood a decent chance of being successful. The fact that many companies came and went quickly testifies to the fact that both technology and marketing were often suspect.

What Is the Best Power Source?

One major debate in these early years was over the best power source for horseless carriages. **Electric cars**, running off batteries, were clean, quiet and easy to start, had no transmission to shift and required little maintenance. But their batteries were good for no more than 20 to 40 miles, depending on road conditions. **Steam cars** were quiet and needed no transmission; their engines were virtually impossible to stall. But the starting procedure could be complex – some took 20 minutes to get up to steam, and they needed refills of water as often as they needed fuel. Many people also feared their boilers would explode. There is no record of such an explosion, but the fear still inhibited sales. Internal combustion engines, burning gasoline, were noisy, required crank starting and needed transmissions that were often difficult to shift. But a small amount of gasoline contains a large amount of energy, and gasoline was relatively easy to obtain. The **gasoline-powered car** could take people a significant distance from home and get them back again more reliably than electricity or steam.

This turned out to be crucial, because most early automobile purchasers used their cars for pleasure. They didn't need cars in the city because public transportation was excellent. They didn't need cars for very long trips between cities because the railroad network was excellent. But for medium-distance pleasure excursions into the countryside, the automobile powered by a gasoline-burning internal combustion engine could not be beat. By 1910, such cars had pushed both steam and electricity to the margins of the auto market. The case for gasoline was made stronger by a massive oil strike at Spindletop, near Beaumont, Texas, in 1901. The

vast oil resources of the Southwest ensured cheap automotive fuel for the foreseeable future.

Designing Cars for American Conditions

But there was still much indecision about just what type of gasoline car was best. Many American cars were modeled after the so-called **Mercedes-type car**, introduced by Daimler in 1901. That German car broke completely with horseless carriage design. Engineers mounted its 35-horsepower, 4-cylinder engine just behind the front axle rather than under the seat, allowing them to lower the frame to only 8 or 9 inches off the ground and seat the passengers behind the engine. This low center of gravity greatly improved the car's handling, so that the Mercedes could cruise at 50 miles per hour over good roads. American automakers recognized this design's advantages, but America lacked something basic – good roads.

French and German roads were the best in the world. American roads were among the worst in the world. Most American roads were simply dirt paths: dusty in dry weather, muddy tracks in the rain and creased with frozen ruts in the winter. To accommodate these dreadful thoroughfares, American engineers modified the Mercedes design in important ways. They raised the chassis to increase ground clearance, used thicker steel for frames and axles, made heavier springs, and favored larger-bore, shorter-stroke engines that gave more power. By sacrificing speed for durability they successfully adapted the European design to American conditions. But **these vehicles** were also expensive, with most costing between \$2,000 and \$7,500.

At the other end of the car market was a peculiarly American automobile known as the **high-wheeler**, or the western buggy. These cars were even more primitive than the earlier horseless carriages. A typical high-wheeler featured a buggy frame, wooden wheels at least 36 inches in diameter, solid rubber tires, a rear-mounted engine (often air cooled), tiller steering and a purchase price between \$250 and \$950. Most were made and sold in the rural Midwest, hence the "western buggy" appellation. Unfortunately, high-wheelers tended to shake and vibrate fiercely, loosening nuts and bolts

and breaking frames and suspensions. They also tended to be underpowered, ultimately disappointing their owners.

In between the Mercedes-type cars and the high-wheelers were a group of cars known as **runabouts**. These cars looked like smaller versions of the Mercedes-type cars because many runabouts placed their engines up front. The ones that didn't often used false hoods to make their antiquated designs seem modern. With engines of one or two cylinders and prices between \$600 and \$1,000, they were far more rugged and capable than the high-wheelers but were less affordable to farmers. The runabout's primary disadvantage was the fact that it had only two or (occasionally) three seats, limiting its usefulness to families.

Meanwhile, the development of the American auto industry was affected by the most celebrated patent-infringement case in American history. The Association of Licensed Automobile Manufacturers (ALAM) owned a patent issued to George B. Selden in 1895 and claimed that it applied to all gasoline-powered cars. ALAM controlled entry to the automobile industry. In 1903, it denied Henry Ford's fledgling Ford Motor Company a license to produce new cars. Ford kept making cars anyway, and the association sued. The case dragged on for years, but in 1911, the court finally ruled against ALAM. The auto industry was open to anyone with the drive and capital to start a company, and Ford earned a reputation as champion of the "little guy."

Finding the Sweet Spot of the Market

When Henry Ford began his fight with ALAM his company was just one of many small, struggling automakers. By the time it won the Selden patent case, Ford Motor was the largest company in the industry. What made the difference was the car Ford introduced in 1908, the **Model T**. The new car blended the size, performance and ruggedness of the large Mercedes-type cars with the low price of the runabouts. The key to this synthesis was a light and highly flexible chassis. Rather than resist the bumps and ruts of America's abysmal roads, the Model T flexed with them. By keeping the car light, Ford could use a relatively small

20-horsepower engine and still get good performance.

The final piece of the puzzle was Ford's relentless pursuit of lower manufacturing costs. Between 1908 and 1914, Ford and his engineers implemented drastic improvements in production methods that led to the introduction of the moving assembly line and drove the price of the Model T down from \$950 to \$490. By the early 1920s, Ford was selling over half the cars made in America. Before production ceased in 1927, over 15 million Model Ts had been sold, and Henry Ford was world famous as the developer of the mass-production techniques that came to be labeled "Fordism."

While Henry Ford was achieving huge success by concentrating on one car, William C. Durant was following a very different business model. Durant had made his reputation building the Durant-Dort Carriage Company into a great success. In 1904, he took over management of the struggling Buick Motor Company. By 1908, he had Buick challenging Ford for sales leadership. In that same year, he combined Buick with Oldsmobile, Cadillac and several auto-parts suppliers to create a new firm he called General Motors. Cadillac was a particularly important acquisition because its founder, Henry Leland, had made it a technological leader. In 1908, Cadillac won Britain's Dewar Trophy for demonstrating precision manufacturing and interchangeable parts. In 1912, Cadillac offered the first practical, factory-installed electric starting and lighting systems, and in 1915, it introduced America's first mass-produced V-8 engine.

One of the consequences of the Ford Model T's success was to define the "sweet spot" of the American car market. Henry Ford said that he was building "... a car for the great multitude ..." in which the owner could "enjoy with his family the blessings of hours of pleasure in God's great open spaces." It was this family market that offered the greatest opportunity for profit, and by the end of World War I, most American cars were being built for that market.

An amazingly large number of American auto companies competed for the family market in the early decades of the 20th century, but only a few, besides Ford and General Motors, had the resources and the management necessary

for lasting success. Packard, with leaders like Henry Joy and Alvin Macauley, established itself at the top of the luxury group. Studebaker successfully made the transition from wagonmaker to automaker. Overland Automobile, under the direction of great promoter John North Willys, and Hudson Motor Car Company, under able administrator Roy D. Chapin, carved out lasting niches.

William Durant proved more adept at assembling a large car company than at managing one, and late in 1920, he was forced out of General Motors. The corporation came under the direction of Alfred P. Sloan Jr., who would dominate the firm for some four decades. Sloan's genius for organization ultimately created a structure that became a model for large corporations.

Sloanism Replaces Fordism

By the early 1920s, Sloan realized that Henry Ford's strategy of building a single, unchanging model would not be successful indefinitely. The Model T offered reliable basic transportation to people who didn't already own cars. But once large numbers of families acquired such a basic automobile, they began to want something more – more comfort, more style, more performance. Sloan also saw that once a majority of families owned cars, the only way the auto industry could sustain itself was to convince those families to give up a still-useful 3- or 4-year-old car and buy a new one.

In response to these changing conditions, Sloan pushed two new strategies. One was the annual model change. By changing the styling of cars every year, General Motors tried to make 1- or 2-year-old cars look even older, hoping to motivate their owners to buy something more up-to-date. To oversee General Motors styling, Sloan hired [Harley Earl](#), who was designing custom car bodies for Hollywood stars and executives. Earl formed General Motors' Art and Color Section, which became the model for styling departments throughout the industry.

Sloan's second strategy was to create a range of cars that covered the market from top to bottom. In contrast to Ford's

single "universal car," General Motors would offer "a car for every purse and purpose." GM developed a hierarchy of cars, with Chevrolet as the low-priced volume leader, followed by increasingly expensive Pontiacs, Oldsmobiles and Buicks, with the luxury Cadillac at the top of the list. Not only did this give Sloan's corporation a car in every market, it also meant that if an owner of a GM car was able to move up from his present vehicle, there would always be a GM car for him to move to. Together these two new strategies – making annual changes in the car's outer appearance and offering a wide range of choices at different price levels – became known as Sloanism.

To accommodate these changes, Chevrolet general manager William S. Knudsen, a former Ford employee, developed production methods that could adjust to the frequent model changes. This new approach was so successful that by the late 1920s General Motors passed Ford in sales.

The Advent of the Big Three

The year 1924 marked the appearance of a name that would soon be linked in the public's mind with General Motors and Ford as one of the Big Three auto firms. In that year, Walter P. Chrysler introduced [the car bearing his name](#). Chrysler had begun his automotive career with Buick but left in a dispute with Durant. Chrysler went on to save the Willys-Overland company from collapse and to reorganize the failing Maxwell Motor Company. He built his new Chrysler Corporation on the bones of Maxwell. The 1924 Chrysler was a well-engineered, fast, good-looking, upper medium-priced car that got Chrysler Corporation off to a strong start.

Like Alfred Sloan, Chrysler realized that his company needed to offer more than one model if it was to survive. In 1928, the opportunity arose to acquire the Dodge Brothers Company. Founded in 1914 by John and Horace Dodge, who had made parts for Oldsmobile and Ford, the company soon acquired a reputation for building tough, reliable cars at reasonable prices. John and Horace had passed away in 1920, leaving the company somewhat adrift and ripe

for purchase by Chrysler. With the Dodge organization, Chrysler acquired not only a well-regarded car but also an outstanding network of dealers and additional plant capacity. In 1928, Chrysler introduced the medium-priced DeSoto and low-priced Plymouth, giving his company a range of products similar to that of General Motors. With GM, Ford and upstart Chrysler accounting for nearly 75 percent of American passenger car production, people began referring to the companies as the Big Three.

In 1927, Henry Ford completed his massive Rouge factory. It was hailed as one of the industrial wonders of the world, representing Ford's attempt to control the production of cars from raw materials to final assembly. It added further to Ford's fame as an innovator of manufacturing techniques. But Ford's car designs were no longer as advanced as his production methods. By the mid-1920s, the Model T was obsolete, with sales falling while sales of Sloan's Chevrolet were rising. Ford halted Model T production in 1927 and after several months came out with a new car called the Model A. Although it did very well it was not the game-changer the Model T had been. The T stayed in production 19 years, but the A had to be replaced after only four. Ford reluctantly adopted the annual model change, but he clung to outdated features like mechanical brakes and Model T-style suspension systems. In 1932, Ford introduced his last great innovation: a mass-produced, light, inexpensive [V-8 engine](#). It gave Ford automobiles the performance of more expensive cars, but it was not enough to halt the company's decline. Before the 1930s were over, Ford Motor Company would fall to third place in sales, behind General Motors and Chrysler.

The Auto Industry in Depression and War

The entire auto industry suffered severely in the 1930s as a result of the Great Depression that began in the fall of 1929. Auto production, which had reached a record of over 5,000,000 units by 1929, dropped off to only a little over 1 million vehicles by 1932. Although sales improved somewhat the next year, the outlook remained gloomy during most of the rest of the decade. The Depression caused the demise of most of the remaining smaller companies. Luxury

makes were hit especially hard, with Duesenberg, Peerless, Pierce-Arrow, Franklin, Cord and Marmon all fading away. Durant Motors, William Durant's effort to re-create his General Motors magic, fell victim to the hard economic times, as did makes like Reo, Graham and Moon. The Big Three suffered but survived to increase their control of the market from 75 percent at the end of the 1920s to 90 percent by the end of the 1930s.

Hard times for the companies meant hard times for the workers, who responded by organizing labor unions. The companies reacted vigorously and sometimes violently, and unions countered with new tactics like the sit-down strike. By the middle of 1941, all the auto companies had signed contracts with the United Auto Workers (UAW) union. The auto companies would never again enjoy the freedom of movement that they had enjoyed during the first two decades of the automobile era.

World War II broke out in Europe in 1939, and even though the United States was not yet involved, the U.S. government began a military buildup, resulting in an increasing number of war contracts for the auto industry. The Japanese attack on Pearl Harbor on December 7, 1941, brought the United States into the conflict, and civilian passenger car production halted, for the duration of the war, in February 1942. The auto plants were converted to produce tanks, guns, airplanes and engines as well as motor vehicles of many types. Not only did the auto industry contribute mightily to the war effort, but the mass-production methods pioneered in Detroit were applied, with some difficulty, to airplanes and even ships. None of the other belligerents could match the ability of the United States to churn out vast quantities of war material. America supplied not only her own needs but some of the needs of allies like Great Britain and the Soviet Union.

Despite the variety of military hardware it produced, the auto industry's most famous wartime product was the [Jeep](#), a versatile four-wheel-drive vehicle jointly developed by the American Bantam Company, Ford and Willys-Overland.

The Golden Years

At the end of the war in 1945, the pent-up demand resulting from 3 1/2 years of no new cars led to a seller's market the likes of which had not been seen in 25 years. Surviving independent makers Studebaker, Hudson, Nash and Packard got back into production with new models faster than the Big Three, and they enjoyed the best years they had had since the 1920s. The late 1940s also saw the last attempt of new companies to break into the business. The futuristic, rear-engined Tucker Torpedo was the most wildly innovative of the new models. Financial and legal problems ended the Tucker effort after only a handful of cars were produced. More successful was the Kaiser-Frazer Corporation, whose various models briefly gave it command of 5 percent of sales. Henry J. Kaiser became famous mass-producing Liberty ships during World War II, but he was not able to translate that into long-term viability in the auto industry. By 1955, Kaiser was out of passenger car production.

The Big Three soon reasserted their accustomed dominance by introducing sleekly styled [new models](#) with powerful, modern V-8 engines and amenities like automatic transmissions. Ford experienced revitalization under Henry Ford's grandson, Henry Ford II. Chrysler, meanwhile, was slow to adapt to new styling trends and fell back to third place in sales.

The 1950s were golden years for the Big Three. The economy was growing, gasoline was cheap and the auto industry happily indulged Americans' preference for buying the largest cars they could afford. Every annual model change brought vehicles that were "longer, lower, wider," with more powerful engines and ever-more flamboyant styling. In the 1930s and 1940s, design was influenced by the rounded streamlined shapes of propeller-driven aircraft like the DC-3. In the 1950s, stylists were inspired by the sharp, angular look of jet aircraft. Chrysler designer [Virgil Exner's "flight sweep" styling](#) emphasized soaring tail fins and airy roofs that resembled fighter plane canopies. It was quickly copied by other designers.

Not every Big Three effort worked out. In 1956, Ford marketed a number of safety features, like seat belts and energy-

absorbing steering wheels, under the moniker "life guard design," but the public seemed uninterested. Ford and the rest of the industry concluded that safety didn't sell. A much bigger failure was Ford's new medium-priced car, the [Edsel](#). Conceived early in the decade, the Edsel finally reached showrooms in 1958, during a sharp recession. Not only was the timing unfortunate, but the Edsel demonstrated that the public's appetite for bizarre styling had some limits.

For the so-called independent American auto companies, life in the 1950s was difficult. Packard, which survived the Depression by selling lower-priced models, never regained its former prestige, and in 1954, Packard merged with struggling Studebaker. The new company was not successful, and the great Packard name disappeared after 1958.

A Counterpoint – the Compact Car

Nash and Hudson also merged in 1954, with somewhat more success. The new firm was called American Motors. After 1957, it dropped both the Nash and Hudson brands and called all its cars Ramblers, a name originally used by Nash's ancestor Jeffery. American Motors president George Romney chose not to compete directly with the Big Three but instead capitalized on a modest but real backlash against the Big Three's products' growing size. Ramblers were touted as smaller, more fuel-efficient, less expensive, more practical alternatives to the Big Three's "dinosaurs in the driveway." Rambler sales zoomed in the late 1950s, providing American Motors with the largest share of the market it ever held.

Interest in small cars had been stimulated by the German-made [Volkswagen](#), first imported to the United States in 1949. Aside from expensive, low-volume European luxury and sports cars, imports had never been an important factor in the American automobile market, but the air-cooled, rear-engined, bug-shaped German "people's car" had by mid-decade acquired a loyal following in the United States. Partly because of its foreign origin and its unusual appearance, the little Beetle became a favorite among a good many middle- and upper-class buyers who bought it not so much because

of its low price but because ownership of the car represented a form of reverse snobbery and/or an expression of disapproval of the excesses of American car design.

With the popularity of the Rambler and the Volkswagen, in 1955 Studebaker introduced its own “compact” (as the new small cars were called), the Lark. Somewhat belatedly, the Big Three recognized the growing market trend and produced compact cars for 1960. Ford’s Falcon and Plymouth’s Valiant were essentially scaled-down versions of bigger models, but Chevrolet’s **Corvair** was a totally new car. It followed Volkswagen’s lead in using a rear-mounted, air-cooled engine, features not seen in American production cars in many years. In 1961, Oldsmobile, Pontiac and Buick would debut their own compact models. The compacts seemed to have successfully stemmed the German invasion, and they satisfied changing consumer tastes, so the auto industry assumed that the 1960s would be like the 1950s, only better.

An Era of Turmoil

In 1964, Ford shook up the car world by clothing the chassis of its mundane Falcon in a stylish four-seater body and giving the new car an evocative name – **Mustang**. The car was a smash hit, attracting a wide audience – those looking for a second car, middle-aged people who didn’t want to seem middle aged and baby boomers who were reaching car-buying age. Other manufacturers quickly jumped on the bandwagon, and roads were soon filled with Mercury Cougars, Pontiac Firebirds, Chevrolet Camaros, Plymouth Barracudas, Dodge Challengers and even American Motors Matadors.

Also in 1964, Pontiac performed an even simpler trick. It took its Tempest (introduced as a compact but by 1964 enlarged into an “intermediate”), dropped in a 389-cubic-inch V-8, appropriated the name GTO from a racing Ferrari and created another new market niche, the muscle car. Again, competitors rushed to counter the move, bringing forth the Dodge Super Bee, Plymouth Road Runner, Chevrolet Chevelle SS396, Oldsmobile 442 and Buick Gran Sport.

But in 1965, a book written by an obscure, young workaholic lawyer would shake the auto industry to its foundations. The book was called “Unsafe at Any Speed,” and the

lawyer was Ralph Nader. His book claimed that American cars were full of unappreciated dangers, but it highlighted handling problems with Chevrolet’s Corvair. The problems had been corrected by the time the book appeared, but most people did not realize that. Nader’s criticisms, and General Motors’ ham-fisted attempts to discredit him, helped create support for governmental regulations that would force the industry to pay more attention to safety and environmental considerations. Over the next few years, what had been one of the most unregulated industries would become one of the most regulated industries, with federal law proscribing what went in fuel tanks, what came out of exhaust pipes and how interiors should be designed.

An Era of Even More Turmoil

If events in the 1960s had taken surprising turns, events in the 1970s would take astonishing turns. To meet increasingly stringent exhaust emission laws, engineers devised a number of stopgap solutions that adversely affected both drivability and fuel efficiency. Then in 1973 came the first Arab oil embargo. After decades of rising oil consumption, America could no longer meet its petroleum needs from domestic sources. It needed Middle Eastern oil, and when that tap was turned off, prices rose as supplies fell. Suddenly consumers cared about gas mileage. Large American cars, getting 12 to 15 miles per gallon, were like the dinosaurs after the asteroid hit: The world in which they had evolved was gone in a flash. American carmakers did not have the fuel-efficient cars buyers now wanted, but foreign makers did. Japanese companies Toyota and Datsun were especially well positioned. American buyers discovered that imported cars were not only economical to buy and operate, they also were better built than most domestic products.

Gas prices subsided with the end of the oil embargo, but rose again after the Iranian Revolution in 1979. Those events, and related economic recessions in the middle and end of the decade, kept demand high for small, fuel-efficient cars. By 1980, imports, mostly from Japan, made up an astonishing 27 percent of total U.S. automobile sales. The Big Three had their worst years since the Great Depression. General Motors and Ford posted billion-dollar deficits in the

early 1980s, while Chrysler was saved from bankruptcy only through unprecedented government assistance and drastic cost-cutting measures carried out by the company's new head, Lee Iacocca. His earlier work at Ford and his work now at Chrysler brought Iacocca a degree of public recognition not seen in the industry since the days of Ford, Durant and Walter Chrysler.

The events of the 1960s and 1970s changed forever the market conditions in place since the advent of the Model T. No longer would there be a monolithic market in which virtually all cars were simply larger or smaller versions of the same basic family car. Not only would the types of cars proliferate but the typical family car would cease to be a car at all.

The Transplants: An Alternate American Auto Industry

In the 1980s and 1990s, Japanese, German and Korean auto companies opened a series of assembly plants across the United States. By building their cars here, the companies hoped to deflect protectionist criticisms regarding the rising market share of imports. In 1977, Volkswagen actually built the first of the “transplants,” as the foreign-owned factories came to be called, but by 1988, poor quality, labor unrest and disagreements between Germans and Americans led to the plant's closing. Honda opened the first Japanese-owned plant in 1982 and established a model for others to follow. The plant was in Marysville, Ohio, northwest of Columbus and away from the center of the U.S. industry. Taxes were low, the workforce was young and unions were not a strong presence in the area. This was a key because, unlike Volkswagen, Honda did not sign a contract with the UAW. Honda's wage scale was little different from unionized plants, but its work rules were more flexible. Because the plant was new, there were no retirees to support, and Honda avoided the long-term costs of a pension plan by using a 401(k) plan instead. The Marysville plant's production costs and build-quality matched that of Japanese plants. Soon other foreign makers followed suit. Nissan opened a plant in Smyrna, Tennessee; Toyota in Georgetown, Kentucky; Mercedes-Benz in Vance, Alabama; Hyundai in Montgomery, Alabama; BMW in Spartanburg, South Carolina; and Subaru in Lafayette, Indiana.

Initially most were just assembly plants, using components made in the home country, but gradually a network of suppliers grew up around the new plants, just like the networks that existed near Big Three plants. By the beginning of the 1990s, there were two auto industries in the United States, one domestically owned, one foreign owned. Their fates over the next two decades would be dramatically different.

The Car Industry Becomes a Truck Industry

Under Lee Iacocca, Chrysler made a spectacular comeback with its so-called K cars – practical front-wheel-drive vehicles that were good values for the money. Then in 1984, Chrysler used the K car chassis as the basis of a whole new type of vehicle – the minivan. Coming 20 years after the Mustang, the minivan was embraced by baby boomers with growing families. Other carmakers scrambled to catch up with Chrysler and introduce their own minivans.

Also in 1984, American Motors, which had acquired the Jeep brand, introduced a somewhat smaller version of Jeep's four-wheel-drive station wagon, the Cherokee. Although designed for use where roads were poor or nonexistent, the new Cherokee soon acquired a following among upscale urbanites who wanted to project a rugged image. The demand for such sport utility vehicles, or SUVs, would grow steadily over the next few years. In another market shift, the 1980s saw significant growth in pickup truck sales as people began using them not just for hauling but for daily transportation.

These developments were boosted by a little-noticed aspect of regulations written in 1975 to increase fuel economy. The CAFE (Corporate Average Fuel Economy) regulations set one mileage target for passenger cars and a lower target for light trucks. The rationale was that trucks were used for business, and their operators didn't have the option of using smaller vehicles. But minivans and SUVs as well as pickups were all classified as light trucks. The lower CAFE targets meant that many customers could continue buying the large vehicles they preferred rather than downsized passenger cars. This would have profound consequences in the 1990s and 2000s.

Chrysler had brought itself back from the brink with its front-wheel-drive K cars. Ford made a similar comeback with its front-wheel-drive Taurus and Mercury Sable. Their European-inspired styling and engineering became the prototypes for a generation of American passenger cars.

In the meantime, American Motors continued to struggle. In 1980, it became the first American car company to merge with a European maker, Renault. It would not be the last. Even though the new arrangement produced some interesting cars, the only American Motors products that sold well were Jeeps. In 1987, Chrysler bought American Motors from Renault and closed down all the brands except Jeep.

The 1990s were the years of pickups and SUVs. To make pickup trucks more useful as daily drivers, companies added extended cabs with second seats and rear doors. The best-selling vehicles in the country were the Ford F-150 and Chevrolet Silverado trucks, with Dodge's Ram usually in fifth or sixth place. Chrysler updated the Cherokee SUV into a more luxurious Grand Cherokee, while Ford answered with the Ford Explorer, Expedition and Excursion; the Mercury Mariner and the Lincoln Navigator. GM entries in the SUV race included Chevrolet's Blazer, Tahoe and Suburban, and GMC's Jimmy and Denali. Profits on pickups and SUVs ran between \$5,000 and \$10,000 per vehicle.

The World Turned Upside Down

The Japanese were caught flat-footed by the rise of light trucks, and it took them several years to develop competitive products. But the flip side was that the Americans neglected passenger car development. The Honda Accord and Toyota Camry became the best-selling cars in America, while the onetime top-selling Taurus languished.

Chrysler, profitable but the smallest of the Big Three, became a tempting target for foreign companies and in 1998 announced a merger with Germany's Daimler-Benz. The new company formed by this "merger of equals" would be called DaimlerChrysler and was expected to become an international powerhouse. Things did not work out as planned.

The American auto industry entered the 21st century on a roll, but GM, Ford and the Chrysler side of DaimlerChrysler

would soon find themselves on a precipice. The high profits from trucks and SUVs masked the fact that the companies had high cost structures, with expensive labor contracts and an ever-growing number of retirees with costly pensions and medical benefits. The September 11, 2001, terrorist attacks upset the economy and sent oil prices rising, causing sales of large trucks and SUVs to slump and giving the advantage to the transplants. By the end of 2004, the market share of foreign-owned companies (with cars produced both overseas and in the transplant factories) had risen to 41 percent. Toyota, with 12 percent of the market, was threatening to overtake Chrysler, with 14 percent.

Things drifted from bad to worse throughout the decade. The DaimlerChrysler merger never worked as expected, and in 2007, the Germans spun Chrysler off to private equity group Cerberus. Ford, GM and Chrysler all made drastic cuts in employment and capacity, but the cuts could never quite catch up to falling profits and falling market shares. The paths of the two U.S. auto industries were going in opposite directions. Then in 2008 came a national banking crisis, a stock market crash and the deepest recession since the 1930s. Both Chrysler and GM turned to the federal government for bailouts, eventually filed for bankruptcy and ended up being partially owned by the taxpayers. Italian automaker Fiat, which had last marketed cars in the United States in the 1970s, bought controlling interest in Chrysler. The long-term viability of that alliance is yet to be determined. General Motors emerged from bankruptcy in somewhat better shape than Chrysler, but its ability to prosper long-term is still an open question. Ford was in better shape because it had in 2006 hired Alan Mulally of Boeing to be its new CEO. Mulally had Ford borrow some \$23 billion before the banking system melted down, giving the company enough cash to weather the downturn. That, plus a significantly improved product line, made Ford the strongest of the former Big Three. The transplant side of the U.S. industry weathered the financial storm fairly well, but in 2010, mighty Toyota found itself embarrassed by a number of quality problems, and the company suffered a loss for the first time in its history. The future of the auto industry looks to be as volatile and unpredictable as its past.

Auto Issues Today

Globalization, Powering Cars of the Future, Vehicles and the Environment, and Modern Manufacturing

Globalization

“[T]he inexorable integration of markets, nation-states, and technologies to a degree never witnessed before – in a way that is enabling individuals, corporations and nation-states to reach around the world farther, faster, deeper and cheaper than ever before. . . . the spread of free-market capitalism to virtually every country in the world”

–T. L. Friedman, describing globalization in
“The Lexus and the Olive Tree”

Buying and Selling Vehicles Around the World

The American auto industry is part of a larger movement of economic globalization that has transformed how companies operate, where and how parts and vehicles are produced, and how vehicles are designed and sold. Globalization means companies operate within a worldwide economy, not just a national, regional or local economy. Many American automotive companies became global companies early in their history, and the industry itself has been global since its founding in Europe.

Ford, General Motors and Chrysler all opened manufacturing or sales facilities outside their original main U.S. market early in their companies’ histories and continue to expand via new national divisions and multi-company partnerships today. Canada was the first market the American manufacturers targeted: Ford established a Canadian division in 1904, GM in 1918 and Chrysler in 1925. These operations allowed the companies to avoid tariff fees for imports; economic incentives like this are a recurring theme in the reasons why companies have opened global operations over time. The Canadian ventures also opened up the British market (including England, Ireland and even India) tariff-free through Canada’s position as a member of the British Com-

monwealth. A similar process is going on today as American manufacturers team with companies in Asia to open up the growing Asian market, especially in China.

American consumers have had increasing choices from a variety of global vehicle suppliers since the 1950s and 1960s as international makers have opened sales operations in the United States. Volkswagen was the first foreign manufacturer to actively court the post-World War II American market; the first VW was sold in the United States in 1949. Japanese manufacturers entered the U.S. market with the establishment of Toyota Motor Sales in the United States in 1957. The **1966 Toyota Corona** is a good example of the type of small family car that began to be increasingly popular with a segment of the U.S. market and that the Japanese manufacturers excelled in producing. In 1975, Toyota became the top-selling import vehicle in America.

Statistics from the Automotive News Market Data Book (1980–2002) illustrate the change in American consumer choice over time. In 1970, 86 percent of cars sold in the United States were made by domestic manufacturers, 8 percent by Europeans and 3 percent by Japanese. In 1980, the market shows the growth of Japanese imports, with 74 percent U.S.-sourced vehicles, 20 percent Japanese and 6 percent European. In 1990, the figures were 67 percent U.S., 30 percent Japanese and 5 percent European. And by 2001, the U.S. manufacturers had only 51 percent of the car market while the Japanese, had grown to 38 percent and Europeans had rebounded to 11 percent. In addition, manufacturers from Korea, India and China are now also competing for a U.S. market share. American manufacturers have maintained a great percentage of the light-truck segment over time, even as Japanese and other manufacturers have introduced vehicles in this category.

In the American auto industry, the pace of change and the deep impacts of a globalized economy have grown significantly since the 1980s. The most obvious impacts in the 1980s were the growing popularity of imported Japanese vehicles, including Toyota and Honda, in the American market and the beginning of domestic production by Japanese auto manufacturers. Japanese manufacturers developed a

reputation in the American market for high-quality, reliable, innovative and efficient vehicles. This reputation is evident in the marketing for the Nissan Stanza wagon from 1985. This small wagon was sold with the tag line “[Nissan Innovation Strikes Again.](#)” promoting not only a passenger side sliding door to access the rear seats but also a driver’s side sliding door. Other notes in the advertisement promote safety, ease of parking in a tight space, cargo room, value, innovative design and style. In the late 1980s and early 1990s, Japanese automakers added to their focus on smaller, fuel-efficient vehicles for the U.S. market with the launch of larger luxury-model lines, including Honda’s Acura brand in 1986 and, in 1989, Toyota’s Lexus and Nissan’s Infiniti brands.

One reaction to the growing popularity of Japanese vehicles was the formation of Saturn, a General Motors subsidiary, in 1982. As seen in the advertisements in the collections of [The Henry Ford](#), its 1990 launch ads brand this new company as “[Saturn: A different kind of company, A different kind of car.](#)” Saturn was specifically set up to compete in the smaller-car market. It was developed with its own dealer network and a dedicated production facility. Saturn also operated under a unique contract with the United Auto Workers that changed many of the standard contract clauses of older domestic facilities and allowed Saturn to emulate many of the work practices made standard by Asian producers, including team-based builds and much more flexible work rules. Saturn also attempted to compete on innovation, including the use of plastic body panels that were intended to be lighter (promoting fuel economy) and easier to modify, in order to decrease the difficulty of changing model designs year after year. The Saturn sales experience was also different from the traditional American car-buying experience: Since each model had a single set price, there was no price haggling at the dealership. But the Saturn project had many detractors, both within General Motors and within the UAW. The company was reluctant to spend the money necessary to keep Saturns up-to-date and competitive, while the union gradually chipped away at the innovative labor contract. In December 2008, GM announced its intention to close or

sell the Saturn division as part of its bankruptcy process. As of 2010, Saturn production has ended and the brand is being closed. Some of the practices developed at Saturn, such as team-based production, greater shared focus by both the UAW and management on quality build, and a focus on new lighter-weight materials, have found their way into the rest of the industry, but Saturn’s model of “a different kind of company, a different kind of car,” was not widely adopted.

Another business strategy used to compete in the globalizing market was the development of joint-venture operations among manufacturers from different countries. Joint ventures are seen as wise ways to build on different companies’ strengths, provide access to new markets, spread financial costs and risks, increase potential profits, and transfer technology and managerial methods. In 1986, General Motors and Toyota formed the first Japanese and U.S. automaker joint-production venture, named New United Motor Manufacturing Inc. (NUMMI), in California. One of the goals of NUMMI was for GM to learn and adopt Japan’s excellence in lean-manufacturing techniques. Lean manufacturing has been adopted by the auto industry worldwide. It is a system built off waste reduction ethics promoted by Henry Ford, refined under the Toyota Production System and named “lean” by John Krafcik in the late 1980s. Lean focuses on reducing waste, smoothing process flow, increasing quality, and ultimately providing greater value for the customer. While the NUMMI plant itself was a success, again both GM and the UAW were reluctant to transfer all the lessons learned to other plants. By 2009, with the country in recession, auto sales falling, GM facing bankruptcy and Toyota losing money for the first time in its history, the California plant became production capacity that neither company needed, and it was closed.

Global Design and Local Production

The definition and perception of an American car versus a foreign car has changed over time. Before the 1980s, it was relatively clear what was an American car and what was a foreign car, based on where each was built and where the building company was based. With changes in the global automobile industry, that distinction is becoming harder to define for many consumers.

Is an automobile defined as American or foreign by where it is designed, where its parts are built, where it is assembled, what regulations it meets, which consortium of companies made it or where its maker's company is based? As globalization has increased, more auto parts are made in a wider array of places, American-based companies design and build in foreign markets, and more foreign-based manufacturers have established design, assembly, production and sales facilities in the United States. And domestic and foreign-based companies have connected in a range of partnerships and co-ownership models. In a global economy, auto companies are based all over the world compete all over the world, and form partnerships across nations to design, build and sell their vehicles.

Foreign-based companies have located production and assembly plants in the United States from quite early in the industry's history. Local production allows manufacturers to avoid some of the costs of import/export, including tariffs and shipping. Rolls-Royce opened a plant in Springfield, Massachusetts, in 1921. Volkswagen opened a plant in New Stanton, Pennsylvania, in 1978. The Japanese entered the American market as manufacturers with the opening of Honda's Marysville, Ohio, plant in 1982. The first Honda Accord to roll off the line as an American-built Honda in 1983 is on display in Henry Ford Museum. As of 2008, 15 manufacturers were producing vehicles in the United States. The definition of an "American car" became more complicated as foreign-based producers began to assemble their vehicles in the United States and U.S.-based manufacturers began to assemble their parts and cars in multiple countries, all for the U.S. market. Is a Honda made in Ohio an American car? Is a Ford made in Mexico for the U.S. market an American car?

This distinction between domestic and foreign cars will get increasingly muddled in years to come as global design and global production are embraced by all auto manufacturers. This is not a new idea; Ford's Model T can arguably be called the first "world car," a car sharing the same design and parts, built and sold simultaneously in multiple countries. Ford continued this strategy, marketing the [1981 Ford Escort](#) as a world car. In 2010, Ford is again embracing the idea of a world car with its Focus line. Designed to meet the tastes and engineering requirements of multiple countries, Ford expects to build and sell the car on four continents with 80 percent of the parts shared across the global production chain. As car companies increasingly globalize their production and sales, this is one path to profitability: Shared design and shared parts streamline the process and reduce costs. But shared design and shared parts also increase the risk of larger and potentially fleetwide recalls if parts that are used on multiple vehicles are found to be faulty.

The increasing move toward world cars recognizes that the largest growth markets for auto manufacturers in the future will be in Asia, particularly in China and India. Global design and global production plans are shaped to meet this growth pattern with most of the world cars being designed as smaller models than vehicles that were designed solely for the American market. One of the challenges for global design will be to maintain some distinction in style and customization for each market. Will cars that sell well in Bangalore and Beijing meet the desires of buyers in Phoenix and Frankfurt, too? Designers and builders are figuring out how to meet this complex new scenario. Interior customization, styling and trim packages, all overlaid on a shared platform, will likely be a big part of the answer. And such cars are increasingly likely to be designed by teams based all over the world. Virtual (computerized) design and build allows teams to collaborate wherever they are. Experts in fuel systems may be located in Europe, interior teams in the United States and exterior-styling teams in Asia; location is no longer primary when work can be done from anywhere and most predesign testing is done online.

Concerns About Globalization

“Proponents of globalization say that it helps developing nations ‘catch up’ to industrialized nations much faster through increased employment and technological advances, and Asian economies are often highlighted as examples of globalization’s success. Critics of globalization say that it weakens national sovereignty and allows rich nations to ship domestic jobs overseas where labor is much cheaper.”

- Lisa Smith, “The Globalization Debate”

While it is a fact of modern life, globalization has been a contentious issue. Concerns about globalization include job loss and relocation; working conditions; differing taxes, tariffs and industrial support; maintaining national industrial capacity; and different standards for environmental regulation.

Labor unions, including the [United Auto Workers](#), have raised concerns about job loss as assembly and parts plants are increasingly located outside the United States. The UAW was one of the most vocal opponents of trade pacts, including the North American Free Trade Agreement (NAFTA), that have made import and export of parts and vehicles throughout the United States, Canada and Mexico simpler since its adoption in 1994. Free-trade proponents argue that overall jobs and exports grew in the United States in the period 1994–2007. Opponents of free-trade agreements like NAFTA, especially in the auto industry, argue that it was a key factor leading to loss of industrial jobs, due to plants moving out of the United States, and that it has changed the balance of power between companies and unions, making it easier for companies to move jobs out of the country.

Concerns about maintaining national industrial capacity, especially the ability to build and maintain military capacity, also come up in discussions about globalization. In the auto-industry financial-bailout debate of 2008–2009, proponents of the bailout often cited the history of Detroit’s auto-industry as the [“Arsenal of Democracy”](#) as a key reason why the U.S. government needed to ensure the economic viability of a national automotive industry and provide financial assistance to Chrysler and General Motors. This argument states

that the United States should ensure that heavy manufacturing operations in the country, including auto suppliers and assembly plants, are stable so they could be transformed from auto production to wartime production again if needed, as was done in World War II.

A similar national competitiveness argument is made for governmental investment in research and development by the auto companies on new-vehicle environmental technology. This argument focuses on the desire for U.S. companies to play a role in the development of battery technology for electric vehicles, fuel cells and other possible pollution control or alternate fuel systems for vehicles. Concerns are raised that if U.S. companies do not lead the development of these technologies, the United States will fall behind in the global market and will ultimately lose jobs and exports to foreign-based competitors. Proponents of government investment often point to the support given foreign-based manufacturers by their home countries as an argument for increased U.S. government support of domestic-based auto companies. Direct investment, tax incentives and regulations by governments can impact industrial development. In the late 1980s, changes to the U.S. corporate antitrust regulation made it possible for U.S. automotive companies to cooperate through groups like USCAR (United States Council for Automotive Research). Research consortiums like USCAR formed as a reaction to globalization concerns in the late 1980s and early 1990s.

Energy, the Environment and Vehicle Choice

“If we want to reduce our dependence on oil, put Americans back to work and reassert our manufacturing sector as one of the greatest in the world, we must produce the advanced, efficient vehicles of the future.”

- President Barack Obama, announcing a \$2.4 billion federal investment in batteries and electric vehicles, August 5, 2009

Americans’ awareness of vehicle-based pollution has been growing since the 1950s. While it may surprise us today, cars were originally considered a clean vehicle option, creating far less pollution than the horse-drawn vehicles they were

replacing in the early 20th century. As that century closed, cars and trucks were recognized as serious contributors to greenhouse gas pollution, contributors to global climate change and a technology that makes the United States dependent on foreign oil.

A contradiction is clear in American culture, between our concerns about the environment and our actual buying habits. Consumers express interest in fuel-efficient vehicles especially when gas prices are high. However, their buying habits have kept Ford's F-150 pickup truck the top-selling vehicle in America for over 25 years (as of 2010). Throughout the 1990s and early 2000s, Americans showed a marked preference for larger vehicles like SUVs and minivans. Then in 2008 and 2009, when gas prices rose quickly, they started to voice more demand for smaller, more efficient vehicles. Government pressure, too, is now pushing the auto industry to move toward vehicles that use alternative fuels (especially biofuels), hybrid vehicles and fully electric vehicles. How will car companies respond to this range of customer and governmental demands? Will a new power technology transform internal combustion vehicles and the network of fueling stations that support them? What regulations, incentives and systemic changes will evolve to alter the cars that America drives? Will American consumers dramatically shift their buying and driving habits? What tradeoffs will be made in switching from traditional gas engines to new vehicle power sources? These are the questions for early 21st-century drivers and manufacturers. The answers will change both America's and the world's concept of personal mobility in years to come.

For auto companies and consumers, the challenge is to choose vehicle designs that will be cleaner to build and use while meeting desires for continued freedom in personal mobility, styling and conveniences, speed and range, and ease of use—and while hopefully limiting unintended negative consequences. Governments are working to link their energy and mobility policies, address climate change and promote their national industrial competitiveness.

Pollution Regulation and Technology Advances

As the 20th century closed, the debate about vehicle power sources reopened with a vocal push to move to cleaner cars and trucks. This time, the debate was driven largely by the realization that gas and diesel power, which dominated the 20th century, had consequentially led to increasing pollution and by concerns over the dependence on and cost of foreign oil. While engine technology and emissions began to be regulated in the 1960s, tailpipe emissions including lead, carbon monoxide, unburned hydrocarbons and particulates continue to cause health concerns and change the environment.

The National Air Pollution Control Act of 1955 was the first nationwide attempt in the United States to understand and begin to regulate sources of air pollution. Concerns about air pollution had been long-standing, especially coal-smoke pollution from home heating and industry; in fact, the term “smog” was coined in 1905 by Dr. H. A. des Voeux to describe London's air as a combination of smoke and fog that was a particular product of cities. In the 1960s, states, especially California, began to regulate air pollution sources, and as understanding about the role of vehicles in creating air pollution grew, emission-control technology was developed. In 1970, the federal Environmental Protection Agency (EPA) formed and began to regulate pollution, including air pollution from vehicles.

In the early 1970s, efforts to control emissions had an adverse effect on engine performance and fuel consumption. These problems were not solved until the [catalytic converter](#) became practical in 1975. But tetraethyl lead, which began to be added to gasoline in the 1920s as an antiknock agent, contaminated the catalyst in the converters. Lead was eventually phased out of motor fuels, and its use was fully banned in 1996. According to the Environmental Protection Agency (EPA) announcement in January 1996, “The average lead content in gasoline in 1973 was 2-3 grams per gallon or about 200,000 tons of lead a year. In 1995, leaded fuel accounted for only 0.6 percent of total gasoline sales and less than 2,000 tons of lead per year.”

The Energy Policy and Conservation Act of 1975 rolled out the first Corporate Average Fuel Economy (CAFE) standards to set industrywide targets for vehicle fuel use, or miles-per-gallon standards. These standards were prompted largely by the 1973–1974 oil embargo and gas crisis in the United States that increased concern about stable gas and oil supplies and put a spotlight on ways to conserve fuel and reduce dependence on foreign oil. Average fuel economy in 1974 was 12.9 miles per gallon (mpg); the goal of the initial CAFE standards was to raise corporate average fuel economy to 18 mpg by 1978 and 27.5 mpg by 1985.

Technology advances have enhanced engine and vehicle efficiency while cutting emissions. Some of the key technologies in this category include fuel injection, electronic injection, secondary air injection, computerized engine control, emissions testing and catalytic converters. In a 2003 Congressional Research Service report, Robert Bamberger wrote that “Between 1976 and 1989, roughly 70 percent of the improvement in fuel economy was the result of weight reduction, improvements in transmissions and aerodynamics, wider use of front-wheel drive and use of fuel-injection.” Drivers have also been taught ways to drive more efficiently, and countries have experimented with laws, including setting speed limits to reduce emissions. Weight reduction has been a significant focus for fuel economy increases, with manufacturers experimenting with many material changes to vehicles, including lighter weight steel, plastic body panels and changes to engine castings to reduce weight.

Average fuel economy did not increase greatly in the late 1980s and actually declined in the 1990s. While CAFE standards remained frozen by Congress throughout the 1990s, this change from the gains seen in the early years of CAFE standards can be largely attributed to the types of vehicles Americans chose to drive. Sales of sport utility vehicles (SUVs) and other larger, heavier vehicles like midsize pickup trucks and minivans rose dramatically throughout the 1990s. SUVs are classified as light trucks in the CAFE standards and have a lower overall mpg requirement than cars. The lower mpg combined with the spike in Americans buying these vehicles, leading to the overall drop in fleetwide miles

per gallon. The National Highway Traffic Safety Administration (NHTSA) introduced rules to improve light truck fuel economy standards beginning in 2003; this rule required a 1.5 mpg increase in fuel economy from 2005 to 2007. In 2007, light-truck standards were again revised, and the way fuel economy is calculated across fleets changed as well. NHTSA estimated that the changes would lead to a rise in SUV and other light-truck fuel economy of an additional 1.5 mpg from 2008 to 2011.

Fuel economy and air pollution have historically been regulated by different federal agencies as well as by states. In 2009, the federal government issued an objective for the Environmental Protection Agency and the Department of Transportation to work together on the next round of CAFE standards. For the first time, this joint development would focus both on the improvement of fuel efficiency and on the overall reduction in greenhouse gas emissions, like carbon dioxide. State agencies, like California’s, gained the right to place additional regulations on tailpipe emissions over and above federal regulations, although proposed federal standards for 2012–2017 largely match proposed state standards.

Air pollution does not respect borders, so not only states and federal governments but also nations around the world are concerned about it. Global climate change discussions and agreements have begun to impact vehicle design, manufacturing and consumer preferences. The 1997 Kyoto Protocol was the first significant worldwide agreement with reduction targets focused on reducing four greenhouse gases (GHG) – carbon dioxide, methane, nitrous oxide, sulphur hexafluoride – and two groups of gases – hydrofluorocarbons and perfluorocarbons – related to greenhouse gases. Reduction targets are set, but the ways they are achieved are flexible country to country. As of 2009, 187 countries have signed and ratified the Kyoto Protocol. The United States is a signatory but has not ratified the agreement to make the reduction targets binding. Global agreements, like the Rio agreement (1992), Kyoto (1997) and Copenhagen (2009), clearly point to a growing understanding and concern about climate change and the choices governments, consumers and manufacturers make to support and maintain our standard

of industrialized living. Managing emissions such as carbon dioxide will become as important in the future as improving fuel economy and securing fuel supplies.

Powering the 21st-Century Vehicle

Manufacturers are addressing growing concerns about the environmental impact of internal combustion gas-powered vehicles by investing in new technology and reconsidering how the entire life cycle of vehicle production and operation is handled. Consumers may be starting on a path of long-term changes in their preferences and buying habits, actively considering the environmental cost of their vehicle choices. Governments are increasingly pursuing policies that help them reach environmental targets to reduce air and other pollution. Innovation is happening constantly and quickly to develop the fuels and systems that will drive the cars of today and tomorrow; much of it is funded by the same companies that currently dominate the current fuel market as they try to shape what they will sell in the future. Manufacturers are working hard to figure out where to invest in order to create the business model and products that will attract future car buyers.

Combined, these changes will transform the vehicles that fill America's cities and highways in the 21st century. Unlike the 20th century, it's likely that no single power solution will become as dominant as gasoline became in the 20th century. A mix of gas and diesel internal combustion engines, biofuel or flex-fuel engines, and hybrid, fuel cell and all-electric vehicles will be seen on the roads over the next 20 to 30 years. In cities, more and more hybrid and electric vehicles are likely to go into use, especially if gas prices rise and air pollution and global-warming concerns continue to influence legislation to limit tailpipe emissions. Just as with the fuel choices of the 20th century, the fuel choices of the 21st century will have consequences. Will they increase some kinds of waste? Will we figure out recycling systems? Will food and fuel compete for the same crops? Will lower-emissions vehicles continue to be more expensive than existing gas and diesel cars and trucks? What trade-offs are consumers willing to make as they choose their next cars?

Biofuels

Using non-petroleum-based fuels or fuel supplements is another way of attempting to break the dependence on gas and oil and potentially reduce emissions without having to drastically change engine technology. This is an old idea; many early diesel engines ran on vegetable oil, and the Model T was designed to run on standard petroleum, pure ethanol or a mixture. Many production vehicles in the late 2000s also have this capability and are billed as flex-fuel vehicles. These vehicles can run on fully or partially plant-based gas mixtures known as biofuel. The sources for biofuels are numerous, ranging from corn-based ethanol, recycled waste oil from restaurants, purpose-grown grasses like switch grass and potentially even algae. The advantages of biofuels are that the plants could be grown within national borders to supply fuel needs without relying on imports, and they are renewable, unlike standard petroleum.

One disadvantage is that crops that could be used for food might instead be used as fuel, creating competition that could negatively impact food prices and availability. This is a challenge for the biofuels industry – to pick either a fuel that comes from an existing waste product or a fuel that can be produced without compromising other resources, such as water or food-producing cropland. Biodiesel was studied in 1998 by the U.S. Department of Energy and the U.S. Department of Agriculture, and the emissions reductions compared to standard petroleum diesel were significant for carbon monoxide, particulates, sulfur and unburned hydrocarbons; nitrogen oxide was the only item not to show a reduction. Ethanol is mandated in many states as a gas fuel additive to enhance combustion and lower emissions.

Solar

Universities often play a role in technology research and development, often pushing invention and innovation by participating in competitions. One example in the collections at **The Henry Ford** is the [first solar-powered vehicle to make its way across the United States](#), in 1984. Known as TSAR and nicknamed the Phoenix, the vehicle was developed by Crowder College in Missouri and crossed the United States from San Diego, California to Jacksonville,

Florida, in 45 days. Current solar-power technology does not produce enough energy per square foot of solar film or solar cells to drive current passenger vehicles. The technology is being adapted in some electric vehicles to provide a small additional boost of power or to power cooling fans and other smaller parts of the electrical system. Solar-powered golf-cart-size vehicles may be viable for limited city use in areas with abundant sunshine. Solar will also be part of the energy equation that provides power to the larger home and industrial power grid that will be used to charge electric vehicles.

Fuel Cells

Just as local, state and federal government agencies and rules play a key role in pollution regulation, they are also one of the drivers of vehicle design and technology development through regulation and incentives. The goal of these initiatives is to spur governmental agencies, universities and private industry to work together to find high-mileage, low- or no-emission vehicles that will meet production and safety standards. Fuel-cell and hybrid-electric vehicle development was a key focus in the 1990s, when President Clinton launched the Partnership for a New Generation of Vehicles (PNGV) in 1993. President Bush maintained a focus on hydrogen fuel cells with the launch of his FreedomCAR initiative in 2003. California's regulation has also spurred a great deal of development and a growing market for non-petroleum-based vehicles. The California Air Resource Board, established in 1990, set increasingly stringent emissions standards. By 1998, 2 percent of all vehicles sold in California were to be emissions-free. This program focused heavily on hydrogen fuel cells and all-electric vehicles in its early years. These still remain a focus, although gas-electric hybrids are increasingly a part of the mix.

Fueling systems also need to be developed, and some of these are co-funded by government as well. One example is California's promise in 2004 to seed the development of a "hydrogen highway." This would be done through partially state-funded development of hydrogen fueling stations along California's major highways. Los Angeles is the primary focus for developing a hydrogen fueling network; San Francis-

co is a secondary area. The California Air Resources Board reported in 2009 that "according to [auto company] combined projections, the number of passenger fuel cell vehicles deployed in Southern California will more than double each year between 2009 and 2017, when they expect the total to be over 41,000. In Northern California, they project 8,450 passenger vehicles by 2017."

Gasoline-Electric Hybrid

Echoing the choices of the early automobile market at the turn of the 19th century, battery electric and electric hybrid vehicles are increasingly the alternative power source of choice for lower- and no-tailpipe-emission vehicles. Federal research and development grants in the 1990s encouraged collaboration among American automakers on hybrid electric vehicles, and a great deal of developmental work was done on the drivetrain and technologies, such as regenerative braking, which captures otherwise-lost energy to power the vehicle.

Modern hybrid vehicles depend on extensive computer technology to operate. The software and electronics are designed to shift smoothly between the internal combustion engine and the electric battery power source. At low speeds, hybrids are operated by battery power, and as the car speeds up toward typical highway speeds, the internal combustion engine automatically engages and takes over. The process reverses as the vehicle slows or idles. Unlike standard internal combustion vehicles, hybrids are actually more fuel efficient at city speeds and less efficient at highway driving. Hybrid electric vehicles cut tailpipe emissions significantly since they have much smaller internal combustion engines and, when operating in electric mode, have zero tailpipe emissions. According to Toyota, their Prius model reduces carbon monoxide, hydrocarbon and nitrogen oxide emissions 50 percent to 90 percent when compared to traditional gas-powered vehicles.

The Japanese were first to market with the modern gas-electric hybrid. Toyota introduced the Prius in Japan in 1997 and brought it to the American market in 2000. Honda was actually first, by a matter of weeks, to market in the United States, with the Honda Insight that went on sale late in 1999.

The Prius quickly became the dominant hybrid vehicle choice and, in fact, became a fashion symbol for those who wanted to demonstrate a “greener” choice in their vehicles. Hollywood stars would sometimes arrive at premieres and events driving the Prius. An example of this [first-generation Prius](#) is in the collections of **The Henry Ford**. It was driven for 90,000 miles; the owner reported no problems with the hybrid drive system.

All major manufacturers are producing hybrid electric vehicles. Most are four-door family sedans or smaller two-door coupes. Ford was the first to introduce a hybrid electric SUV. There are also hybrid pickup trucks by Chevrolet and by GMC on the market; these trucks doubled the gas mileage for full-size trucks. While initial vehicle purchase costs are higher, electric hybrids are being adopted by users because they offer not only fuel and environmental savings with the battery electric system but also the extended driving range of a traditional internal combustion engine. The long-term maintenance costs and typical lifespan of the hybrid propulsion systems is unknown at this point.

Battery Electric

The United States Advanced Battery Consortium (USABC) formed in 1991 and signaled a new era of battery-electric vehicle development in the United States. This group, linking American auto manufacturers Chrysler, Ford and General Motors, was one of the first to connect domestic manufacturers in joint research and development. Their work has focused on developing improved batteries that can power vehicles for a longer range at a cheaper cost. Initially, electric vehicles used lead-acid batteries, similar to those that are used to start most cars. Nickel-metal hydride and lithium-ion batteries are now used in battery-electric cars because they give a great driving range per charge.

In 1997, General Motors introduced the [EV 1](#), an electric-powered two-door two-passenger car available by lease only through its Saturn dealerships. The initial EV 1 used lead-acid batteries and had a range of 50-75 miles per charge.

The second generation EV 1, rolled out in 1998, switched to nickel-metal hydride batteries and had an increased range of 55-95 miles per charge. Its top speed was 90 miles per hour. The car was designed in every aspect to reduce drag and increase range – the body was a sleek design, there was no radio antenna and rear wheels were placed 8 inches inset from the front wheels to create a teardrop shape. The EV 1 was only available by lease, and the rate was high compared to other vehicles available on the market. The typical lessee had a household income over \$200,000 per year and was 52 years old; 83 percent of lessees were male, 79 percent were married and 76 percent had a college or post-college degree. Lessees were passionate advocates for the car and rallied together when General Motors discontinued the vehicle in 2001 and terminated all of the leases. General Motors was losing money on each car and announced that it planned to focus development on hybrid and fuel-cell vehicles instead.

Interest in all-electric vehicles rose again in the late 2000s, as oil and gasoline prices again climbed and especially after the U.S. government reinvested in research and development for low- and zero-emission vehicles and battery production facilities. The Tesla Roadster electric-powered sports car is available for sale; this high-end vehicle has a price tag over \$100,000 but has achieved a highway range of 244 miles per charge. Nissan and Ford have announced plans to release all-electric hatchbacks and sedans in late 2010 and 2011 in the approximately \$30,000 price range. All the vehicles under current design and production are planned to plug in to standard household electrical outlets for recharging. Driving range per charge remains a significant concern for some potential drivers. The Nissan Leaf is predicted to get 100 miles per charge with in-city driving but highway range is expected to be less. The 2011 all-electric Ford Focus is expected to have a similar range of about 100 miles per charge. Ford also launched the all-electric Transit Connect in 2010, a delivery-styled vehicle designed for city-area operation with a top speed of 75 miles per hour and an 80 miles-per-charge range. The Transit Connect is the first all-electric vehicle targeted at fleet and commercial purchasers.

What's Old Is New Again: Electric Cars

“But one thing we know is that for automakers to succeed in the future, these companies need to build the cars of the future – they can’t build the cars of the past.”

– President Barack Obama, speech on clean energy,
April 22, 2009

As the automobile age dawned in America in the early 20th century, three power sources competed to see which would drive America’s cars: steam engines, electric motors and internal combustion engines, usually fueled by gasoline. Each had advantages and disadvantages. Ultimately, gasoline-fueled internal combustion-powered vehicles came to dominate. As electric vehicles are again promoted as the car of the future, it’s illuminating to see how gasoline vehicles became the primary choice in the 20th century, beating out electric- and steam-powered vehicles.

Steam and electric power ran 19th-century rail and streetcar networks. Americans were familiar with both types of power, while internal combustion engines were much less well known. Internal combustion engines were used primarily as stationary power sources, especially on farms. Steam locomotives burned coal to boil water into steam, but coal was not practical for road vehicles. Instead, builders of steam cars generally used gasoline or less-volatile kerosene. Power for electric streetcars was produced in large generating stations and distributed by overhead wires or third rails. Again, this was not a practical way to power a road vehicle that wasn’t tied to a fixed route, so builders of electric horseless carriages relied on storage batteries to provide electricity. Horseless carriages powered by internal combustion engines generally burned gasoline or sometimes kerosene.

Although the first American production automobile, the 1896 Duryea, was an internal combustion car, steam and electric vehicles dominated the early market. For instance, in 1900, the fledgling U.S. auto industry produced 1,681 steam cars, 1,575 electric cars and only 936 gasoline-burning cars. But the motive power mix began to shift rapidly. At the 1901 New York auto show, 58 steam cars were exhibited, 23 electric cars and 58 gasoline cars. By the 1905 New York

show, only nine steam cars and 23 electrics were on display, against 219 gasoline cars. The 1908 Cycle and Automobile Trade Journal, one of the leading early auto periodicals, listed only nine companies making steam cars, 11 making electric cars and 151 making gasoline cars.

Thus, in less than a decade, steam and electric cars were reduced to niche players. The obvious question is, why? Steam cars had a number of advantages – they were quiet and fast and their engines were virtually impossible to stall. But the negatives seemed to outweigh the positives. Steam cars needed both fuel and water, and dirty water could foul boilers. The starting procedures for early steam cars were often complicated and time-consuming. It could take between 10 and 20 minutes to get an early steam car ready to run. Even though that time improved steadily, the perception was planted in people’s minds that they were tedious to start. Many people were also afraid of boiler explosions. There is no record of a steam-car boiler ever exploding, but perception often trumped reality. Steam was also seen as old technology that had been around since the 18th century. Again, perception played an important role. But what explains the decline of electric cars, which had none of steam’s disadvantages and were the new modern power source to boot?

Conventional wisdom cites a variety of explanations. The great Texas oil strike at Spindletop in 1901 made gasoline cheap and abundant. Early auto racing promoted the speed and power of cars powered by internal combustion engines. Oil companies and auto companies cooperated in a symbiotic relationship. But the most common explanation is range – the fact that one can go farther on a tank of gasoline than on fully charged storage batteries. The superior range of internal combustion-powered cars is true enough, but this explanation only gives rise to another question: Why was range so important?

The answer seems to lie in how people chose to use this new invention called the automobile. We think of the auto as an essential transportation device, because we have arranged our world to accommodate the car’s capabilities. But at the beginning of the 20th century, the world was arranged to accommodate the capabilities, and limitations, of the existing

modes of transportation: electric streetcars, steam railroads, bicycles, horses – and shoe leather. People didn't need the car to get around. Rather, for early motorists, the car offered the opportunity to do things they didn't know they wanted to do: control something powerful; own something modern and complex; and, most important, take relatively high-speed excursions into the open countryside. In other words, the earliest motorists used the car for recreation. They drove cars not because they needed to, but because they could. This is why, for the first 20 years or so of the auto age, private motor vehicles – those not used for profit-making ventures like hauling passengers or goods – were referred to not as passenger cars but as pleasure cars. So this is why range became important – because electric cars that depended on batteries were unsuited to traveling over rough, hilly country roads with no power lines and no recharging stations. Gasoline-powered cars needed only the fuel, which was readily available even in country stores.

Unable to compete head-to-head with internal combustion-powered cars for the general automobile buyer, electric carmakers focused instead on buyers with whom they thought they had certain advantages: women, especially urban, upscale women.

Women liked electric cars because they were clean, quiet and could be started with the turn of a switch. Internal combustion-powered cars were dirtier, noisier and had to be crank-started by hand. This latter operation not only often required upper body strength but could be dangerous if the engine kicked back and sent the crank spinning backwards into an arm or wrist. Electric cars also required no transmission at a time when internal combustion car transmissions were relatively primitive and balky. Electric carmakers targeted urban women because they used their vehicles for short trips at relatively slow speeds, so battery range was not an issue. They targeted upscale women of necessity, because electric cars were not cheap, either to buy or operate, and because upscale women were more likely to have the leisure time for driving a car.

This focus on the female market was successful for several years, giving rise to stately, elegant cars with plush, parlor-like interiors. But in 1912, Cadillac introduced the first effective electric self-starter for internal combustion, and the innovation spread rapidly throughout the auto industry. That, and the gradual improvement of transmissions, opened the internal combustion-powered car to women and undercut the last rationale for electric cars. The fate of one carmaker, Detroit Electric, is illustrative. The company made as many as 1,900 cars in 1916 but sold just 143 of their [1922 model](#). Detroit Electric was the longest-surviving American maker of electric cars, finally giving up the ghost in 1931. The nameplate was revived in 2008 and will be placed on cars made by the Proton group of Malaysia.

There have been abortive attempts to revive the electric car in America, especially during the oil embargos of the 1970s, but such cars were typically glorified golf carts like the Comuta-Car. The most recent serious attempt to build a viable electric car was the General Motors EV1. The fate of that car is significant, because it brings us back to how people use their cars and what they think is important about those cars.

The EV1 had a group of committed users who were passionate about the car. They loudly lamented General Motors' decision not only to end production but to recall all the cars, which GM had made available only through a lease. Those EV1 owners willingly accommodated their lifestyle to the limitations of the car – it had only two seats and, like all electrics, a limited range. But those owners placed values such as limiting environmental impact ahead of other values such as unlimited mobility. General Motors ended production of the EV1 because the company believed that there were not enough of those people to make continued production profitable.

If the electric car is indeed to be the car of the future, it will be because a significant number of consumers choose to put other values ahead of more traditional American values like rapid, unlimited mobility.

Networked Thinking: Personal Mobility, Mass Transit and Energy Grids

Energy, the environment and personal mobility are becoming increasingly interwoven. As drivers, governments and manufacturers think more about the impact of vehicles on the environment, they will increasingly use this thinking as part of their decision-making on how to move around in their daily life, which car to buy, what policies to enact to favor public transportation and technology development, and so forth. Drivers of today and the future are likely to still want the freedom, speed, ease of use and other factors that have made personal car use so prevalent and desired. Drivers between Detroit and Chicago or between Portland and San Francisco don't want to stop for several hours to recharge their electric vehicle (most have a top range of 100 miles on a full charge). If a culture-wide shift will be made to fully electric vehicles, then many systems beyond just the car need to be developed.

Systems sprang up in the 20th century to support internal combustion-powered cars, including fueling stations and quick-oil-change shops. New systems need to evolve with any significant changes in vehicle power sources. The nationwide power grid may evolve to allow for quick-charging stations to fuel electric cars in 10 minutes instead of several hours. Power costs may be cheaper overnight and more expensive during the day to encourage a better spread of the load on the system. Mass transit hubs are likely to be further developed to allow people to easily move between different styles of transportation best suited to the type of travel; a commuter may drive a personal car to a hub on the edge of a town, then hop on light rail to get into the heart of the city, then use an electrified bike or scooter that is available for quick on-demand rental to run lunchtime errands close to the office. Or systems like Zip Cars, which make car use available without owning cars, may spread. And the entire way you buy, own or lease a car may change. It's possible that a consumer will buy the bulk of the car, but the battery system will be owned by the manufacturer. In this scenario, it's possible that drivers will go to a battery-swapping station instead of a gas station when they need a recharge. Just as the

20th century dawned with the coming of a new transportation technology, the 21st century is ripe for new developments and new choices for personal mobility.

Auto Manufacturing Today: High-Tech, Team-Based, Quality-Focused

The American auto industry is in the midst of significant transition. After decades of very little change in the methods and styles of production, automobile companies are now changing rapidly to compete in the global market. American vehicles are also being transformed by information technology and its inclusion in the manufacturing process, vehicle design, vehicle distribution, and vehicle systems and amenities. While often unaware of how technology is part of the manufacturing process, users now expect higher overall vehicle quality that is often technology based, and they expect a great deal of computer technology to be built into their cars.

People and Machines Building Together

Just as the desktop computer revolutionized how people work in office jobs, computers and robotics have revolutionized how vehicles are built. Dangerous, physically difficult and repetitive precision work is often moved to machine-based operations. One of the earliest examples is in the collections of **The Henry Ford**; this **Unimate robot** was installed in 1961 to load and unload a die-casting press at General Motors.

In modern vehicle-assembly welding, most painting and jobs like installing windshields are handled by robots. Machine-assisted assembly also helps to ensure that workers are not lifting or bending too much, so assembly and manufacturing work has become more ergonomically friendly and less physically harmful to many employees. While specific operations vary by manufacturer, most parts and assembly installation today is done by people using computerized tooling. These smart tools are capable of tracking the speed, torque, angle and many other parameters of nearly every fastener that is installed on a vehicle. This computerized tracking can

lead to great increases in quality control because the equipment can sense a poor install or even a part that is bad. But people are still integral to this system. People program the tolerances in the machines, respond to quality reports, and watch the machines and parts to ensure they are working well.

People are often working primarily in teams in most vehicle assembly plants. This system, called “kaizen” by the Japanese manufacturers, was widely adopted beginning in the 1980s and 1990s. As discussed in the Globalization section of this chapter, many American manufacturers partnered with Japanese manufacturers in joint ventures partially to learn this style of manufacturing management. Teams often have break rooms specifically for building camaraderie, they often have time each week to analyze quality reports and give ideas on how to improve team and work processes, and they are trained to work together as effectively as possible. Assembly teams also increasingly work with engineers and designers earlier in the vehicle design process so that vehicles are designed with final production in mind. This process is often done with virtual 3-D models of the cars, parts and assembly processes. Models can be run from anywhere in the world so that design and build can be more global processes. This change in the design-build process can decrease costs, improve the ease of assembly, and improve new product-launch quality and timing significantly.

Cars Are Rolling Computers

Just as today’s cars are built in fully computerized, synchronized, high-tech assembly plants, the cars themselves often are computers and entertainment systems on wheels. Computer chips, microprocessors and electronics control everything in the vehicle, from braking to acceleration to fuel injection. This increase in computer technology in cars has made them largely impossible to repair by the home mechanic. It has also increased fuel economy and, in many areas, introduced safety systems like antilock brakes and sensors that warn if the driver is going to back into something. The interior of a modern vehicle is increasingly a built-in, high-tech environment with voice command, keyless igni-

tions, GPS, sensors that can track what is in toolboxes in truck beds, entertainment systems for passengers and built-in refrigerator compartments.

Lean and Flexible Manufacturing

Manufacturers work in an increasingly competitive global environment where all costs must be managed tightly and systems made as robust as possible. Two concepts are helping manufacturers in this area – Lean manufacturing and flexible manufacturing. Lean systems are those that reduce as much waste as possible from the production process. Characteristics of lean systems are those that have limited stock on hand (often only 2-6 hours of parts in the assembly area); reduce packaging waste and often rely on reusable packaging; maximize technology to plan product, parts and labor flow; and use human and machine labor to the most efficient level. Lean systems depend on robust and reliable transportation networks and communication to ensure that parts are where they need to be exactly when they need to be there.

Supply-chain management through bar-coding is often used. Imagine the way FedEx or UPS track packages through their systems with bar codes; similar tracking is done on parts and vehicles as they flow through the assembly process. The lean manufacturer also uses far more statistical analysis and prediction to ensure that the right number of vehicles is built for the current market. In many plants, assembly is modified on a week-to-week and day-by-day basis so that plants are building to order. Flexible manufacturing lines are built for quick product change and to support more than one product on shared assembly lines. An example of this is a plant that could produce a car and a small truck on the same line using shared tools and overlapping product supplies. Global products will increasingly share the same base platform, but finishes will be customized to the sales region.

Focus on Quality

As car technology and amenities improved and became widely standardized across the industry, manufacturers had to find another way to compete. Quality has become one of their biggest standards; the industry works toward quality, and consumers measure quality when they choose vehicles. Quality reports rank vehicles on initial and sustained performance. Computerized tooling, team training and systems work together in plants to focus on quality measures. International systems like ISO 9000 are implemented to standardize systems and focus them on quality.

Companies build and build upon their reputation for quality, and tout it in their product advertising, internal communications and product-development planning. Quality issues like recalls and parts problems cost manufacturers millions of dollars, so they attempt to build systems that focus on building the best quality. Technology, like computerized tooling, has helped to raise production quality. Technology is also one of the flaws in the system that can help spread a quality problem. With the increasing reliance on computerized operating systems in vehicles, software bugs can cause major problems and can be far more difficult to find and fix than traditional visible mechanical issues. Globalized and shared supply chains can also quickly spread quality problems.

Chapter 5

Transportation Networks

Waterways

During early settlement, the easiest way to navigate inland was by water. Thus, for settlers, water routes were akin to our freeways. They were faster, safer and more comfortable than overland travel.

As the need for internal transportation improvements increased, the question remained who would take responsibility for and fund these improvements. Most early bridges and ferries were locally or privately funded.

Early modes of river transportation developed in an anonymous, evolutionary manner. For example, boats for transporting freight included the so-called Durham boat on the Delaware River, the Schenectady boat on the Mohawk and the Hudson River sloop. These were powered by wind on sails, and going against the current was difficult.

Settlers heading inland in the early 19th century were likely to take a river flatboat. Flatboats, like the name implies, were flat-bottomed vessels with straight prows, powered by hand with long poles. Larger flat-bottomed barges traversed larger Western rivers, though upstream travel was minimal to nonexistent. River travel could be hazardous, with hidden trees and tree trunks as well as island sandbars. Under ideal conditions, flatboats averaged 70 to 80 miles in a day.

Canals

Perhaps the most spectacular of America's early internal improvements was the building of canals. These artificial waterways traversed straight distances between points using specially designed flat-bottomed canal boats hauled by teams of horses or mules who trudged alongside the canals on adjoining towpaths.

Canal fever hit many communities during the 1820s and 1830s, as states became increasingly involved in canal-building projects. The largest of these was the Erie Canal, completed in 1826, which stretched 363 miles and included 84 locks where boats were raised or lowered to different water levels. This canal served as an important training ground for American engineers who went on, over the next 15 years, to build 330 miles of canals across the country.

Canals had the advantage of bypassing difficult stretches of road, connecting two rivers to each other or connecting lakes with rivers, and providing rivers with a navigable outlet to ocean ports. They drastically reduced the cost of transporting goods, lowering prices for consumer goods, connecting previously isolated parts of the country, and making farming and manufacturing profitable in new areas. But they were slow, took financial backing and commitment to build and maintain, and had severe geographic limitations.

Inventors and entrepreneurs continued to seek means of using inland rivers effectively, especially the enormous Mississippi.

Steamboats

The answer came in the form of one of America's major contributions to transportation technology – the steamboat. Steamboats were faster and more luxurious than canal boats, and cheaper and more comfortable than stagecoaches. They were ideal for [navigating up and down America's great rivers, like the Ohio](#), Mississippi and the Missouri.

Many innovators were involved in the development of early steamboats, including:

- John Fitch (aided by Henry Voight) and James Rumsey, who made early (different) steamboat attempts.

- Oliver Evans, who produced a standard engine for Western steamboats.
- John Stevens, a pioneer in steamboat travel, who was more successful than Fitch or Rumsey.
- Robert Fulton, who gets the most credit, developing not the first steamboat but the first commercially successful one, along the Hudson River. With Robert Livingston, Fulton established a monopoly that curtailed further steamboat innovation by others.
- Captain Henry Shreve, who developed a high-pressure steamboat, widely adapted to the Mississippi and other Western rivers.

The flat-bottomed Western steamboat, designed to navigate the shallow riverbeds and swift currents of Western rivers, converted the Mississippi into a sort of national highway. By 1830, some 200 steamboats were in operation in the West. By 1855, this number had increased to 727. Great Lakes steamers evolved from these steamboats, but were designed larger to carry bulky freight like wheat, coal and iron ore as well as passengers.

Steamboats revolutionized passenger and commercial transportation in numerous ways, making trips faster and cheaper, and, importantly, making upriver travel possible. A trip by flatboat might take six weeks downriver and four months back up (with a crew of strong men), while by steamboat it took only 25 days in all, and in the 1850s, two weeks or less. Similarly, a trip by sailing packet down the Hudson River might take two days to two weeks, depending on wind and weather. In the 1830s, a steamer could make the trip in 10 hours.

But many lost their lives due to boiler explosions (between 1825 and 1830s, 42 explosions cost the lives of 273 people). This led to an early example of federal government regulations in the interest of public safety. Much like canal networks before them, steamboat river transport created national markets, increased the pace of settlement, connected states and regions, and trained a new generation of American machinists, this time for building railroads.

Roads

Early Roads

To the average American, high-quality roads funded by local, state and especially the federal government seem like the natural order of things. But throughout the 19th century, there was no consensus over what constituted “good roads” and how or even whether to fund them.

Colonial rural roads were little more than cleared dirt paths. As late as 1804, an Ohio law specified that stumps left in the road be no more than one foot high. Such roads typically connected farms with the mills, stores or cotton gins found in villages, or they connected the villages with the nearest navigable water. There was a large network of these roads, and they were essential for everyday commerce. How then to account for their poor condition? Essentially, the cause lay in the way road construction was funded – in essence, it was not funded. Local authorities adopted the ancient Anglo-Saxon tradition of asking those who used the roads to maintain them by doing the work themselves. Local farmers lacked the knowledge, time and inclination to devote significant efforts to road maintenance, and so the roads were bad.

At the federal level, there was a continuing debate over the desirability and even the legality of funding highways and other “internal improvements.” The halls of Congress and the taprooms of local taverns resounded with debates over the constitutionality of federal funding, with no final resolution. The one great federal project was the Cumberland (or National) Road initially connecting Cumberland, Maryland, and Wheeling, West Virginia, and eventually running to Illinois. The National Road was relatively well-built on a stone foundation covered with gravel. It was also a turnpike, charging users a toll.

In the early 19th century, there was a flurry of interest in turnpikes. Relatively few were actually funded by governments at any level. Rather, governments granted private stock companies the rights to build and operate toll roads over specified routes. The idea seemed the best of all worlds – construction funds came from stockholders while mainte-

nance funds (as well as stockholder dividends) would come from users. No money would come from taxes. Most turnpikes were relatively well-constructed, with proper grading and drainage. Surfaces were often of stone or gravel. Later ones followed the well-proved methods of British road engineer John McAdam. Yet maintenance costs proved higher than anticipated, while revenues were lower. One by one the turnpikes failed, and investors turned to two new transportation modes, the canal and the railroad.

In the 1840s and 1850s, there was a brief boom for plank roads – literally, roads paved with sawn boards. They were cheaper to build than the earlier turnpikes but deteriorated even more rapidly and were no more successful.

The rise and spread of railroads put an end to most efforts to improve rural roads. By the end of the 19th century, American roads were being described as “inferior to those of any civilized country” (Rae, 1971, 26).

City Streets

The condition of 19th-century city streets was often no better than that of rural roads. While cities did use taxes to pay for streets, they did not typically use a pool of general revenue. Rather, they resorted to special assessments of the abutters, the owners whose property fronted the streets. Strange as it seems to modern observers, abutters were not always eager to have well-paved streets. City streets at this time were not used primarily for transportation. Streets served as meeting places. Vendors set up stalls in them, peddlers rolled slow-moving carts through them and children played in them. Streams of steadily flowing traffic were incompatible with these uses. Poorly paved streets discouraged such traffic. In addition, abutters were reluctant to expend large sums for high-quality paving when lower-quality paving could be had for less. While city governments wanted to pave high-traffic streets, in part because they were easier to clean of horse droppings, many city residents simply did not want their streets to carry much vehicular traffic. One result was that as late as 1890, virtually half of American city streets were unpaved.

Impact of the Automobile

The automobile brought changes to both rural and urban roads. The explosion in popularity of the bicycle in the late 19th century had spurred demands by riders for better roads, but it was the even greater popularity of the auto that finally produced results.

Automobiles also created a demand for improved highway-construction methods. The carefully built crushed-rock surfaces developed by McAdam for a horse-drawn world quickly broke down under the pounding of auto tires. Asphalt, introduced late in the 19th century, gained popularity for surfacing city streets. Portland cement concrete proved to be an ideal paving material for automobile highways. Ironically, it had been tried earlier but would not hold up under the pounding of steel-shod horses.

In 1916, Congress passed the Federal Aid Road Act, appropriating \$75 million to be spent on improving rural post roads. The money was to be dispensed through state highway departments, thus forcing any state that wanted the money to establish such a department. In 1921, the Federal Highway Act expanded the central government’s role by focusing federal aid on “such projects as will expedite the completion of an adequate and connected system of highways, interstate in character” (Rae, 1971, 38).

Increased automobile ownership after World War I intensified the demand for improved roads. The highway organizations of the teens (the most famous being the Lincoln Highway Association, founded in 1913) expanded in the early 1920s into more than 100 groups that sponsored at least 250 marked trails and installed every shape and size of road sign.

In 1919, the U.S. Army sent a column of trucks, motorcycles and cars from Washington, D.C., to San Francisco to test and demonstrate the military possibilities of motor vehicles. The trip took 62 days, averaged only 5 miles per hour, and demonstrated how far both trucks and American roads had to go. Young Lieutenant Colonel Dwight Eisenhower emerged from the trip as a proponent of better highways. This also tested the limits of long-distance trucking, which after World War II became the dominant means of transporting

goods except for bulk commodities like wheat and coal, still transported by rail.

Also in 1919, Oregon adopted the first gasoline tax – 1 cent per gallon. The gas tax would prove to be the golden goose that highway advocates had sought for over a century. It was not only effective, it was actually popular. As the man in charge of collecting Tennessee’s gas tax put it, “Never before in the history of taxation has a major tax been so generally accepted in so short a period.” It was remarkable, he thought, to what extent Americans “were willing to pay for the almost infinite expansion of their automobility” (Flink, 1988, 171).

The inauguration of a federal road system in 1925 for the first time standardized numbered routes and road signs across the country. The gasoline tax would eventually finance a vastly expanded road network. Throughout the 1920s and 1930s, however, most road money went into improving existing roads rather than building new ones.

The [highway network](#) was steadily expanded after World War II, but nothing had greater impact than the Interstate Highway System. Established by the Federal Aid Highway Act of 1956, it authorized the construction of 41,000 miles of express highways. Taxes on fuel, tires, new buses, trucks and trailers, and on operating trucks were funneled into a Highway Trust Fund that covered 90 percent of construction costs.

The interstates were not the first great expressways in the United States. Pennsylvania, Indiana, Ohio, New Jersey and other states had constructed four-lane, limited-access turnpikes, while similar but toll-free roads were built in California. But the interstate system was nationwide and eventually incorporated many of the state turnpikes.

One of the great public works projects in human history, the interstates forever altered transportation patterns and the highway traveling experience.

Impact of Highways

The interstates bypassed many older roads and thereby caused towns on those roads to wither and die. They also provided a common, homogenized experience. Consistent sign styles; franchised gas stations, restaurants and motels; and the steady unrolling of the highway lanes put the emphasis on covering ground as fast as possible.

If the interstates caused bypassed small towns to wither away, they had an even greater effect on the large cities they passed through. The coming of the automobile largely eliminated the old-style, multipurpose city street described above. Concrete and asphalt replaced dirt and cobblestones, while the streets became arteries for the flowing streams of cars. Better streets and faster cars accelerated suburban growth already begun by streetcars. But the interstates did even more. Often they slashed through the heart of a city, obliterating neighborhoods (usually poor, often minority neighborhoods lacking the political clout to prevent their destruction) and isolating the remaining parts of the city from one another. They altered traffic and living patterns forever. In other places, beltways and bypasses were built around cities. Every place an existing main arterial road crossed the beltway was an opportunity for new commercial and residential development. In many cities, interstates have had both effects. In some cities, residents did band together to stop the roads or alter their paths. With the interstate system now complete, and with many people doubting that it represents unalloyed progress, the future of the American road system is unclear.

Railroads

[Railroads](#) were the most influential businesses in 19th-century America. From their founding in the late 1820s, they quickly spread throughout the nation. Railroads were looked to as essential for moving goods and people on a national scale. The 3,000 miles of railroad track in place by 1840 had tripled by 1850, traversing almost every state east of the Mississippi River. And they were the fastest mode of transport to date. In 1817, for example, it took 50 days to

transport goods from Cincinnati to New York by keelboat and wagon, 28 days to go by steamboat down the Mississippi River and sailing packet up the East Coast, and 18 days by Erie Canal to the Hudson River, then down the Hudson to the New York harbor. This same trip by railroad in 1850 took six to eight days, including unloading. The cost was also greatly reduced: In 1816, a trip by steamboat and stagecoach from Philadelphia to Quebec (taking 100 hours) cost \$47. The same trip by railroad in 1860 (taking 31 hours) cost \$19.

Until the Civil War, accidents were frequent, and travelers spent a great deal of time and money changing trains because of the lack of a unified gauge system among the railroad networks in various parts of the country. Nevertheless, trains were the fastest vehicles yet, traveling at speeds of up to 15 to 20 miles per hour and reaching areas that had been inaccessible merely a generation earlier. By 1860, railroad companies were operating 30,600 miles of track in the United States.

By the time of the Civil War, there was a national rail network that played an important part in the course of the conflict. Railroads so dominated long-distance travel that they caused American highways to atrophy until the 20th century. Cities at the hubs of railroad networks grew at a faster pace, and railroads began to spawn suburbs. They provided cheaper transportation for heavy, bulky items like coal, wheat and cattle. They boosted the economy and encouraged settlement west of the Mississippi River. They could transport perishable foodstuffs and allowed many more people the opportunity to take pleasure trips.

The need to prevent accidents and standardize timetables between all the different railroads led to the creation of standard time zones in 1883. These forced Americans to be more rigorous than ever in sticking to a time schedule. While there was increasing differentiation between social classes in different railroad cars, railroads were still considered a democratic form of transportation – accessible to all and a place where all kinds of people could mix..

Railroads created and destroyed cities, changed eating habits by transporting food in refrigerated cars and were a training ground for generations of business leaders and engineers.

Opposition to railroads' economic power spawned political movements and prompted the creation of federal regulatory agencies. Railroads captivated and confounded Americans for decades, yet by the 1920s, users were abandoning them for cars and trucks. Railroads once were leaders in a variety of technological fields but today are regarded (wrongly) as old hat. They are an inspiring, infuriating cautionary tale of the rise and decline of a technology.

Urban Public Transportation

Living in the city brought its own unique transportation needs. Various modes of transportation were developed to ease congestion, move large numbers of people and eventually to allow people with more means to live farther and farther away from their workplace in the city. By the late 19th century, various combinations of these modes were integrated into crude transportation networks that varied from city to city:

- **Steam ferries**
Especially important on the Hudson River, these allowed Brooklyn, New York, to become the first major suburb in the early 19th century.
- **Horse-drawn omnibuses**
A slow and primitive system over often poor roads, they were innovative nonetheless.
- **Commuter and interurban railroads**
At first too expensive for most wage earners, these became cheaper and more universal later. Wealthier people continued to take them to outlying suburbs, towns or hinterlands, even as most middle- and working-class people took **streetcars** and, later, buses into the city to work.
- **Horsecars**
Horse-drawn streetcars on iron rails with iron wheels were the first really successful forms of public transportation. They were affordable and flexible, had all-weather capability, were easier on horses than omnibuses and were cheaper than railroads.

- **Cable cars and rapid transit systems**
Cable cars and rapid transit systems served as experiments with mechanical and electric systems, above- and below-ground, for transporting large numbers of people.
- **Electric streetcar/trolleys**
Electric streetcars and trolleys made the greatest impact on American cities of any form of public transportation and transformed undeveloped land into suburbs during the late 19th to early 20th centuries. They were larger than horsecars, so fares could be dropped from a dime to a nickel. There were local lines in many cities by the 1920s, which put beaches, amusement parks, shopping and recreation within easy reach of many city dwellers.
- **Buses**
Once the design was standardized by the late 1920s, buses became a popular and flexible alternative and/or connector to systems that ran on tracks. Some railroad companies even had bus subsidiaries that encouraged development of and access to places ever-farther from the city center. By the mid-20th century, the low cost and great flexibility of bus transport marked the decline and sometimes the end of many existing tracked systems, especially streetcars and trolleys. However, once automobiles became popular, buses declined in popularity, except for people who couldn't afford cars and in cities where traffic congestion hindered the use of cars.

Intermodal Freight Transport

The term “intermodal” implies that more than one mode of transportation is used to move goods between their origin and their destination – rail, ship, truck, aircraft and so forth. Today, this often involves the use of intermodal containers or vehicles that preclude the handling of the freight itself while changing modes. This method reduces cargo damage and costs, improves security and increases the speed at which freight can be transported.

Historically, railroad cars and semitrailers could be considered intermodal, but these generally stayed within their own transportation system, with goods switched out between systems. The container changed all that. Containers of a sort were used in the early 1900s for transporting furniture, but they were not yet standardized. Standardized flat wooden pallets were developed after World War II for transferring freight between warehouses, trucks, railroad cars, ships and aircraft. The 1950s saw the first experiments with shipping and hauling in metal containers. Trucking magnate Malcom McLean is credited with transforming container hauling from an impractical idea into a massive industry that slashed the cost of transporting goods and established truly global industries. It took not only his vision but huge sums of money from private investors, with port cities embracing the new technology as new industry leaders, and, finally McLean's successes in supplying goods to U.S. forces during the Vietnam War, persuaded the world of the container's potential.

Between 1968 and 1970, the International Organization for Standardization (ISO) issued standards for container sizes, based upon U.S. Department of Defense standards for military use. The first containers measured 8-foot-square cross-sections in units 10 feet long. This ensured the interchangeability between different modes of transportation worldwide.

To increase productivity, container sizes have grown. Stronger steel is used in their construction, and they have been designed to double-stack. They can be carried by truck, rail (flatcar or container “well car” with a standardized depression), container ship (which can stack up to seven units high!) or aircraft. Variations now include piggyback containers (also known as TOFC, or trailer on flatcar containers, or semitrailers hauled on railway flatcars); open-topped containers for larger loads; tanktainers for liquids; refrigerated containers; and swap bodies, which, instead of being stacked, are designed to move without a crane, with folding legs under the frame for use on road and rail. New technologies also include the RoadRailer and the RailRunner – that is, trailers transported on rail that have railway wheel assemblies, allowing the trailers to turn into one large articulated

railway car. This is faster than loading trailers on flatcars and requires no extra railway cars.

Between 1980 and 2002, intermodal freight transport has had a huge impact on commercial transportation. It has brought consumers a previously unimaginable variety of low-cost products from around the globe and paved the way for Asia to become the world's workshop. It also has focused activity away from older ports like New York City and London to more obscure new ones like Oakland, California.

Intermodal Passenger Transport

Public transportation today tends to focus primarily in cities, where automobile driving is difficult. Subways, light rail, commuter trains and rapid transit systems, buses, ferries and van pool services – all these combine to provide a vast network of interconnecting modes of transportation. Many of these interconnected networks have a long history, such as connections between rail and ferry, rail and bus, and car parking at train and bus stations.

The major goal of intermodal passenger transport today is to proactively reduce the dependence on automobiles as a major mode of ground transportation and to increase the use of public or alternative modes of transportation, such as bicycling.

Legislation for Intermodal Transport

Since 1991, federal legislation has been enacted to encourage intermodal transportation on a regional and national scale, including:

- **ISTEA (Intermodal Surface Transportation Efficiency Act), 1991-1997 –**
The first U.S. federal legislation of this type in the post-Interstate Highway System, ISTEA presented an overall intermodal approach to highway and transit funding, with collaborative planning requirements, giving significant additional powers to metropolitan planning organizations. It defined 80 “High Priority Corridors” across the country.

- **TEA-21 (Transportation Equity Act for the 21st Century), 1998-2003 –**
This act authorized the federal surface transportation programs for highways, highway safety and transit for this six-year period. It required the following six planning factors be included in regional transportation plans: supporting the economic vitality of the metropolitan planning area; increasing the safety and security of users; increasing accessibility and mobility options for people and freight; protecting and enhancing the environment while promoting energy conservation and improving the quality of life; promoting an efficient system of management and operation; and emphasizing efficient preservation of the existing transportation system.
- **SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users), 2005-2009 –**
This act contains a host of provisions and earmarks intended to improve and maintain the surface transportation infrastructure of the United States, including the Interstate Highway System, transit systems around the country, bicycling and pedestrian facilities and freight rail operations.
- A replacement bill is in the works for the next six-year period.

Bibliography

Transportation: Past, Present and Future – Part 1

Primary sources are indicated by bold print.

Print

- Agar, Michael H. *Independents Declared: The Dilemmas of Independent Trucking*. Washington, D.C.: Smithsonian Institution Press, 1986.
- Barrett, Paul. *The Automobile and Urban Transit: The Formation of Public Policy in Chicago, 1900-1930*. Philadelphia: Temple University Press, 1983.
- Belasco, Warren James. *Americans on the Road: From Autocamp to Motel, 1910-1945*. Boston: MIT Press, 1979.
- Belzer, Michael H. *Sweatshops on Wheels: Winners and Losers in Trucking Deregulation*. New York: Oxford University Press, 2000.
- Berger, Michael L. *The Devil Wagon in God's Country: The Automobile and Social Change in Rural America, 1893-1929*. Hamden, Connecticut: Archon Books, 1979.
- Berkebile, Don H., editor. *American Carriages, Sleighs, Sulkies, and Carts*. New York: Dover Publications, 1977.
- Bilstein, Roger E. *Flight in America, From the Wrights to the Astronauts*. Baltimore: The Johns Hopkins University Press, 1984.
- Boorstin, Daniel J. *The Americans: The Democratic Experience*. New York: Vintage Books, 1974.
- Bottles, Scott L. *Los Angeles and the Automobile: The Making of the Modern City*. Berkeley and Los Angeles: University of California Press, 1987.
- Cabadas, Joseph. *River Rouge: Ford's Industrial Colossus*. St. Paul: MBI, 2004.
- Cabadas, Joseph and Byron Olsen. *The American Auto Factory*. St. Paul: MBI, 2002.
- Cohen, Norm. *Long Steel Rail: The Railroad in American Folksong*. Urbana: University of Illinois Press, 1981.
- Cowan, Ruth Schwartz. *A Social History of American Technology*. New York: Oxford University Press, 1997.
- Cray, Ed. *Chrome Colossus: General Motors and Its Times*. New York: McGraw-Hill, 1980.
- David, Laurie and Cambria Gordon. *The Down-to-Earth Guide to Global Warming*. New York: Orchard Press, 2007.
- Ferguson, Eugene S. "The American-ness of American Technology," *Technology and Culture*, XX (January 1979), 3-24.
- Ferrell, Merri McIntyre, Joanne Abel Goldman, Doris Halowitch and M. Hunt Hessler. *19th-Century American Carriages: Their Manufacture, Decoration and Use*. Stony Brook, New York: The Museums at Stony Brook, 1987.
- Flink, James J. *America Adopts the Automobile, 1895-1910*. Cambridge, Massachusetts: MIT Press, 1970.
- Flink, James J. *The Automobile Age*. Cambridge, Massachusetts: MIT Press, 1988.
- Foster, Mark. S. *From Streetcar to Superhighway: American City Planners and Urban Transportation, 1900-1940*. Philadelphia: Temple University Press, 1981.
- Friedman, T. L. *The Lexus and the Olive Tree*. New York: Farrar, Straus and Giroux, 1999.
- Goddard, Stephen B. *Getting There: The Epic Struggle Between Road and Rail in the American Century*. Chicago: The University of Chicago Press, 1994.

- Gordon, Sarah H. *Passage to Union: How the Railroads Transformed American Life, 1829-1929*. Chicago: Ivan R. Dee, 1996.
- Hilton, George W. *The Cable Car in America*. Palo Alto: Stanford University Press, 1982.
- Hindle, Brook, editor. *Material Culture of the Wooden Age*. Tarrytown, New York: Sleepy Hollow Press, 1981.
- Hindle, Brooke, and Steven Lubar. *Engines of Change: The American Industrial Revolution, 1790-1860*. Washington, D.C.: Smithsonian Institution Press, 1986.
- Hokanson, Drake. *The Lincoln Highway: Main Street across America*. Iowa City: University of Iowa Press, 1988.
- Holmes, Oliver W. and Peter T. Rohrbach. *Stagecoach East: Stagecoach Days in the East from the Colonial Period to the Civil War*. Washington, D.C.: Smithsonian Institution Press, 1983.
- Hood, Clifton. *722 Miles: The Building of the Subways and How They Transformed New York*. New York: Simon & Schuster, 1993.
- Hounshell, David A. *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States*. Baltimore: Johns Hopkins University Press, 1984.
- Jackson, Kenneth T. *Crabgrass Frontier: The Suburbanization of the United States*. New York: Oxford University Press, 1985.
- Jakle, John A. *The Tourist: Travel in Twentieth Century North America*. Lincoln: University of Nebraska Press, 1985.
- Jakle, John A., and Keith A. Sculle. *Motoring: The Highway Experience in America*. Athens, Georgia: University of Georgia Press, 2008.
- Jennings, Jan. *Roadside America: The Automobile in Design and Culture*. Ames: Iowa State University Press, 1990.
- Johnston, James D. *Driving America: Your Car, Your Government, Your Choice*. Washington, D.C.: The AEI Press, 1997.
- Karolevitz, Robert A. *This Was Trucking*. New York: Bonanza Books, 1966.
- Kay, Jane Holtz. *Asphalt Nation: How the Automobile Took Over America and How We Can Take It Back*. Berkeley: University of California Press, 1997.
- Kinney, Thomas A. *The Carriage Trade: Making Horse-Drawn Vehicles in America*. Baltimore: Johns Hopkins University Press, 2004.
- Lay, M.G. *Ways of the World: A History of the World's Roads and of the Vehicles That Used Them*. New Brunswick, New Jersey: Rutgers University Press, 1992.
- Lewis, David L. and Laurence Goldstein, editors. *The Automobile and American Culture*. Ann Arbor: University of Michigan Press, 1980.
- Lewis, Tom. *Divided Highways: Building the Interstate Highways, Transforming American Life*. New York: Viking Penguin, 1997.
- Marcus, Alan I. and Howard P. Segal. *Technology in America: A Brief History*. New York: Harcourt Brace Jovanovich College Publishers, 1989.
- McDonough, William & Michael Braungart. *Cradle to Cradle*. New York: North Point Press, 2002.
- McIntyre, Stephen L. "The Failure of Fordism: Reform of the Automobile Repair Industry, 1913-1940," *Technology and Culture*, XLI (April, 2000), 269-299.
- McShane, Clay. *Down the Asphalt Path: The Automobile and the American City*. New York: Columbia University Press, 1994.
- McShane, Clay, and Joel A. Tarr. *The Horse in the City: Living Machines in the Nineteenth Century*. Baltimore, MD: The Johns Hopkins University Press, 2007.
- Middleton, William D. *The Time of the Trolley: The Street Railway from Horsecar to Light Rail*. San Marino, California: Golden West Books, 1987.
- Moline, Norman T. *Mobility and the Small Town, 1900-1930*. Chicago: University of Chicago, 1971.
- Rae, John B. *The Road and the Car in American Life*. Cambridge, Massachusetts: MIT Press, 1971.

Rae, John B. *The American Automobile: A Brief History*. Chicago: University of Chicago Press, 1965.

Rowsome, Frank, Jr. *Trolley Car Treasury: A Century of American Streetcars – Horsecars, Cable Cars, Interurbans and Trolleys*. New York: Bonanza Books, 1956.

Rose, Mark H. *Interstate: Express Highway Politics, 1939-1989*. Knoxville: University of Tennessee Press, 1990.

St. Clair, David. *The Motorization of American Cities*. New York: Praeger, 1986.

Schivelbusch, Wolfgang. *The Railway Journey*. Oxford: Basil Blackwell, 1980.

Seely, Bruce E. *Building the American Highway System: Engineers as Policy Makers*. Philadelphia: Temple University Press, 1987.

Steinbeck, John. *Travels with Charley*. New York: Viking, 1962.

Taylor, George R. *The Transportation Revolution, 1815-1860*. New York: Rinehart & Company, 1951.

Tobin, Gary Allan, "The Bicycle Boom of the 1890s: The Development of Private Transportation and the Birth of the Modern Tourist," *Journal of Popular Culture* VII: 4 (1974), 838-49.

Vance, James E., Jr. *The North American Railroad: Its Origin, Evolution and Geography*. Baltimore: Johns Hopkins University Press, 1995.

Wachs, Martin and Margaret Crawford, editors. *The Car and the City: The Automobile, the Built Environment and Daily Urban Life*. Ann Arbor: University of Michigan Press, 1991.

Online

Bamberger, Robert. "Automobile and Light Truck Fuel Economy: The CAFE Standards." *National Council for Science and the Environment*. Congressional Research Service, 2003. www.ncseonline.org/programs/science-policy/crs-reports

"CAFE – Fuel Economy." *National Highway Traffic Safety Administration*. National Highway Traffic Safety Administration. www.nhtsa.gov/fuel-economy

California Fuel Cell Partnership. California Fuel Cell Partnership. www.cafcp.org/home

"California Hydrogen Highway Network Hydrogen Infrastructure." *California Hydrogen Highway Network*. State of California, 2010. www.hydrogenhighway.ca.gov/facts/ca_infrastructure.pdf

"Cars, Light Trucks and CAFE Standards Issues." *ProQuest*. CSA, 2004. www.csa.com/discoveryguides/ern/03aug/overview.php

Drive Clean. California Air Resources Board. www.driveclean.ca.gov

Emmons, Garry. "American Auto's Troubled Road." *Working Knowledge*. Harvard Business School, April 10, 2006. hbswk.hbs.edu/item/5290.html

"EPA Takes Final Step in Phaseout of Leaded Gasoline." *U.S. Environmental Protection Agency*. U.S. Environmental Protection Agency, 29 January 1996. www.epa.gov/history/topics/lead/02.html

"Fuel Economy and Environment Label." *U.S. Environmental Protection Agency*. U.S. Environmental Protection Agency. www.epa.gov/otaq/carlabel/index.htm

"Globalization and the Auto Industry." *CAWTCA Canada*. Canadian Auto Workers, 2002. www.caw.ca/en/campaigns-issues-past-campaigns-issues-globalization-and-the-auto-industry.htm

Herbert, Henry William. "Frank Forester's Horse and Horsemanship of the United States and British Provinces of North America." New York: Stringer & Townsend, 1857. Google Books. Google, 2007.

books.google.com/books?id=AmECAAAYAAJ&ots=uJ4NDv6hHp&dq=Frank%20Forester%E2%80%99s%20Horse%20and%20Horsemanship%20of%20the%20United%20States%20and%20British%20Provinces%20of%20North%20America&pg=PP13#v=onepage&q&f=false

Hlynsky, Karen. "Cars of Tomorrow and the American Community." *Northeast Sustainable Energy Association*. Northeast Sustainable Energy Association, 2002.

www.nesea.org/k-12/curricularunits

Kovarik, William. *The Environmental History Timeline*.

www.environmentalhistory.org

Lechner, Frank and John Boli. "Globalization Issues." *The Globalization Website*. The Emory University Teaching Fund Committee, 2001.

www.sociology.emory.edu/globalization/issues01.html

"Market Research: Energy/Environment." Automotive Information Network Inc.

www.automotivedigest.com/displayMarketResearch.aspx?cat=Energy

"Modern Automobile Manufacturing." *Business Reference Services*. Library of Congress, 2004.

www.loc.gov/rr/business/BERA/issue2/manufacturing.html

Musk, Elon. "New Design Electric Cars." *OnInnovation*.

The Henry Ford, 2010.

oninnovation.com/videos/detail.aspx?video=1253&title=Newpercent20Designpercent20Electricpercent20Cars

"Related Links." *Green Vehicle Guide*. U.S. Environmental Protection Agency.

www.epa.gov/greenvehicles/Links.do

"Renewable Fuel Standard Implementation: Frequently Asked Consumer Questions." *Transportation and Air Quality*. U.S. Environmental Protection Agency, 2007.

www.epa.gov/OMS/renewablefuels/420f07062.pdf

Smith, Lisa. "The Globalization Debate," *Investopedia*.

Investopedia ULC.

www.investopedia.com/articles/07/globalization.asp

Weber, Adna Ferrin. *The Growth of Cities in the Nineteenth Century*. New York: Macmillan, 1899. Google Books. Google, 2006.

books.google.com/books?id=cvshAAAAMAAJ&printsec=frontcover&dq=The+Growth+of+Cities+in+the+Nineteenth+Century+Weber&source=bl&ots=Is225WsY4k&sig=ELdhfWV3Uf3JTRn8WvNEE71TQR8&hl=en&ei=tmwPTd3YG4jMnAfFqbSzDg&sa=X&oi=book_result&ct=result&resnum=1&ved=0CBcQ6AEwAA#v=onepage&q&f=false

Melosi, Martin. "The Automobile and the Environment in American History." *Automobile in American Life and Society*.

University of Michigan-Dearborn and The Henry Ford, 2005.

www.autolife.umd.umich.edu/Environment/E_Overview/E_Overview1.htm

Chapter 1

20th-Century Migration and Immigration

“I have a wife and 5 children and we all want to get out... and try to buy a good home near good schools [and] good churches. Wages here are so low [we] can scarcely [sic] live. We can buy enough to eat [but] we only buy enough to keep up alive.”

– Letter from a laborer in Ellisville, Mississippi, May 1, 1917
(Scott, 305)

The hope of finding opportunity and a secure life lies at the foundation of what motivated millions of people to uproot their lives and their families to travel across states and oceans. For over 400 years, the lure of America has pulled and pushed colonists, settlers, immigrants and migrants from within the country and around the world. Migration stories tell how farms turned into suburbs, cities turned into megalopolises, immigrants became Americans and Southern farmers became factory workers. The story of migration and immigration to the United States is more than statistics and columns of numbers printed by the government. It is a story based on hope in the potential of the United States.

Defining Migration

Migrations are defined broadly in three categories: local, regional and international. Local migrations involve individuals and families moving from village to town or town to city. The extent of local migrations is primarily dependent on the availability of land or work and the potential for future improvement. The movement of Americans from rural farms to cities during the second half of the 19th century is an example of local migration. Regional migrations involve people moving across greater distances and could involve people moving from one state to another or, for example, from New England to the Midwest after the opening of the Erie Canal. Another example of a regional migration is the

post-Civil War migration of freed slaves to Kansas, Nebraska and Oklahoma known as the Exoduster Movement. This effort to obtain good farmland far from the growing repression of the South after Reconstruction ultimately led to thousands moving to Western states and territories. Finally, migrations encompass [travelers crossing continents](#), oceans and sometimes continents again. Some international migrations were permanent, such as the millions of Europeans and Asians who immigrated to the United States during the 19th century. Sometimes, international travel is temporary and even seasonal, as is the case for thousands of Mexican agricultural workers today (Flanders, 3-12).

Migrations can be either voluntary or involuntary. Voluntary migrations include the initial European settlement of the Americas, the Exoduster Movement, the Great Migration of Southern blacks to Northern cities and the mass migration of Europeans to North America. Involuntary migrations have also influenced what the United States has become as a nation. The forced relocation of Africans to North America during the 17th and 18th centuries, and the relocation of Native Americans off lands they had held for generations in the 19th century, influenced how these people would interact with each other for over a century.

Even relatively small population movements have influenced the nation. After Great Britain forced French colonists out of eastern Canada in the mid-1700s, who could have guessed that the French resettlement in New Orleans would create one of the most distinctive subcultures in the United States? When the U.S. government removed hundreds of thousands of Japanese-American citizens residing on the Pacific Coast during World War II into internment camps, who could have imagined the impact their internment would have on the development of the nation's Western states?

Pushes and Pulls

Migration is a deeply personal decision based on pushes and pulls that influence where, when and how people move.

Push factors usually consist of social, economic or political influences that make living and working in a particular place difficult and sometimes dangerous. Some pushes are environmental or natural disasters, like hurricanes and floods, and some are man-made disasters, such as nuclear contamination, toxic spills and pollution. Alternating seasons of flood and drought, for example, helped push farmworkers out of the South during World War I and out of the Dust Bowl in the 1920s and 1930s.

Pull factors, on the other hand, attract people to a location. Pulls can include job or housing opportunities, better schools and an overall higher standard of living. During the 19th century, the lure of relatively high wages and regular factory work pulled farmworkers into the cities, while cities today pull young people in with the chance of excitement and the possibility of success. The promise of instant wealth pulled thousands to California during the [Gold Rush](#), and inexpensive land in Oklahoma pulled thousands to the former Indian Territories in the 1890s. One of the most important factors in migration is the role that family relationships played in influencing where people move. The process of chain migrations involving family members has been part of America's migration story since the first settlers arrived in the early 1600s.

How people moved influenced where and when they moved. Until the early 1800s, people could [move only at the speed of a horse](#), canoe or sailing ship. In a relatively short period of time, roughly from 1810 to 1830, technological advances in transportation changed where and how people migrated. When steam power was used on river and lake shipping, cost and travel time were reduced, and shipping people and goods over longer distances expanded. In the United States, the integration of expanding canal and rail networks linked the vast interior of the expanding nation to ocean seaports and ultimately to the world. By the end of the 19th century, it was possible for someone to travel from

rural Germany, Russia or Italy across the Atlantic Ocean and settle in New York, Philadelphia, Detroit or Chicago at a cost that was within reach.

Moving From Country to City: Urbanization

The urban city in America is an idea that is commonly accepted today and also in conflict with a basic American ideal. After the American Revolution, a debate played out about what kind of nation the new United States would be. The debate centered on whether the future of the new nation should be built on a rural population of independent yeoman farmers or if the country should become a nation of manufacturers competing with industrial powers like Great Britain. Thomas Jefferson and Alexander Hamilton represented the opposing sides, and for the first four decades of the nation's history, Jefferson's ideal of independent farmers as the backbone of the nation seemed to win out. Even as American cities continued to expand, the majority of Americans lived on [independent family farms](#) and in small towns and villages throughout most of the 19th century. After the Civil War, the overall trend was toward urban growth and concentration, which brought with it problems still faced by cities today: overcrowding, police and fire protection, water supply, roads, education and sanitation (Mohl and Betten, 23–25).

America's continual westward movement also led to the expansion of a second tier of urban centers built on a frontier foundation. River towns, including Pittsburgh, Cincinnati, Louisville, St. Louis and New Orleans, experienced their greatest growth during the advent and expansion of steam-powered riverboats that connected the cities to coastal ports. The "lake cities," including Buffalo, Cleveland, Detroit, Milwaukee and Chicago, rose to regional prominence with the completion of canals and the appearance of steamships on the lakes (Kramer, 155–157).

As cities and frontier regions became more interconnected, manufacturing replaced trade as a primary form of wealth creation. The emergence of the [factory system](#), which included specialization, division of labor and the decline of

traditional “cottage industries” marked the end of the so-called preindustrial urban movement and the beginning of industrial expansion that required greater numbers of factory workers (Mohl and Betten, 27–29; Ward 39–46). Initially, factory labor was supplied by excess local farm laborers who were no longer needed after the introduction of time- and labor-saving mechanical farm implements like reapers, threshers and [steam traction engines](#) (Flanders, 165–167). When local communities could no longer supply adequate numbers of laborers, the full impact of industrialized and mechanized farming was just peaking across Europe. Hundreds of thousands of poor and unskilled European farmers set out in search of work – a search that led many across the Atlantic Ocean to the industrial cities of the United States.

One of the main challenges faced by city governments was housing the seemingly never-ending stream of migrants and immigrants, and land annexation appeared to meet most of the immediate demand. Throughout the 19th century, cities like Philadelphia and Chicago annexed outlying areas and increased their municipal control over hundreds of square miles. Detroit, for example, experienced the tensions of growth and housing as well. In 1860, Detroit covered roughly 5 square miles and had a population of just over 45,000. In 1930, the population was 1.6 million and the city encompassed over 140 square miles of land. The benefits of annexation for cities included an expanding tax base to fund new construction of basic necessities like roads, lights and sewage, and urban geographic expansion became a function of how quickly outlying lands could be annexed (Ebner, 374–375; Flanders, 176–183).

Moving From City to Suburb: Suburbanization

The movement of people out of urban centers to outlying semirural and rural areas is not a 20th-century creation. Almost as soon as American cities began to expand in the late 1700s and early 1800s, those who could afford the price of leaving the hectic world of the city moved to a more peaceful life in the suburbs. Nineteenth-century suburbs were not necessarily the same as they are today. In the early decades of the 1800s, Brooklyn, New York, was a tree-filled suburb where wealthy and middle-class families lived in individual houses on small lots or in large brownstone apartment houses. Dotted throughout the city were idyllic parks reminiscent of the rural areas that a growing number of residents recalled from their own childhoods. By the end of the century, Brooklyn was one of the five largest cities in the country, experiencing the same growing pains that Manhattan had gone through a generation earlier (Ebner, 372).

The introduction and integration of mass-transportation networks altered the physical landscape of urban centers. Until efficient and cost-effective street rail systems were developed in the 1880s and 1890s, city growth was limited because workers had to live within walking distance of their jobs, which were still mostly located in cities. Relatively inexpensive transit, such as [electric street cars](#), however, opened up [outlying rural areas](#) on the borders of cities. (Kramer, 155–160; Ebner, 373–374). Inexpensive plots of land were subdivided and sold to anyone who could afford to purchase, build and commute, and working-class and middle-class suburbs began to sprout on the fringes of most urban centers.

Reflecting the tension of the contested ideal of an agrarian or urban nation, 19th- and early 20th-century critics and reformers alike pointed to growing American cities as the source of social problems. Poverty, disease, gambling, alcoholism, prostitution and general immorality plagued cities, and anyone capable of leaving did so at the first chance. High factory wages helped many working-class families move into single-family homes on the outskirts of the city, and a smaller number of middle- and upper-class families moved further away from the city center. The move to suburban

plots and subdivisions allowed small cohesive groups to settle with fellow ethnics or fellow class members. The expansion of suburban living also led to a fragmentation of urban society as people pursued options to live with others like themselves. The emergence of the automobile as a cost-effective form of transportation accelerated urban fragmentation and suburban expansion (Taeuber, 154–157; Baker, 364–369; Wiese, 1496–1502; Ward, 125–130, 140–143).

Recent suburban growth is best understood within the context of the post-World War II housing expansion and the transformation of former dependent suburbs into independent suburban-urban centers. During and after World War II, demand for housing by workers and returning servicemen rapidly outstripped available housing in the traditional urban centers. Outlying rural communities quickly began to parcel subdivisions, build roads and add infrastructure for willing buyers. While workers and their families were moving to the suburbs, manufacturing companies were also taking advantage of low taxes and cheap real estate costs, and located more production plants outside traditional urban centers. Workers could enjoy the benefits of both living in a suburban setting and being close to work. Merchants and retailers followed suit, and suburban commerce began to expand to meet demand. Well-funded public schools, shopping malls, grocery stores and movie theaters provided all the conveniences of the city without the threat of urban defilement. (Ebner, 376–378; Flanders, 184–190)

The growing autonomy of the suburbs has been played out beyond services and entertainment. Following the movement of industries to suburban locations over the past 30 years, high-tech and service companies – the growth industries of the 21st century – have located in expanding “techno-burbs.” Even in recently deindustrialized urban areas like southeastern Michigan, suburbs of Detroit, such as Dearborn, Livonia, Troy and Ann Arbor, are economically, politically and culturally independent from Detroit, and there are some residents of those communities who only go to downtown Detroit for special events and others who have never bothered to go to the city (Muller, 45–58; Gilfoyle, 182–184).

Current Issues: The Belt Migrations

Detroit’s changing population illustrates key elements of the American migration story throughout the 20th century. In 1900, Detroit had a population of 285,000. On the eve of World War II, Detroit boasted 1.6 million residents, and by 1950, 1.8 million people called Detroit home. The migration of people out of the city also began in the ‘50s. Every census after 1950 reported fewer and fewer residents in the city until 2000, when the city of Detroit had fewer residents than it had in 1920. In the 20-year period between 1970 and 1990, the city lost 500,000 residents. (Hudgins, 219–220; Farley, et. al., 750–753; Sugrue, 552–553). The story of Detroit’s decline can be explained in part by urban flight to the suburbs starting after World War II and peaking after the 1967 riot. It can also be told by the locked and decaying factories that litter the cityscape. One of the major migrations of the second half of the 20th century was the movement of people from the industrial states of the Midwest and Northeast to growth areas in the American Southwest, West and South.

The term “Rust Belt” refers to the region of the United States that first experienced large-scale industrial growth during the 19th century, including New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Minnesota and Michigan. These states grew to national prominence both through their location along major inland and coastal waterways and as suppliers of raw materials, including lumber, iron ore, coal and petroleum. During the early decades of the 20th century, manufacturing in the Rust Belt states was the foundation for the country’s industrial strength. After World War II, American manufacturing began the slow and steady shift away from traditional forms of industry that has lasted to the present day. One of the largest industries to undergo this realignment has been the automobile industry, centered in Detroit (Flanders, 191–194).

Beginning in the 1950s, the American auto industry underwent structural realignments to meet demands not only of the domestic market but of world markets as well. Auto companies began to decentralize operations and shifted away from traditional centralized organizations such as Ford

Motor Company's vertically integrated structure, which included the production chain from company-owned raw material sources to distribution networks. Auto manufacturers also incorporated more efficient production technologies that allowed for higher production with fewer workers. With fewer workers in the plants, local cities began to suffer as did states that could no longer collect sales and income taxes. Auto companies also relocated production plants to states where labor costs were lower, usually in nonunion Southern states. Finally, the U.S. government began shifting government military contracts toward more high-tech weapons systems on new jet fighters and rocketry and away from the traditional, heavily-mechanized tanks and trucks the auto companies supplied during World War II. Although American manufacturers were able to meet consumer demand during the 1950s and 1960s, beginning in the early 1970s, world events and a new world market threatened the traditional ways of American manufacturing.

By the 1970s, an expanding and more integrated world market began to take shape as American manufacturers competed against other companies around the world. In many industries, American manufacturers could not compete with low labor costs in places like Mexico, Japan and Taiwan, and eventually in China, Vietnam and Indonesia. In addition to worldwide competition and restructuring markets, the United States was hit by two major economic downturns at the beginning and end of the decade. Every sector of manufacturing was hit hard, but the auto industry was particularly hard-pressed to fend off foreign competition. Since the 1970s, the American auto industry has lost market share to foreign competitors almost annually. For industrial centers like Detroit, the downturns of the 1970s and 1980s forced many people to relocate to areas of the country where jobs were available, primarily to Southern and Western cities – the Sun Belt cities like Dallas, Phoenix, Los Angeles and San Francisco – leaving behind shrinking cities and huge swaths of vacant factory properties to rust in the winter snows.

Focus on Migration: Michigan and Detroit

People have been migrating to and through Michigan for centuries. When European explorers, trappers and settlers entered Michigan, they interacted with three tribes who had migrated from eastern Canada: the Odawa, Ojibwa and the Potawatomi. French explorers, missionaries and trappers were the first Europeans to travel and settle in Michigan. Large populations of valuable fur-bearing animals, especially beaver, made trapping a profitable incentive to establish trading posts and settlements throughout the Great Lakes region.

The settlement of le detroits (the narrows) by Antoine de La Mothe Cadillac in July 1701, along with French settlements at Sault Ste. Marie, St. Ignace and Fort St. Joseph (Niles, Michigan) established French colonial control over most of the Great Lakes. Throughout the colonial and early national period, Detroit's permanent population of trappers, soldiers, voyageurs, coureurs de bois (forest runners) and Native Americans varied between 500 and 1,000. The transient Native American and trapper populations, however, could spike to 2,000 to 3,000 at times throughout the year.

During the first two decades of the 19th century, Michigan remained a distant frontier for most Americans. In 1805, Michigan was made a separate territory with Detroit the territorial capital, and during this period, leaders including Lewis Cass, Fr. Gabriel Richard and Augustus B. Woodward envisioned a thriving city expanding into the wilderness. After government surveys in the 1820s were completed, federal lands became available for purchase, and the land office in Detroit was soon selling thousands of acres on a daily basis for \$1.25 to \$2 per acre (Hudgins, 212-216).

The biggest challenge to settling the territory (which became a state in 1837) was the lack of inexpensive and efficient transportation. [Roads connecting Detroit to nearby cities](#) were limited to postal and military roads that followed Native American forest trails and were generally considered poor at best. When canals and steam power became widely used and cost-effective, the 1830s and 1840s witnessed the beginning of "Michigan Fever."

The opening of the Erie Canal in 1825 revolutionized settlement and future expansion in the Great Lakes region. The New York canal connected Albany to Buffalo, but, more importantly, it [connected the Great Lakes region to New York City](#). Barges towed by donkeys and oxen made the 363-mile, one-way trip in less than a week, less than half the time it took prior to the canal. From docks in Buffalo, people and goods transferred to sailing ships to continue their journey to Cleveland, Toledo and Detroit. Settlers from New England and the Northeastern states flooded into Michigan, giving the region a distinctive Yankee flavor. Two years after the Erie Canal opened, Michigan's population had nearly doubled, to 17,000. In 1830, the territory boasted over 31,000 residents, and in 1834, a special census reported over 87,000 residents. Three years after statehood, slightly more than 212,000 people lived in Michigan (Hudgins, 216-220; Fuller, 22-37).

With the advent of steam power, first on lake ships and then on land, transportation radically altered how and where people settled. Railroad construction in Michigan began as early as 1830, but it was not until the eve of the Civil War that the lower half of the state was connected by rail from Lake Michigan to Detroit. In 1855, completion of the Soo Locks along the St. Mary's River in Sault Ste Marie connected Lake Superior and the lower Great Lakes.

During the first 30 years of settlement in Michigan, the transition from forested frontier to farming state drew thousands of people. Settlers and then [lumberjacks](#) cleared the Lower Peninsula, allowing farmers to follow and established productive and profitable farms. The lumberjacks who cleared Michigan were initially seasonal workers from nearby farms working to supplement their family incomes. As lumbering became more profitable, clearing the vast white pine forests in the northern third of the state was done by lumberjacks from the Northeast, mostly from Maine, and from French Canada.

During the second half of the 19th century, Michigan was also home to diversified industries, including commercial food processing (cereals and sugar beets), [plant seeds](#), furniture manufacturing, cement production, pharmaceuticals and wagon manufacturing. As the hub of economic activity in the state and the region, Detroit drew thousands of new settlers and residents throughout the 19th century.

As a major lake port, shipbuilding and ship repair became one of Detroit's largest industries. Building, maintaining and repairing steel-hulled, steam-powered lake ships required a highly skilled workforce. In addition, manufacturing iron and steel for the ships required ore processing, blast furnaces and foundries. Detroit's ironworkers and skilled tradesmen also produced home stoves that were distributed across the country. By the end of the 19th century, Detroit was the nation's largest manufacturer of home stoves. Railcar construction was also one of the largest manufacturing concerns in the city, and by 1900, the American Car and Foundry Company employed over 10,000 workers in the city. Integrated transportation networks of roads, steam ships and railroads bringing people and raw materials into and out of Detroit were well-established by the turn of the century, and the requirements of the city's iron and steel works attracted skilled tradesmen, tool designers, machinists and regular workers to staff the foundries and factories throughout the city. The combination of geography and an industrial foundation based on skilled workers helped put Detroit at the center of a growing automobile industry.

At the beginning of the 20th century, automobile manufacturing was a craft job that required small groups of highly skilled workmen to assemble unique, one-of-a-kind pleasure cars for wealthy consumers. Within a period of less than 10 years, however, automobiles became more than the playthings of the wealthy as more people discovered the convenience and independence of owning their own motorcar. Although industrial cities such as Buffalo, Cleveland, Indianapolis and Chicago initially had more automobile companies, Detroit quickly became the center of the new

industry. Visionary engineers and salesmen including John and Horace Dodge, Henry Leland, David Buick, Ransom E. Olds, Louis Chevrolet and William C. Durant came to the city and defined a new industry.

Henry Ford was unique among the early developers of the automobile. Ford was born and raised outside of Detroit and brought a rural and rudimentary education to his work as an engineer at one of the city's electric power stations. Ford's traditionally conservative and frugal lifestyle stayed with him throughout his life and is reflected in his view of what the automobile should be – inexpensive and easily maintained. Ford's ultimate car, the Model T, was the car built by everyman for everyman. The success of the Model T and the American auto industry pushed Detroit to the forefront American manufacturing. By 1910, Detroit auto plants were the final destination point for hundreds of thousands of immigrants and migrants.

Chapter 2

Immigration Stories

Immigrants to the United States have played and continue to play a vital role in the ongoing debate over what it means to be American. To say that the United States is an immigrant nation is to state a basic fact of reality: Between 1820 and 1930, over 30 million people migrated to the United States. In his groundbreaking history of immigrants to the United States, “The Uprooted,” John Higham summarized the impact that immigrants have had on the history of the United States, writing, “Once I thought to write a history of the immigrants in America. Then I discovered that the immigrants were American history” (Higham, 3; Gabaccia, 1115–1134). It is true to say that if you look back far enough in time, everyone came from someplace else. The original inhabitants of North America themselves had migrated. By the time the United States existed as a nation in 1783, colonial settlement of North America by Europeans had been in full swing for over 200 years and included settlers from Great Britain, Germany, France, Spain, the Netherlands and Sweden.

During the colonial period, British settlement was a mixed bag of migrants primarily from the British Isles (England, Wales, Ireland and Scotland), directed at various times by private corporations, the Crown and individual decisions. On the eve of the American Revolution, 4 million mostly Anglo-English colonists lived in villages, towns, plantations and cities along the Atlantic Coast. During the same era, France competed with England for access and control of territories in North America. French colonies dotted the major rivers and Great Lakes of the vast interior of North America, controlling, at least nominally, a colonial empire that extended through the heart of North America from the mouth of the St. Lawrence River through the Great Lakes and down the Mississippi River to New Orleans.

Although Spain was one of the first European powers to explore the land and exploit the native people of North America, Spanish explorers and conquistadores made mostly

brief excursions into North America throughout the 1500s. In 1565, they seized a French colony in Florida and established St. Augustine. Nearly 10 years before English settlers established a tenuous settlement in Jamestown in 1607, the Spanish established the province of New Mexico. Eventually, Spain’s colonies would extend across the American Southwest and along the Pacific coast of California. Other European powers also attempted to seize a piece of the New World. The Swedish crown briefly held a colony in what is now Delaware, and after fighting four wars with England, the Dutch colony of New Amsterdam became New York.

In addition to colonists choosing to move to the New World, thousands of poverty-stricken indentured servants came to the colonies in a last desperate act of survival, trading up to seven years of their lives for the chance at a new start. Finally, during the colonial period, nearly 1 million Africans were forcibly relocated across the Atlantic Ocean to plantations in Britain’s colonies to grow tobacco, rice and, eventually, cotton (Flanders, 27–74; Daniels, 30–52; Hirschman, 596–599).

The Old Immigrants

During the first half of the 19th century, a combination of industrialization, political instability and population growth swept across Western Europe, pushing Europeans out of their homelands. Migrants from Great Britain and European countries, mainly Germany, provided the bulk of immigrants to the United States. German migrants had a long history in the country, dating back to before the American Revolution. Pennsylvania had become a primary destination for many Germans, so much so that Benjamin Franklin commented on the dominance of German speakers over English speakers (Nugent, 27–37; Daniels, 3–10, Muller, 14–20). In 1860, nearly 2 million Germans had migrated to the United States, making up the second-largest immigrant population after the British.

The other major immigrant group to come to the United States before the Civil War was the [Irish](#). Although the Irish had settled in America since the colonial period, between 1840 and 1855 a series of potato crop failures decimated the primary food source for over 8 million Irish and caused the death of an estimated 1 million. The famine migration out of Ireland brought impoverished and desperate Irish men, women and children to America's Eastern cities; by 1860, 1.6 million Irish had come to the United States. In addition to immigrants from England, Germany and Ireland, there were significant populations of foreigners from Belgium, China, France, Mexico, the Netherlands, Norway, Sweden and Switzerland in the United States. Except for migrants from China and Mexico, most of the immigrants to the United States in the mid-19th century were from Western and Northern Europe, and they all shared what they believed to be a common Anglo-Saxon heritage (Eighth Census of the United States, 1860, 620-623; Daniels, 126-145, 164-176; Vander Hill, 14-26, 35-44).

As growing numbers of foreigners swelled the cities, there was growing unease on the part of native-born Americans – white Anglo-Saxon Protestants, who formed the core of East Coast elite society. Some voiced concern over how the nation would absorb and control the foreigners and how well the strangers would adapt to their new home. At times, the concern was translated into political action, as was the forming of the American Party in the early 1840s. The American Party was also known as the “Know Nothings” because when members were asked about questionable campaign techniques and virulent newspaper stories against foreigners, their response was that they knew nothing. Groups like the American Party worked to restrict the flow of immigrants to the United States. Other native-born Americans felt threatened by the growing numbers of Catholics in Protestant-dominated American cities, leading to riots, such as occurred in Philadelphia in 1844, when rioters burned several Catholic churches and a Catholic orphanage. In cities where the “famine Irish” settled – Boston, New York and Philadelphia, for example – attacks against the poor, uneducated and unskilled immigrants fo-

cused on their Catholicism; many Protestants believed that Catholics, because of their faith, could never become true Americans.

In spite of growing tensions in Eastern cities, America's expanding Western frontier served as a social relief valve during the middle of the century. Irish laborers dug the Erie Canal, and many settled in cities and villages along the canal route. German immigrants, using encouraging letters from family members and friends already in the country, moved quickly to Midwestern territories and states to take advantage of federal land sales. Norwegians, Finns and Swedes sought out familiar lands and settled throughout the Great Lakes and Upper Midwest. Even the vast western lands of the United States could not address all the new groups coming to the country at the end of the century.

The New Immigrants

During the last decades of the 19th century, the impact of industrial growth and agricultural mechanization was felt in new areas of Europe as farmers and their families were forced off their lands and growing numbers of immigrants from Southern, Central and Eastern Europe began to disembark in American ports (Taylor, 91-106). Greece, Italy, Bulgaria, Turkey, Romania, Hungary, Slovenia, Poland, Lithuania, Estonia, Latvia and [Russia](#) became the primary feeder nations of the new migration.

The new migration of poor, uneducated and mostly unskilled foreigners cast doubt in the minds of many about the quality of the new immigrants. This doubt was supported by new “scientific” ideas about races and their inherent abilities. New immigrants were measured against racial hierarchies to determine intelligence, morality and work ethic, and usually came up lacking in the qualities necessary to become good Americans. Newspapers lampooned immigrants and their dress, their facial features and their faith. For many American Protestants, the growing numbers of Catholics, Jews, Orthodox Christians and even Muslims were viewed as a threat to traditional American Christian values and beliefs (Ward, 52-56; Daniels, 265-270).

Many native-born Americans viewed immigrants with fear at the beginning of the 20th century. Economic instability and social tensions were blamed on foreigners, and the “immigrant problem” became a national focus. Before World War I, restriction on the numbers and kinds of immigrants emerged as an acceptable solution to the social, economic and cultural problems Americans believed they faced because of foreigners. Between 1896 and 1913, the United States Congress passed restrictive legislation requiring adult immigrants to be literate in their native language, and presidents from Cleveland to Wilson vetoed the legislation (Daniels, 279–284; Ngai, 75–80). The 1920s witnessed the extent of American fears of “the other” with the meteoric rise to national prominence of the reconstructed Ku Klux Klan. With over 4 million active members across the nation in the mid-1920s, the [Klan swore](#) to protect traditional American ideals, Christian beliefs and the purity of the “American race” (Muller, 36–42).

In 1924, under mounting pressure from their constituents, from business owners and from labor leaders, Congress passed the Johnson–Reed Act, the nation’s first comprehensive law restricting immigration. Johnson–Reed limited the number of immigrants allowed to enter the country from a given nation to 2 percent of that group’s population in 1890. Effectively, the new restrictions gave preference to Western and Northern European immigrants, because of the larger percentage of the population those groups represented in 1890, and severely discriminated against new immigrants from the rest of Europe. In 1929, Congress passed the National Origins Act, limiting total white immigration to the United States to 153,714. After over 100 years of unrestricted immigration, the “golden door” of the United States was closed.

Assimilation and Americanization

One of the challenges posed by mass immigration was that of integrating, or assimilating, the immigrant. In the early 20th century, assimilation was based on the belief that anyone could become an American by adhering to traditional ideals of thrift, conservatism, morality and community. Early in the nation’s history, assimilation was assumed by native-born Americans because many of the immigrants were like themselves – English, or at least of Western European heritage. When the late 19th-century migrations seemed to overwhelm the nation, Americans began to fear for the future of the nation. Americanization, the process of becoming an American citizen, was believed to be the first step toward assimilation into the greater nation. World War I, and the confusion of fighting a war against the home nations of millions of immigrants, gave added importance to the call for Americanization programs in the name of national security. These programs were organized and run by private and local welfare and patriotic groups, and developed a base set of requirements that would give the foreigner basic tools required to [create a new identity as an American](#) and assimilate more quickly into American society.

Americanization programs were utilized by Anglo-Americans to [preserve the integrity of the concept of American/America](#) and to control migrants and immigrants. Americanization programs supported by city, state and federal governments as well as [private agencies and corporations](#) presented an organized effort to assert control over the newest “others” in America and define them. Assimilation programs directed at European immigrants also established behavioral controls that dictated where they lived and worked, what they ate, and how they dressed and defined a niche for them in American society.

Learning to speak and read English was a primary focus for most Americanization programs. On a practical level, English language skills enabled immigrants to function more efficiently in the factory, in the store, on trolleys and in public life. Reading and writing English allowed immigrants to absorb American culture through news-

papers and advertising. On a theoretical level, learning to speak English forced immigrants to think like Americans. The ideals of Americanization focused on elevating foreigners to a higher cultural level by training them in traditions of the American past. These ideals looked back to belief in a Puritan work ethic that promoted sobriety, morality and simple hard work. Finally, the legal process of naturalization, of becoming a legal citizen of the United States, required that immigrants learn the commonly accepted standards of American history and the ideals of the American Revolution. Critics of Americanization and assimilation at the time pointed to conflicts and possible problems with the programs.

“Americanizers,” as they were called, did not see a problem with using glowing terms like “elevation” and “betterment” when describing their programs, although others understood the terms implied that the immigrant’s native identity and culture were somehow less advanced. Critics of assimilation also railed against the idea of actual physical merging between “lesser races,” such as Italians and Poles, and Americans (Kalinski, 9-16; Muller, 237-250; Barrett, 997-1001 and 1009-1015).

Public schools were a strong influence on how immigrants became Americans; they used the immigrants’ children to help teach their parents what it means to be an American. Schoolchildren were taught only English and American history, and they were given traditional models, like George Washington, Benjamin Franklin and Abraham Lincoln, to emulate. Children also provided an important link between the immigrant community and the “outside” by translating for their parents and acting as a buffer between the two worlds. Manufacturers were also interested in acculturating immigrants in the hope that an Americanized worker would be an efficient and profitable worker. No other industrialist put this idea of industrial Americanization into practice better than Henry Ford and Ford Motor Company.

Ford Motor Company’s English School and Sociological Department

After the introduction of the Ford Model T in 1909, Ford Motor Company quickly rose to become the leading manufacturer of automobiles in the world. The integration of the progressive assembly line helped to put the “universal car” within reach of many working-class laborers. Ford plants became the model factories for cost-efficient production in the world. In order to meet the demand for the cars, Ford Motor Company increased plant sizes, first at the Highland Park Plant, and then, in the late 1920s, at the massive industrial colossus on the River Rouge. Along with American manufacturing in general, Ford’s demand for cheap labor and, after 1914, the high wages of the \$5-per-day profit-sharing plan [drew thousands of immigrants and migrants to Detroit](#) annually (Heald, 291-304).

In order to organize, monitor and gain the most efficiency from this large and diverse workforce, managers and superintendents at Ford Motor Company created the Ford English School and later the Sociological Department. The Ford English School was established by the company in 1913 in order to address the chronic problem of non-English-speaking workers and the potential threats to safety they posed. At a time when worker safety was rarely considered in most factories, Ford Motor Company officials took great pains to ensure that the auto factory was as safe as possible. English classes staffed by Ford employees were offered free of charge to Ford employees; however, students were required to attend [classes](#) before or after their work shifts. In class, they were [taught by mimicking instructors](#) who would hold up objects, such as tea kettles, and repeat what the object was. This basic vocabulary formed the foundation for more complex sentences, and by the end of the course, the student had a basic comprehension of written and spoken English. Ford’s English program was so successful that other companies and social organizations patterned their programs after it. A [Ford English School diploma](#) was considered so valuable that immigrants seeking naturalization could use it to meet many of the requirements needed before taking their final citizenship exam.

The culmination of the Ford English School program was the graduation ceremony, where students were magically transformed into Americans. During the ceremony, speakers would give rousing speeches, and factory bands would play marches and patriotic songs. The highlight of the event would be the **transformation of immigrants into Americans**, when students dressed in costumes reminiscent of their native clothes stepped into a massive stage-prop cauldron that had a banner across the front identifying it as the “AMERICAN MELTING POT.” Seconds later, after a quick change out of sight of the audience, the students emerged wearing “American” suits and hats and waving American flags, having undergone a spiritual smelting process where the impurities of foreignness were burned off as slag to be tossed away, leaving a new, 100 percent American (Kalinski, 25–29; Kazal, 440–453; Meyer, 67–82).

In addition to teaching immigrants a new language, the Ford English School, later incorporated into the company’s Sociological Department, also assisted workers by **teaching their wives about home care, cooking and hygiene** to qualify employees, immigrant and native born alike, for the \$5-per-day profit-sharing plan. The investigators of the Sociological Department would make unannounced visits to the employee’s house and **evaluate the cleanliness and safety of the home**. They would note if the family had renters as well as check with school attendance office to determine if children were attending school, and they would check banking records to see if the employee was making regular deposits.

Focus on Immigration: Michigan and Detroit

Turn-of-the-century Detroit was a growing city with a central business district that extended only about 3 miles up Woodward Avenue from the Detroit River. Detroit, with 285,704 people in the city, only ranked 13th nationally in population. The city’s 96,051 foreign-born residents and 4,111 blacks combined to make up only one-third of the city’s population. Before the advent of the automobile, Detroit’s manufacturing was fairly diversified, with nearly 10,000 men working in many small- to medium-size factories, producing such products as lumber, tobacco, ships, processed food, clothing and, most notably, stoves. Detroit was

a small but growing community that reflected the national trend of Americans moving away from traditional family farms and into the bustling urban centers (Swierenga, 73–78; Abstract of the Twelfth Census: 1900 103; Zunz, 33, Kalinski, 22–23).

At beginning of the 19th century, Detroit’s social geography delineated ethnic neighborhoods such as Corktown, Dutchtown, Kentucky, Polacktown and Piety Hill. Blacks lived with Russian and Polish Jews along Hastings Street and throughout the St. Antoine district, only a few blocks from the Greek community centered along Beaubien Street, while Gratiot was home to Detroit’s Germans. A small population of Polish Catholics claimed Hamtramck, while Detroit’s Italians spread throughout the east side Paradise Valley.

The near east side of Detroit, running parallel to Woodward Avenue from the Detroit River to Grand Boulevard, was the line of contact between Detroit’s various native-born, immigrant and migrant populations. Throughout the 19th century, the near east side served as the entry into Detroit and American society for many of Detroit’s immigrants and migrants. Poles, Jews, Italians, blacks and smaller groups, such as Hungarians, Austrians, Swiss, Dutch and Swedes, crowded into houses next to each other, just a few blocks from Detroit’s commercial center.

As a colony, territory and state, many different people, including the French, Canadians, English, Welsh, Irish, Scots, Americans and Native Americans, called Michigan home. Until the opening of the Erie Canal and the widespread use of steam-powered ships on the lakes, travel to Michigan was expensive, time-consuming and, at certain times, dangerous. Regular and inexpensive transportation brought the first wave of migrants to the state, dominated by native-born Americans, primarily from New England and the Northeast. The foreign population of Detroit was dominated by Germans, Canadians, English and Irish who made up nearly 25 percent of the city’s population.

Although German migrants had settled in the area surrounding Detroit since the Revolutionary era, the state experienced a large migration of Germans beginning in the 1840s. Beyond Detroit, German Lutheran missionaries came

to the state and established religious missions in the Saginaw Bay region centered in Frankenmuth, Frankentrost, Frankenlust and Frankenhilf. Numbering just over 30,000, German immigrants made up nearly one-third of the foreign-born population in Detroit at the turn of the century, spreading throughout the far east side of Detroit, and were nearly 10 percent of the skilled labor force.

Next in size were the Irish living in Corktown on the west side of the city. Unlike the Germans and native-born workers, the Irish worked mostly in unskilled and low-skilled jobs and supplied the unskilled labor to Detroit's new industries. Irish immigrants to Michigan initially came to the state after the Erie Canal opened in 1825; they established a small but vibrant and stable community. One of the benefits Irish settlers found in Detroit was a long-standing acceptance of Catholicism after over a century of French Catholics living in the area. Irish immigrants to Michigan also made up a sizable community in Upper Peninsula mining towns, including Houghton, Hancock, Marquette, Iron Mountain and Calumet.

One of the largest of the "old" immigrant groups to settle in Michigan was a colony of Dutch settlers established as a religious mission on the shore of Lake Michigan (Swierenga, 86-105. Vander Hill, 45-56). Michigan is also home to large numbers of the "Nordics," who migrated from Finland, Sweden, and Norway to the state's Upper Peninsula to work in lumber camps and mining boomtowns.

At the end of the century, Michigan mirrored national trends in immigration. Starting in the 1880s, new immigrants from Southern, Central, and Eastern Europe made their way to the United States and to Michigan, where either factory jobs were available for the working poor or cheap land could be purchased by those who had the money. Michigan's new immigrants were predominantly and generally from Eastern and Central Europe and specifically from Russia (including Poland), Italy and Hungary. Starting in the 1870s, immigrants from Russian-, German- and Austrian-controlled Poland migrated to the United States and made their way to the interior states. Detroit attracted a large number of Polish immigrants during the 1880s and 1890s, due to growing demands for factory labor producing iron

plate for ships and stoves and constructing railroad cars. Polish immigrants were also likely to migrate to other parts of the state where farm land was inexpensive and where they could return to more familiar agricultural work.

Throughout the early decades of the 20th century, the "new" immigrants settled in growing numbers not only in Detroit but also in other growing cities in the state. In the mining towns of the Upper Peninsula, closely knit immigrant neighborhoods centered on national parishes were the centerpieces of life for hundreds of thousands of Italians, Poles, Hungarians, French-Canadians, Welsh, Irish and Germans who mined the valuable copper and iron out of the northern wilderness (Zunz, 57; Katzman, 68-71; Hudgins, 215-220).

World War I slowed the flow of immigrants to the United States for the duration of the war, and, in order to meet demand for labor for war production, manufacturers and industrialists had to find new sources of labor. They found their new labor quite literally in their own backyard. One area that proved fruitful was the American Southwest with its large population of seasonal migrants from Mexico working various farming districts. Northern factory owners quickly saw the potential of this population and began to actively recruit Mexican farm laborers to work in factories. For Mexican workers, political instability in Mexico, demand for labor and better wages combined to push and pull thousands of Mexicans first to Michigan's sugar beet fields in the Saginaw Valley and then into factories. In Detroit, the Mexican population grew to 4,000 by 1920 and 15,000 in 1930, with most migrants working in the automobile factories. Factory work provided Mexican migrants with higher incomes than they could earn working in the sugar beet fields or other farm work as well as a community to live in with people like themselves (Flanders, 167-168; Garcia, 10-18, 65-76, 231-240; Vargas, 48-57, 68-70).

Along with the massive flow of immigrants from overseas and a significant number of Mexicans, Detroit also became home to large numbers of Southern white laborers coming to the factories for many of the same reasons as Mexican migrants and foreign immigrants – jobs and good wages. Economic conditions in Southern states at the turn of the

century were far behind the North, and Southern white workers experienced high unemployment even in industrializing cities. Like immigrants and other migrants, Southerners settled with people like themselves and re-created their culture and beliefs as best they could while confronting a new and different society. By 1940, over 20 percent of Michigan's white population was born in another state, with over 100,000 coming from Kentucky, Tennessee, Alabama and Mississippi. The migration of Southern whites to industrial centers like Detroit occurred at the same time as the Great Migration of African Americans to the North. The implications of this parallel migration of Southerners would have far-reaching consequences for Detroit and the nation throughout the course of the 20th century (Beynon, 333-335; Taeuber and Taeuber, 720-727; Killian, 66-69; Gregory, 118-126).

Chapter 3

The Great Migration

No single reason can sufficiently explain why, in a brief period of five years, from 1915 to 1920, nearly 500,000 Southern blacks moved from farms, villages, towns and cities to the North, starting what would ultimately be a 50-year migration of millions. Contemporaries and historians agree that it was a combination of basic structural problems in Southern society and an exploding Northern economy that fired the migration. Southern blacks streamed in the thousands and hundreds of thousands throughout the industrial cities of the North to fill the work rolls of factories desperate for cheap labor. Better wages, however, were not the only pull that lured migrants from the South. Crushing oppression and economic peonage in the South provided major impetus to blacks throughout the South seeking a better life. Detroit, with its automotive and war industries, was one of the main destinations for thousands of Southern black migrants.

Background: The Exodusters

The Great Migration of the early 20th century was not the first migration of blacks out of the South. In the late 1870s, recently freed slaves witnessed the dismantling of Reconstruction state governments and laws. In an effort to rebuild the South and reunite the country after the Civil War, Congress imposed radical legislation to ensure that freed slaves and their recently acquired voting and civil rights would be protected. To that end, the former Confederacy was divided into military districts, and federal troops were utilized to enforce the laws. Freedmen's Bureau offices were established throughout the South to assist freed slaves in land purchases, education and farming. Although Reconstruction achieved some limited successes, white Southerners actively opposed implementation of equal rights for former slaves. During the 1870s, as the nation and the federal government turned to the Western frontier, former Confederate leaders regained control over Southern states and began implementing state laws to severely restrict the political, social and economic

freedoms of blacks. When federal troops finally pulled out of the South in 1876, Southern Democrats were free to rebuild a new version of supremacy over blacks.

As their civil rights and freedoms were slowly stripped by Southern legislators, blacks across the South began looking north and west for opportunities. Joining the westward movement to the frontier, a trickle of Southern blacks sought out land on what they believed was the free West. Some found cheap land and open spaces in Kansas and began writing to family and friends about the West. Kansas held an important place in the minds of many recent slaves who were aware that the first shots of the war that brought them freedom were fired in "Bleeding Kansas." Moving to Kansas, Nebraska and other frontier territories was in effect staking a claim to the foundation of war to end slavery. Although there was no leader of the exodus movement, Benjamin "Pap" Singleton was a vocal and strong advocate for blacks to migrate to Kansas and the West. Encouraged by boosters like Singleton, more blacks packed up and joined thousands of other migrants to the West. Letters home encouraging migration brought more former slaves out of the South, and best estimates conservatively say that 50,000 black Southerners migrated not only to Kansas but also to Missouri, Indiana and Illinois (Painter, 108-117; Savage, 30-34). The exodus of the 1870s was the first migration of Southern blacks in search of the opportunity to fulfill their version of the American dream.

Why the Great Migration?

Throughout the last two decades of the 19th century, black status in Southern society eroded as [Jim Crow](#) laws enacted throughout the South effectively negated the few gains blacks had achieved immediately after the Civil War. Grandfather clauses in polling laws, which restricted voting to those whose grandfathers had previously voted, and poll taxes prevented blacks from voting in most elections while

strict segregation between blacks and whites from cradle to grave prevented blacks and whites from associating anywhere in the public arena. Rigid and legally sanctioned separation in schools, restrooms, restaurants, churches, hospitals and cemeteries created a separate and unequal Southern society. Blacks faced unfair treatment in the courts, with fee systems for minor offenses and forced labor for others. Lynching was by far the worst aspect of black disfranchisement. Southern blacks faced an onslaught of murder, rape and mutilation with no legal protections throughout the last two decades of the 19th century. Even though black Americans shared a belief in hard work, thrift and morality with white Americans in the South, these behaviors could get blacks lynched for getting out of their place or being “uppity,” while Northerners could not believe that the descendants of slaves could possess such ennobling ideals.

Education for Southern blacks was another ingredient in the migration mix. Although Southern public education was far behind that of the North, black students were particularly hampered by poor funding since most black communities could not raise the money necessary to pay for books, buildings and teachers. Black students rarely attended school more than four or five months out of the year, in dilapidated and sometimes dangerous school buildings. Black teachers, themselves possessing fewer more skills than their students, were rarely prepared to teach over 30 students whose ages could range from 5 years to high school age all in one room.

Finally, a series of natural disasters between 1915 and 1916 swept through the South and made an untenable situation unbearable. Boll weevil infestation virtually wiped out **cotton** crops throughout the South from 1915 through 1917, while unusually strong floods swept entire fields clean of vegetation throughout Louisiana, Mississippi and Alabama during the summer of 1915. These environmental disasters undermined the sharecropping farm system that developed after the Civil War. Under sharecropping, tenant farmers, black and white, rented farmland from landlords and paid for seed, tools, food and clothing on credit. After the crops were harvested, farmers paid off what they had borrowed. Generally, these poor farmers were paid less than market prices and ended the season still owing money to

the landlord and store owners, who were usually the same people. The cycle of perpetual debt started over again the following year when farmers borrowed again for seed and tools. All these circumstances combined to ignite the explosion of Southern migration into cities throughout the North and South (Flanders, 163–165; Martin, 1–5; Crew, 5–21; Kalinski, 37–39; Trotter, 2–8).

The Journey North

Making the decision to leave, however, was not an impetuous or easy one. Black migrants, like Southern whites and immigrants from foreign countries, had to weigh the costs and benefits of leaving their home and family. They had to decide when to leave, how to travel and, most importantly, how to pay for their journey. They also had to make arrangements for those left behind: parents, wives, children, brothers and sisters. They had to decide whether to take small steps and go from their home to a nearby town or city or to go straight to the North, and, if going all the way, where to go. Many black migrants used their families, friends and acquaintances to help them make their decisions. As the Great Migration grew, many of the first migrants would inspire others left behind with glowing letters about opportunities and freedoms. Money for train fare frequently accompanied these letters.

Paying for the trip was one of the first hurdles to overcome. Since almost all long-distance travel was by train, coming up with a substantial fare required planning and the help of family and friends. The cost of a single adult to travel from New Orleans to Detroit in 1918 was a significant \$26.30, which had to be paid on boarding (Henri, 66; Crew, 31–34). In addition to fares, migrants had to buy food and lodging during the journey, and once they reached their destination, they had to have money to rent a room. Traveling by train out of the South forced black migrants into overcrowded day cars, sometimes for several days at a time, and they had to wait in segregated stations with substandard bathroom facilities and food. As the Great Migration became a flood out of the South, Southern legislators and local officials tried to prevent blacks from leaving and tried enlisting railroad employees and officials to keep them off northbound trains.

In spite of the economic, social and racial challenges they faced, black migrants kept coming north. The Great Migration peaked between 1917 and 1918 as thousands of Southern blacks disembarked from trains in New York, Boston, Philadelphia, Cleveland, Chicago and Detroit, hungry and tired but still hopeful that they had finally reached, if not the promised land, at least a better land.

Focus on the Great Migration: Detroit

In 1910, Detroit's black population had grown to only 5,741, up from just over 4,000 in 1900. White Detroiters were still focused on coping with the growing immigrant population when blacks started pouring into the city to work in the factories. By 1920, the city's population climbed to 993,678, an overall increase of 113 percent over 1910. Despite war restrictions, Detroit's immigrant population still increased 84 percent over 1910, to 289,297. Detroit's black population, however, showed an astounding 611 percent increase, shooting up to 40,838, with most of that increase occurring after 1916. Detroiters were faced with the double impact of Southern blacks and immigrants from Southern, Eastern, and Central Europe (Martin, 2-5; Flanders, 163-165).

The industrial expansion in Detroit between 1910 and 1920 put native-born whites, immigrants and Southern blacks in daily contact for the first time. By 1920, nearly 20,000 black men worked in Detroit's manufacturing industries and competed with over 160,000 immigrants for the lowest levels of pay and most dangerous work.

Black migrants were initially met by an indifferent white population that hoped the Southern strangers would return south when the need for their labor ended. Detroit's established black community met their Southern cousins with disdain and occasionally hostility for upsetting well-defined social structures in the city. While Detroit's Anglo-American community accepted the challenge of assimilating European immigrants in order to stave off real and imagined threats to the community, it was soon apparent to the growing black community that they would have to address the problems of the Southern migrants themselves. In the face of growing tensions and diverse goals between Anglo-Americans,

immigrants, and Southern migrants Detroit and its residents began the process of renegotiating a place in the city.

Most Detroiters, black and white, were slow to accept the permanence of the black migration to the city, believing that the massive influx of Southern workers would reverse after the war. The city's main social welfare agency, United Community Services, provided little money or support for social work, health care or education for black migrants. Detroit's social settlements, already busy coping with immigrant assimilation, refused to provide services to blacks living in the same neighborhoods. Many settlements would not even let black children participate in dances or other events in the settlement houses. Social welfare agencies including the United Community Services did provide limited support for the Phyllis Wheatley House, although it was not a settlement house in the traditional sense. The Phyllis Wheatley House, founded in 1897, served initially as a home for older black residents, providing limited housing for up to 17 men and women, meals, light entertainment and burial for its residents.

Detroit's public schools, while nominally not segregated since 1867, provided little or no industrial education for black students. The Detroit public schools administered a trade school under the combined auspices of United Community Services and Detroit's automobile manufacturers. The Wilbur Wright Trade School was the only high school in the city offering skilled-trade training and on-the-job training in area automobile factories. Black students, however, found themselves in a vicious circle of racial antipathy. Detroit school administrators refused to let black students enter the two-year training program, believing that the training would be wasted on students who were rarely, if ever, hired into skilled jobs. With no formal training, black high school students were effectively shut out from an important entry point into the skilled labor force that was open to white students, including immigrants and the children of immigrants. Training programs along the lines of Ford Motor Company's Industrial Training School provided some degree of instruction for blacks but only in the context of their position as unskilled and low-skilled labor.

Black leaders in Detroit attempted to remove race as a success determinant by emphasizing common working-class interests among all of Detroit's workers. Migrants to Detroit faced race and class issues, internally and externally. Private and public institutions, including the Detroit branch of the National Urban League, employment offices funded by business owners, public schools and recreation departments, and churches, set out to alleviate as many of those issues as possible.

While white Detroiters utilized the resources of the entire community and government to assimilate European immigrants, nothing was done on an institutional level to help blacks adjust to their new homes. Black Detroiters quickly realized that the Southern migration to Detroit was not a temporary or seasonal shift in the workforce and commissioned a study of the black community. Black leaders believed migrants needed immediate education and training in how to live in the Northern urban setting. Workers from the Detroit branch of the National Urban League tried to alleviate growing discrimination in Detroit by reminding migrants that they had to adhere to different standards of living and behavior, albeit standards determined by middle-class whites, in order to succeed in the North (Martin, 7-12; Crew, 34-51; Lewis, 548-551).

Prior to the Great Migration, Detroit's black community was centered along St. Antoine Street immediately east of the downtown business district. Before 1910, the neighborhood was also home to immigrants, including significant numbers of Italians and Russian Jews. As more black migrants entered the neighborhood, immigrants and whites moved to other areas of the city so that by 1920 the former St. Antoine Street neighborhood encompassed roughly 3 square miles of the city, from the Detroit River north into the heart of downtown. This area, known as Black Bottom at the southern end and Paradise Valley on the north, while adequate for a relatively small mixed population of blacks and immigrants, soon became overwhelmed by new Southern migrants. At the beginning of the Roaring '20s, more than 300,000 people lived in an area that previously housed less than a quarter of that number. Because of restrictive

covenants written into real estate deeds and contracts, most of Detroit's housing was off-limits for black migrants.

Throughout Black Bottom and Paradise Valley, housing was substandard at best. Multiunit apartment buildings were further subdivided by owners so that three- or four-room apartments were cut into additional rental units housing two or three times as many people. Most of the housing units did not have electricity or plumbing. In some cases, landlords installed toilets and bathtubs in the middle of kitchens because pipes were easier to access. Installation work was generally poor, and it was a common complaint by renters that bath water, or worse, continually leaked from upstairs apartments into those below. Heating was generally a single small stove in the center room with stovepipes winding through walls and across rooms to vent outdoors. On top of the unsanitary and unhealthy conditions, black residents usually paid three or four times the rent paid for apartments in other, white parts of the city.

Black churches took an active role to alleviate migrant transition and assert control over the migrant community. In 1914, there were nine organized black churches in Detroit, while by 1920, there were 38 black churches with 21,854 members, or over 50 percent of the black population. Second Baptist and St. Matthew's Episcopal played an important role due to the combination of their strengths. Second Baptist, led by Rev. Robert Bradby, had the largest congregation, and St. Matthew's, led by Fr. Everett Daniels, included most of the black middle and upper class. The pastors of these two churches also enjoyed a special relationship with Detroit's largest employer, Henry Ford. A recommendation by one of these religious leaders to Ford would almost certainly guarantee placement into a job at Ford Motor Company (Washington, vol. 2).

Churches provided migrants with a central meeting point for the black social community where marriages, births, funerals and dances could occur unhindered by outside forces. According to Forrester B. Washington writing in his 1920 survey of black life in Detroit, the "Negro church is the centre [sic] of the social life of the great mass of Negroes....

due partly to the fact that the opportunities for wholesome recreation for the Negro are limited to a large extent in the general life of the city” (Washington, Vol. 2: Crew, 55-57; Martin, 34-39). The Urban League praised much of what the churches did but was critical toward church members moving into areas of social work and assistance better suited to trained professionals. Churches provided time, space and staff for clubs and societies, as well as classes for the migrants, to help teach them about their new home, but the churches could not provide the attention to scientific social work the league believed was the key to adjusting black migrants to their new home.

In addition to churches, other organizations were organized by black leaders to integrate the newcomers into the community and mediate between themselves and the rest of white Detroit. Not all of Detroit’s black community organizations agreed on how best to address the needs of the community. The Good Citizenship League was established in 1918 by some of Detroit’s Old Guard leaders who resented the influence that an outside organization like the Urban League had in the city. Although they differed on how to achieve integration into Detroit’s civic, social and political life, groups like the Urban League, the Good Citizenship League and churches repeatedly stressed to their members and the community at large that blacks had to work hard, attend church, keep their children in school and keep their yards, alleys and streets clean. It was up to blacks themselves to prove to whites that they belonged in American society.

Black migrants had to maintain a delicate balance between antiunion manufacturers who were working to prevent organization in the plants under the auspices of the Detroit Employers Association and the early unions and organizers who reviled black workers who worked for less pay than white workers. Before World War I, Detroit’s small black community was barely noticeable in the workforce of the city’s manufacturing plants. Wartime demand for greater industrial production provided an opening for black workers, and by 1918, Detroit’s industries employed 8,000 black workers. By 1925, Ford Motor Company had the largest industrial black workforce in the country at 16,000, with most

working as janitors and cleaners or in the dirty and dangerous bowels of the River Rouge Plant’s massive blast furnaces and **foundries** (Peterson, 180; Crew, 42-51; Martin, 14-22).

Outside the factories, small numbers of blacks achieved the status of holding skilled job positions; the great majority of blacks in Detroit were relegated to unskilled work such as garbage collectors, street sweepers, construction workers, dishwashers and packers. Black women working outside the home were relegated to domestic work and, in some instances, to limited factory positions. The Detroit Branch of the National Urban League opened up its own employment office and was supported in part by Detroit businessmen and the city’s public service offices.

Racial tensions between black and white Detroiters simmered below the surface mainly because, after a brief recession in 1920-1922, economic growth kept most workers too busy. Black leaders continued to work to teach migrants how to dress, walk, speak and behave when around whites, hoping to prevent racial conflict like riots that had spread across the country in 1919. The relatively good economic conditions, however, also drew more black migrants to the city and added more bodies to the overflowing Paradise Valley.

In the early 1920s, geographic mobility for Detroit’s white population was limited mainly to what a family could afford and where they wished to live. Mobile immigrants and their children expanded farther into the city as relatively more affluent highly skilled workers and managers, such as foremen and supervisors, moved from the core business center, leaving blacks and recent immigrants to squabble for overpriced substandard housing in the near east-side.

Blacks struggled for the same opportunities as whites to improve their living conditions and live in well-built safe neighborhoods and send their children to better schools. Speaking at the height of the Ossian Sweet murder trial in the fall of 1925, John C. Dancy summarized the aspirations of many blacks when he stated that they “desire[d] to live in better quarters than those found in any of the so-called Negro Colonies.” The reason blacks tried to move out of the east side ghetto was not to invade and take over white

neighborhoods or force themselves into white homes; rather it was simply that “a...man wants to live in a house commensurate with his salary” (Kalinski, 68).

In 1924, there were several instances of black families attempting to move into predominantly white neighborhoods that ended with large crowds surrounding the black-owned homes, verging on rioting and forcing the unwanted families out of their homes. That year a runoff election to fill a vacant mayoral seat ended with the defeat of a Ku Klux Klan-supported candidate by a slim “15,000” vote margin. By 1925, tensions had reached a boiling point as black residents began asserting their right to live where ever they chose and whites began organizing so-called neighborhood improvement associations to keep out anyone they thought undesirable. In the fall of 1925, however, the city’s tense race relations nearly broke open when a doctor tried to move into a home worthy of his position.

In 1925, Dr. Ossian Sweet was a respected and successful physician, originally from Florida and a graduate of Howard University’s medical college. He was married only two years to his wife, Gladys, and was the proud father of a 1-year-old baby girl. Dr. Sweet was not an activist in the black community, but he was well-known and respected. He was, quite simply, a man looking to raise his daughter in a safe and clean neighborhood near a good school. In September 1925, Dr. Sweet purchased a three-bedroom bungalow house on the corner of Garland and Charlevoix on the city’s near west side, a white neighborhood. Dr. Sweet, with the help of family and friends, moved into the house without incident, but crowds began to gather in the afternoon so that by dinnertime, several hundred people surrounded the house while police watched from a safe distance (Boyle, 20–24; Vine, 22–25).

The crowd was yelling toward the house for the Sweets to get out and began throwing sticks and rocks at the building, breaking several windows. In the ensuing melee, several gunshots rang out. Leon Brenier, a white neighbor sitting on his porch across the street, fell dead, and another man was seriously wounded. Police rushed in and arrested Dr. Sweet and his family, charging them all with murder.

When national black organizations heard of the “Sweet Incident,” as the papers referred to it, leaders from the NAACP hired Clarence Darrow to handle the Sweets’ defense. Darrow’s defense centered to two points: first, that no one could conclusively prove that it was the Sweets who fired and killed Brenier, and second, that it was the right of every man to defend his home and life against a threat he believed was deadly. Darrow’s eloquence brought tears to some observers, and the jury could reach no decision. Rather than retry the entire case the prosecuting attorney tried Dr. Sweet’s brother, who, after another Darrow defense, was acquitted. Even though the Sweet Incident had made national headlines and a black man was acquitted of murdering a white man, race relations in the city were only temporarily settled (Vine, 111–118; Kalinski, 68–70).

The Great Migration had wide-ranging effects on American society in general and on Detroit specifically. The migration of Southerners to Northern cities slowed only during the 1930s and the Great Depression. After the Sweet Incident, black, white and immigrant Detroit settled into a pattern of mutual exclusion except as necessary in public and work interactions. The Great Depression blunted further racial conflict as all Detroiters struggled to find work to buy food and lodging. There were incidents, however, that periodically flared up and pointed to smoldering antagonisms between white and black Detroiters.

In the mid-1930s, Detroit was home to the Black Legion, a violent, antiunion, white supremacist group that traced its founding to Michigan’s Ku Klux Klan. The Black Legion flared brightly and faded quickly but left a trail of murder that shocked the city and the nation. A more covert incident occurred on the northern frontier of the city along Eight Mile Road when a white real estate developer erected a brick wall eight feet high that extended for half a mile. The wall separated a white housing development from a black neighborhood that backed up to the white housing. The straight whitewashed brick wall extending off to the horizon delineated the stark contrasts between the neighborhoods. On one side of the wall was the patchy grass of the white

neighborhood and, on the other side of the wall, the run-down houses, telephone poles and rubbish-filled yards of the black neighborhood (Martin, 54-58; Crew, 60-72; Kalinski, 59-62).

In the spring and summer of 1941, Ford workers staged a wildcat strike at the Rouge Plant that led to fights between black and white workers, while black and white students at Detroit's high schools fought each other. With war looming in Europe, the federal government office directing war-industry housing proposed to construct low-cost housing for black defense workers in a predominantly white neighborhood that also contained a large population of Polish immigrants and their families. When it was announced that blacks would live in the projects, the Polish and native-born white residents formed a neighborhood improvement association and picketed the building site and City Hall to protest the project.

Buckling to this pressure, federal housing officials changed their orders in January 1942 and declared the projects, now named after Sojourner Truth, would house only white workers. In February 1942, black residents attempted to move into the apartments for which they had already paid rent and were met by white protesters armed with knives, sticks, bats and bricks. Black residents and white protesters fought a pitched battle before police charged the black lines. Blacks sustained most of the 40 injuries and 200 arrests during the incident. In April, black residents finally moved into the project under the baleful stares of their white neighbors and with the protection of hundreds of city and state police troops. Federal officials investigating the Sojourner Truth incident harshly criticized the police actions against blacks and noted the extreme "hostility between Negroes and Detroit's Poles." The report concluded that unless swift action was taken by all levels of city, state and federal governments to alleviate housing and racial tensions the possibility of racial violence between blacks, immigrants and whites was very real and imminent (Shogan and Graig, 29-31). In early June 1943, 25,000 Packard Motor Company employees struck the company's plant in a wildcat strike to protest the promotion of three black workers in the plant. Finally, between June 20 and June 22, simmering tensions between black and white Detroiters boiled over.

While the exact event that started the riot will never be known, it is known that between 10:30 p.m. and 11 p.m. on the hot and humid Sunday night of June 20, black and white Detroiters started fighting as they made their way home from Belle Isle Park. Depending on the race of the audience who heard accounts from "eyewitnesses," all manner of horrendous acts of violence were acted out by the other race. If one could believe the so-called eyewitness accounts, black and white women and children were being tossed off the Belle Isle Bridge at an alarming rate. News quickly spread throughout Detroit's black and white communities that each group was attacking and killing the other. The fighting spread from Belle Isle up Grand Boulevard and along Jefferson Avenue to Woodward. Woodward Avenue became the line of demarcation between black and white rioters. Blacks rioted, burned and looted stores and businesses on the fringe of the black neighborhoods, while whites mainly stayed along Woodward Avenue; on either side of the line, black and white rioters hunted solitary members or small groups.

Throughout the night and into the day on Monday, violence escalated as blacks and whites caught in public were pulled off streetcars and out of automobiles and were beaten or stoned as they drove past the a group of the opposite color. It was not until late in the evening on Monday that Mayor Jeffries and Governor Kelly were able to complete the steps needed to declare martial law and allow federal troops to enter the city. The grim statistics of the riot's toll on the city tell of viciousness and brutality. In all, over 400 Detroiters were treated for injuries ranging from lacerations and minor bruises to gunshot and knife wounds. Nearly 1,900 persons were arrested and 34 were killed. It is estimated that property damages exceeded \$2 million (Capeci, Jr. and Wilkerson, 186; Kalinski, 75-78).

War production and post-war economic growth allowed the tensions between white and black Detroiters to ease throughout the 1950s, but the legacy of the Great Migration was seen again throughout the 1960s. Once again, housing and work became contested areas of the city. Even though Detroiters, both black and white, had been moving out

of the city since the end of World War II, the 1960s saw a

significant rise as more and more black residents moved into white neighborhoods. In response, whites moved to suburban neighborhoods and cities in growing numbers. By the summer of 1967, tensions had risen again, and in July another riot broke out, on a hot summer night, at 12th and Clairmont on the city's near west side.

The Detroit riot, or insurrection, of 1967 was decades in the making. Years of unfair treatment by Detroit's mostly white police force and a legacy of police shootings had established a deep-seated distrust of the force. The decades-long struggle for blacks in Detroit to find affordable, clean and safe housing was exacerbated during the late 1950s, both by the federal highway-building program and by attempts to implement so-called urban renewal programs. These programs and building projects combined to wipe out what remained of Black Bottom and Paradise Valley as I-375, a downtown spur off I-75, paved over Detroit's traditional black community. In addition, unequal access to high-paying factory jobs, continued white flight to the suburbs and a rising militancy in the ongoing civil rights movement all combined to create the tinder that exploded into flames on July 23.

Between July 23 and July 27, black and white Detroiters fought each other, the police, firemen and eventually federal troops from the 82nd Airborne Division over deep-seated, endemic issues of race, class, and equality. The numbers tell a story of destruction and loss: businesses and stores suffered

an estimated \$40 million to \$80 million in losses; over 2,500 stores were looted or burned; 400 buildings and homes were destroyed, leaving nearly 400 families homeless; and of the over 7,000 arrested during the riot, 6,500 were black. The toll of death and injury made the Detroit riot one of the bloodiest in United States history: 43 people died, of whom 33 were black; 467 civilians, police, fire fighters and National Guard and Army soldiers were injured. The greatest casualty, however, was the city itself. After the riot, many who were able, whether they were black, white, business or corporation, left the city as quickly as they could buy property in the outlying suburbs. The loss of taxes (personal, property, business, sales, etc.) that funded operations devastated city and school budgets, beginning a downward spiral of economic decline.

At the beginning of the 21st century, Detroit, like the rest of the United States, is engaged in a new process of negotiation and debate about what will happen in the coming decades. The changing world economy and fitful shift away from traditional manufacturing is forcing the city, the state and the nation to reexamine what direction the future will be and who will there for that future.

Bibliography

Transportation: Past, Present and Future – Part 2

Primary sources are indicated by bold print.

Print

- Baker, O. E.** “Rural and Urban Distribution of the Population of the United States.” *Annals of the American Academy of Political and Social Science: The American People: Studies in Population* 188 (1936): 264–279.
- Barrett, James R. “Americanization From the Bottom Up: Immigration and the Remaking of the Working Class in the United States, 1880–1930.” *The Journal of American History: Discovering America: A Special Issue* 79.3 (1992): 996–1020.
- Beynon, Erdmann Doane.** “The Southern White Laborer Migrates to Michigan.” *American Sociological Review* 3.3 (1938): 333–343.
- Boyle, Kevin. *Arc of Justice: A Saga of Race, Civil Rights, and Murder in the Jazz Age*. New York: Henry Holt and Company, 2004.
- Capeci, Dominic J., Jr., and Martha Wilkerson. *Layered Violence: The Detroit Rioters of 1943*. Jackson: University of Mississippi Press, 1991.
- Crew, Spencer. *Field to Factory: Afro-American Migration, 1915–1940*. Washington, D.C.: Museum of American History, Smithsonian Institution. An Exhibition, 1987.
- Daniels, Roger. *Coming to America: A History of Immigration and Ethnicity in American Life*. New York: HarperCollins Publishers, 1990.
- Ebner, Michael H. “Re-Reading Suburban America: Urban Population Deconcentration, 1810–1980.” *American Quarterly* 37.3 (1985): 368–381.
- Farley, Reynolds, Charlotte Steeh, Maria Krysan, Tara Jackson, Keith Reeves. “Stereotypes and Segregation: Neighborhoods in the Detroit Area.” *The American Journal of Sociology* 100.3 (1994): 750–780.
- Flanders, Stephen. *Atlas of American Migration*. New York: Facts on File Inc., 1991.
- Fuller, George N. “Settlement of Michigan Territory.” *The Mississippi Valley Historical Review* 2.1 (1915): 25–55.
- Gabaccia, Donna R. “Is Everywhere Nowhere? Nomads, Nations, and the Immigrant Paradigm of United States History.” *The Journal of American History: The Nation and Beyond: Transnational Perspectives on United States History: A Special Issue* 86.3 (1999): 115–1134.
- Garcia, Juan R. *Mexicans in the Midwest, 1900–1932*. Tucson: The University of Arizona Press, 1996.
- Gilfoyle, Timothy J. “White Cities, Linguistic Turns, and Disneylands: The Paradigms of Urban History.” *Reviews in American History: The Challenge of American History* 26.1 (1998): 175–204.
- Gregory, James N. “The Southern Diaspora and the Urban Dispossessed: Demonstrating the Census Public Use Microdata Samples.” *The Journal of American History* 82.1 (1995): 111–134.
- Heald, Morrell, “Business Attitudes Toward European Immigration, 1880–1900.” *The Journal of Economic History* 13.3 (1953): 291–304.
- Henri, Florette. *Black Migration*. Garden City: Doubleday Publishing, 1975.
- Higham, John. *The Uprooted: The Epic Story of the Great Migrations That Made the American People*. Boston: Little, Brown and Company, 1952.
- Hirschman, Charles. “Immigration and the American Century.” *Demography* 42.4 (2005): 595–620.

Hudgins, Bert. “Evolution of Metropolitan Detroit.”

Economic Geography 21.3 (1945): 206–220.

Kalinski, Peter D. *Through the Vestibule: Assimilation and the Great Migration to Detroit, 1915–1925*.

Detroit: Wayne State University, (Masters Thesis), 2000.

Katzman, David M. *Before the Ghetto: Black Detroit in the Nineteenth Century*. Chicago: University of Illinois Press, 1973.

Kazal, Russell A. “Revisiting Assimilation: The Rise, Fall, and Reappraisal of a Concept in American Ethnic History.” *The American Historical Review* 100:2 (1995): 437–471.

Killian, Lewis M. “The Adjustment of Southern White Migrants to Northern Urban Norms.” *Social Forces* 32.1 (1953): 66–69.

Kramer, Paul and Frederick L. Holborn, editors.

The City in American Life: A Historical Anthology.

New York: Capricorn Books, 1971.

Lewis, David Levering. “Parallels and Divergences: Assimilation Strategies of Afro-American and Jewish Elites from 1910 to the Early 1930s.” *The Journal of American History* 71.3 (1984): 543–564.

Martin, Elizabeth Anne. *Detroit and the Great Migration, 1916–1929*. Ann Arbor: Bentley Historical Library, University of Michigan, 1993.

Meyer, Stephen. “Adapting the Immigrant to the Line: Americanization in the Ford Factory, 1914–1921.”

Journal of Social History 14.1 (1980): 67–82.

Mohl, Raymond A. and Neil Betten, “The History of Urban America: An Interpretive Framework.” *The History Teacher* 3.3 (1970): 23–34.

Muller, Thomas. *Immigrants and the American City*.

New York: University Press, 1993

Ngai, Mae M. “The Strange Career of the Illegal Alien: Immigration Restriction and Deportation Policy in the United States, 1921–1965.” *Law and History Review* 21.1 (2003): 69–107.

Nugent, Walter. *Crossings: The Great Transatlantic Migrations, 1870–1914*. Bloomington: Indiana University Press, 1992.

Painter, Nell Irvin. *Exodusters: Black migration to Kansas after Reconstruction*. New York: Alfred A. Knopf, Inc, 1986.

Peterson, Joyce Shaw. “Black Automobile Workers in Detroit, 1910–1930” *The Journal of Negro History* 64.3 (1979): 177–190

Savage, Sherman W. “The Negro on the Mining Frontier.” *The Journal of Negro History* 30.1 (1945) 30–46.

Scott, Emmet J. “Letters of Negro Migrants of 1916–1918.” *The Journal of Negro History* 4.3 (1919): 290–340.

Shogan, Robert and Tom Graig. *The Detroit Race Riot: A Study in Violence*. Philadelphia: Chilton Books, 1964.

Sugrue, Thomas J. “Crabgrass–Roots Politics: Race, Rights and the Reaction Against Liberalism in the Urban North, 1940–1964.” *The Journal of American History* 82.2 (1995): 551–578.

Swierenga, Robert P. “The Settlement of the Old Northwest: Ethnic Pluralism on a Featureless Plain.” *Journal of the Early Republic* 9.1 (1989): 73–105.

Taylor, Philip. *The Distant Magnet: European Emigration to the U.S.A*. London: Eyre & Spottiswodde Publishing (Ltd.), 1971.

Taeuber, Conrad. “Rural–Urban Migration.”

Agricultural History 15.3 (1941): 151–160.

Taeuber, Karl E. and Alma F. Taeuber, “White Migration and Socio–Economic Differences Between Cities and Suburbs.” *American Sociological Review* 29.5 (1964): 718–729.

Trotter, Joe William Jr. *The Great Migration in Historical Perspective: New Dimensions in Race, Class, and Gender*.

Bloomington: Indiana University Press, 1991.

United States Census. *Eighth Census of the United States–1860. Recapitulation Population of the Tables of Population, Nativity, and Occupation*. Washington, D.C.: Government Printing Office, 1864.

Vander Hill, C. Warren. *Settling the Great Lakes Frontier: Immigration to Michigan, 1837-1924*. Lansing: Michigan Historical Commission, 1970.

Vargas, Zaragosa. *Mexican Autoworkers at Ford Motor Company, 1918-1933*. Thesis (Ph.D) Ann Arbor: University of Michigan, 1984.

Vine, Phyllis. *One Man's Castle: Clarence Darrow and the Defense of the American Dream*. New York: HarperCollins Publishers, 2004.

Ward, David. *Cities and Immigrants*. New York: Oxford University Press, 1978.

Washington, Forrester B. *The Negro In Detroit: A Survey of the Conditions of a Negro Group in a Northern Industrial Center during the War Prosperity Period*. Detroit: Research Bureau of the Associated Charities of Detroit, 1920. Vol., 1-2 at the Walter P. Reuther Library Archives of Labor and Urban Affairs, Detroit: Wayne State University.

Wiese, Andrew. "The Other Suburbanites: African American Suburbanization in the North before 1950." *The Journal of American History* 85:4 (1999): 1495-1523.

Zunz, Oliver. *The Changing Face of Inequality: Urbanization, Industrial Development, and Immigrants in Detroit, 1880-1920*. Chicago: University of Chicago Press, 1982

Online

Washington, Forrester B. *The Negro In Detroit: A Survey of the Conditions of a Negro Group in a Northern Industrial Center during the War Prosperity Period*. Detroit: Research Bureau of the Associated Charities of Detroit, 1920. Google Books. Google, 2009.

books.google.com/books?id=oDhAAAAMAAJ&dq=forrester%20washington%20negro%20detroit&pg=PA1#v=onepage&q&f=false

Chapter 1

Pleasure Travel

Americans Become Travel Conscious: To the Civil War

Travel before the 19th century was an arduous, grueling experience for Americans. Heavy expenditures of time and money, poor roads and inadequate modes of transportation tended to limit trips primarily to ones that were absolutely necessary. Adventurous youths and members of the upper class were most likely to take trips for the sole purpose of pursuing pleasure.

As modes of transportation and roads improved in the early 19th century, pleasure travel became more viable. Passenger stagecoaches traversed new and improved roads, usually dropping travelers off at inns, taverns or private homes for overnight stops. Roads, weather and lodging were quite unpredictable, however, and stagecoach travelers often found that unwittingly they had embarked on an adventure.

Improvements in water travel transformed inland journeys into pleasure trips rather than ordeals. Developed in the 1820s, travel via canals was admittedly slow (about 4 miles per hour), but smoother and far more comfortable than overland travel. When conveniences like sleeping and dining facilities were added to canal boats, this means of travel became fashionable for a time. After the initial novelty wore off, however, complaints about slowness, tedious meals, mosquitoes and low bridges increased, and soon canals were being used primarily for commercial transportation.

By the 1840s, elegant steamboats carried passengers across major lakes and rivers. Steamboats were faster and more luxurious than canal boats and cheaper and more comfortable than stagecoaches. But it was the development of the railroads from the 1830s on that added a new dimension to travel in America. The 3,000 miles of railroad track in place by 1840 had tripled by 1850, traversing almost every state east of the Mississippi River. Until the Civil War, however, railroad travel remained far from comfortable. Accidents

were frequent, and travelers spent a great deal of time and money changing trains because of the lack of a unified gauge system among the railroad networks in various parts of the country. Nevertheless, trains were the fastest vehicles yet, traveling at speeds of up to 15 to 20 miles per hour and reaching areas that had been inaccessible to most people a generation earlier.

Despite the rigors of travel, increasing numbers of Americans embarked on pleasure trips. Among them were explorers, adventurers, government surveyors and merchants. The latter often engaged in pleasure trips while pursuing their business interests. Others were writers, poets and painters seeking solace among the beauties of nature. As accounts and pictures of newly discovered scenic areas were published, an increasing number of travelers set out to experience their splendor firsthand. The wealthy, able to afford the time and expense of the trips, were among the first of the avid travelers. As early as 1826, Timothy Flint wrote in “Recollections of the Last Ten Years” that the better classes were carrying the desire for travel “to a passion and a fever.” In time, less well-to-do people also undertook pleasure trips, as new transportation methods enabled them to travel great distances at less expense. As the desire to escape the constraints of crowded urban life became stronger, and as epidemic diseases like cholera ravaged the cities, travel gained even more appeal.

Foreign visitor Francis J. Grund, author of “The Americans,” published in 1837, marveled that “there is scarcely an individual in so reduced circumstances as to be unable to afford his ‘dollar or so,’ to travel a couple of hundred miles from home in order to see the country and the improvements which are going on.” By the mid-19th century, the tradition of leaving home for a daylong excursion or a seasonal vacation was well under way.

Destination

People who could afford only short excursions away from home took advantage of an increasing number of scenic picnic groves and rural retreats located on the outskirts of towns and cities. These included some rural cemeteries, like Mt. Auburn Cemetery outside Boston and Greenwood Cemetery on Long Island, both specifically landscaped to provide reposeful surroundings. At first many of these places were intended exclusively for the upper class, but before long they were being frequented by all classes of people seeking a respite from city crowds and daily routines.

Resorts became the favorite destinations of long-distance travelers. Usually they offered magnificent scenery and pleasant climates. The oldest and most fashionable resorts centered around springs that were reputedly laden with health-giving minerals. Rationalizing that their visits were in the interest of good health, the wealthy transformed these watering places from invalid retreats into bustling social centers. Relaxation and “taking the waters” were soon superseded by sporting pastimes, public entertainment, dancing and railroad or stagecoach excursions to nearby attractions.

The increasing scope of railroad and canal travel led to the discovery of mineral springs farther inland. Saratoga, New York, was the most popular and fashionable of these inland spas, sporting a hotel as early as 1803. Before long, however, Saratoga became known for its drinking, dancing and “looseness” rather than its health-giving qualities. To escape the heat and epidemics associated with the summer months, Southern planters and their families fled to Saratoga by the thousands until sectional political tensions forced them to stay at home. As the Civil War became imminent, they turned instead to Southern resorts like White Sulphur Springs in what is now West Virginia.

Resorts also grew up around various natural wonders that had been visited by sightseers since the late 18th century. The most popular of these curiosities was Niagara Falls in New York State. Thronged with visitors after the Erie Canal reached it in 1826, Niagara Falls quickly became commercialized. As early as the 1830s, visitors complained about “the abominable fungus” of souvenir vendors polluting its environs.

When sea bathing caught on as a healthful and invigorating pastime, dozens of beaches along the East Coast – especially those close to cities – attracted bathers. Some beaches became so popular that special boardinghouses were built to accommodate the crowds that flocked to them. In several areas, lavish hotels and resorts eventually replaced these boardinghouses. As new beach resorts became crowded, members of the upper class moved to less accessible spots. Newport, Rhode Island, soon emerged as the most fashionable resort for the wealthy. However, even Newport was soon besieged by tourists, and the old elite cordoned itself off from the ordinary folk by erecting luxurious and secluded private “cottages.”

In contrast to the elegance and exclusiveness of Newport, the beach resorts of Atlantic City, New Jersey and Coney Island, New York, became popular in the late 1850s as summer havens for the middle class. There, everyone could take advantage of the mixed bathing made popular at Newport by the rich.

As these East Coast resorts became crowded, areas farther north and inland were developed. After a few appreciative artists directed attention to Mount Desert Island on the coast of Maine, it was invaded by armies of summer pilgrims. Others sought a respite from city life and summer crowds at more tranquil and less accessible resorts on inland lakes like Lake George, New York, and Lake Winnepesaukee, New Hampshire. By 1860, the English novelist Anthony Trollope noted in North America that “it is the habit of Americans to get to go to some watering-place every summer, that is, to some place either of sea water or of inland waters.”

Mountains held a particular appeal for summer travelers because of their healthful air and scenic views. First made known by artist and writers, many mountain retreats became popular stops on sightseeing routes as well as seasonal destinations for those escaping the cities for the summer. Mt. Washington in New Hampshire and the Catskills in New York were early tourist destinations, with the initially primitive shelters there giving way to luxurious resorts by the 1840s and 1850s. As new, more secluded resort areas were sought, the Adirondacks area in upper New York State attracted attention as a place where people could relax and regain their health.

Before long, critics attacked the resorts for encouraging false responses to nature in the frenzied search for continual amusement. The revelry and gay life of the resorts were severely condemned by ministers and other like-minded people. Such critics found more appropriate opportunities for relaxation at a number of Methodist camp meetings like the ones at Ocean Grove and Round Lake, New Jersey, and at Eastham, Massachusetts. There, they could count on finding healthful activities and sociability in what they considered to be a moral atmosphere.

Both rural and urban residents visited a variety of cities in search of pleasure and novelty. Cities like New York, Boston, Philadelphia and Baltimore offered live entertainment and exciting sporting events. By the 1850s, cities located farther inland, such as Pittsburgh, Cincinnati and New Orleans, also had become popular travel destinations. Foreign and American tourists alike enthusiastically visited industrial, civic and social institutions to observe the nation's rapid growth firsthand. In 1853, the first international exposition held in America, at the Crystal Palace in New York City, encouraged Americans to compare their own industrial and cultural progress with that of the rest of the world.

Beginning in the 1830s, improvements in steamships made transatlantic pleasure trips more viable for Americans. Artists, writers, students and members of the upper class, in particular, embarked on trips to Europe. The Grand Tour, which usually included England, France and Italy, with the addition of briefer excursions into Switzerland, Germany and the Low Countries, was well on its way to becoming a defined itinerary for future American tourists visiting the European continent.

Tourism Gets Organized: 1865-1915

Following the Civil War, the number of pleasure travelers grew dramatically. The combination of increasing prosperity and lower travel costs swelled the ranks of those who could afford to travel. A growing number of people of all classes sought to escape the cities, while the relaxation of religious restrictions on Sundays provided yet another impetus to travel. By the end of the 19th century, getting away for periodic rest and change had become a “must” for those who could afford it. As the June 1909 edition of Cook's Excursionist warned, “the ‘dull boy’ who takes all work and no play is outclassed by his bright and energetic competitor who has learned the value of occasional recreation and change.”

The desire to travel was stimulated by a spate of books, guides and accounts that were widely read at this time. A number of new magazines, including *Outing* (1881), *Outdoor Life* (1898) and *Travel* (1901), specialized in travel subjects. Some transportation companies even published their own travel periodicals. Among these was the Southern Pacific Railroad, whose *Sunset* magazine marketed the pleasures of tourism to a large public.

Newspapers also abounded with travel suggestions, advertisements and travel accounts. Starting in 1867, the *New York Tribune* was the first to include a column of travel tips and information. In 1906, both the *New York Times* and the *New York Tribune* began to include Sunday travel sections. Americans were also spurred to travel by paintings, prints, stereoscopic views, illustrated promotional literature and a growing number of picture postcards and snapshots depicting scenic spots.

Especially significant to the expansion of pleasure travel at this time was the development of a standardized travel network on a growing number of passenger [railroad and steamship lines](#). These forms of travel offered regular schedules and predictable routes. Both trains and steamships became increasingly more comfortable and luxurious in their appointments, giving travelers a feeling of elegance and sophistication.

The proliferation and increased reliability of the railroad checked the zeal for road improvement and gradually lessened the use of inland waterways. Railroad mileage quintupled between 1865 and 1885 as the railroad networks spanned the United States. Fierce competition led to the development of faster and larger trains and improved service. Between 1885 and 1900, railroad passenger traffic increased almost 70 percent. Improvements in the design and manufacture of passenger cars reduced the cost of railroad travel as well as ensuring greater comfort and safety. Pullman's comfortable, indeed elegant, railroad cars – beginning with the sleeping cars of the early post-Civil War years – set a high standard for the railroad industry as a whole. By the 1890s, railroads offered special excursion rates that substantially increased the number of those who could afford long-distance trips.

During the first two decades of the 20th century, railroads continued to dominate long-distance public transportation. In 1915, almost a billion train tickets were sold, about triple the figure for 1885. Because it remained the chief mode of transportation for the multitude not yet able to buy cars, the railroad acquired the nickname “the poor man's automobile.”

During the 1890s and into the early years of the 20th century, urban mass transportation also improved dramatically. More efficient, electrically powered trolley cars replaced many horse-drawn omnibuses and cable cars, while larger cities built underground or elevated rapid transit systems. These advances in urban mass transportation allowed the general populace to undertake day excursions and outings.

The tremendous popularity of the safety bicycle in the 1890s began to refocus attention on the road for the first time in several decades. Heeding the promotion of manufacturers and the encouragement of printed travel accounts, millions of bicyclists fled from “the psychic and moral void of the city” to the promised peace and serenity of the countryside. For those who could afford it (the cost of a bicycle still averaged a rather expensive \$100 in 1895), the bicycle's convenience and flexibility helped to offset the growing dissatisfaction with public transportation. In “Twenty Years

of Cycling” (Fortnightly Review, August 1897), J. and E. R. Pennell commented in this way on the superiority of cycling over public modes of travel, “As [the cyclist] rides on, there is absolutely nothing to shut out the prospect; no fellow passengers to dispute it with him, no carriage top to obscure it, no silly driver to intrude inane remarks.”

The popularity of bicycle touring not only led to a renewed interest in road improvement but also revived almost obsolete travel services along the roadside. Wherever the bicyclist went, proprietors of inns and hotels geared up for business. An article in the *The New York Times*, July 28, 1895, entitled “On the Old Merrick Turnpike,” noted *The truck farmers, whose produce-laden wagons could formerly be seen at any time in great numbers stopping at the various road houses, now hurry over this portion of their cityward journey, or take other routes to avoid “them dern bicycle fellers” . . . Bicycle riders, the road house keepers have found, are a better class to cater to. . . . Not only are their numbers greater, but they spend money more freely. . . . Hence they have altered the character of their hotels entirely. The names once so common of “Farmers Home,” “Market-mans Hotel,” etc., have been supplanted by “Bicyclers’ Retreat,” “Wheelman’s Rest,” and similar names. Every hotel keeper has supplied himself with a foot pump and repair kit for the use of the wheelman.*

Ironically, while trying to escape from the city, bicyclists ended up bringing urban amenities with them to the roadside.

What the bicycle tourist began, the automobile tourist perfected. Not only did the roads and roadside services improve tremendously, but the automobile itself represented the greatest comfort, flexibility, convenience and independence of any vehicle thus far used for pleasure travel.

Around 1905, the high cost of purchasing, maintaining and operating an automobile kept it primarily as a plaything for members of the upper class, who looked on motoring as a fast, exciting replacement for sport carriage driving. As early as the 1890s, members of this “motor fraternity” enthusiastically participated in races, meets and group tours.

Travel guides for motorists advanced beyond anything imagined by bicyclists. They were prepared and published by such organizations as the American Automobile Association, founded in 1902, as well as dozens of smaller highway associations and local touring clubs.

Like the bicycle, the automobile freed travelers from the “bondage of the timetable.” Its slow speed (in contrast to the railroad) and the freedom and intimacy it allowed were nostalgically compared to earlier travel by stagecoach and carriage. Others equated the automobile with a return to an active, strenuous life, an individual and spiritual test against hardship in contrast to relatively smooth and passive transportation on a train or ship.

During World War I, frustration with public transportation increased while comfort and safety of the automobile improved. Better highways and cheaper, more dependable automobiles portended the transformation of motoring into a major means of pleasure travel for the public at large. In the years after World War I, the growing comfort and speed of the newer models belied the earlier likening of automobiles to both the hardships and the leisurely pace of stagecoach travel.

Between the Civil War and World War I, pleasure travel was organized and promoted on a national scale. The desire of many more people to travel and the improvements in transportation led to the development of a full-fledged travel industry. The tremendous expansion of promotional literature, the growth of travel agencies offering standardized package tours and the introduction of conveniences like travelers’ checks in the 1890s further facilitated pleasure travel and the growth of tourism.

Heading Farther Afield

Short day excursions were the easiest, least expensive and thus the most possible pleasure trips for the average person at this time. By the 1890s, railroads offered trips by day coach or weekend “sleeper” to neighboring towns, especially for planned community celebrations and sporting events. Steamboats also ran excursion trips along rivers, around bays and to popular bathing beaches.

At the same time, to encourage weekend business, trolley companies developed their own recreations grounds on the outskirts of cities and towns. Trolleys also allowed people to explore their hometowns. They appealed especially to the working classes, who had little other means of escape from their often cramped quarters.

For those who chose to undertake more extended vacations, resorts continued as the favorite destination. Large resort hotels, often associated with railroad or steamship lines, were geared increasingly to a middle-class clientele as the wealthy moved to more exclusive summer homes. Resorts promised healthful pursuits, relaxation and a change of scenery and climate, as well as pleasures and luxuries not available at home. The veranda, where guests relaxed and engaged in idle conversation, became the symbol of the leisurely atmosphere of resort hotels. Women and children predominated at these hotels, their vacations paid for by the heads of the household, whose economic viability and social status were secured by obsessive attention to their business careers.

As more Americans found their way to resort areas, tourist services and contrived attractions inevitably followed. Day excursions from the resort hotels by horseback, horse-drawn vehicle, railroad or boat became extremely popular. Souvenir shops, photographers, ice-cream parlors and other refreshment stands abounded near many resort hotels. Live entertainment and other amusements directed at tourists proliferated. Important among these were amusement parks, the first of which was built at the seaside resort of Coney Island, New York, in 1895.

Continuing the pre-Civil War trend, the major resort areas generally centered on mineral springs, magnificent scenery or a comfortable climate. Fashionable spas like Saratoga Springs and White Sulphur Springs continued to draw the well-to-do. Springs even farther inland, like French Lick, Indiana, and Hot Springs, Arkansas, also became popular. By the 1870s, greater accessibility to these springs attracted what an article in the *Independent*, June 1, 1911, recalled as a more “dense, democratic, and vulgar” clientele. In seeking privacy from the increasing hordes of vacationers, members of the upper class began to frequent mineral springs in Colorado’s Rocky Mountains. Colorado Springs became a

particularly fashionable hot spot for East Coast socialites to visit during the 1870s, although many criticized it for being overcrowded while lacking the amenities offered by resorts in the East.

Seaside resorts continued to be as crowded as ever. Newport remained the most exclusive, while a succession of lesser communities, such as Long Branch, New Jersey, and various beaches along the Long Island coast rose and fell in favor. By the 1890s, however, even Newport was being invaded by hordes of excursionists, people of modest means who crowded the beaches and tried to catch a glimpse of the palatial summer homes with their beautifully landscaped grounds.

As in the case of the mineral spring resorts, the wealthy responded by seeking ever more distant watering places like Bar Harbor, Maine, and the Thousand Islands area of the St. Lawrence River. The beaches of Florida also became fashionable winter destinations, and luxurious resorts and private estates multiplied there. Palm Beach, accessible by private yacht or railroad car, was particularly favored. By the 1880s, seacoast destinations in California, such as San Francisco, San Diego and Monterey, were accessible by rail to those with plenty of time and money.

For the less well-to-do, smaller hotels, cottages and boardinghouses provided accommodations at seaside and lakeside resort areas. Denominationally-sponsored summer resorts and campgrounds, often located on the sites of earlier camp meeting grounds, provided recreation and relaxation in a morally inspiring atmosphere. The New Jersey shore sported a number of these, including ones at Ocean Grove and Asbury Park. Several towns modeled after the original Chautauqua site in upstate New York also served as summer resorts, providing instruction and entertainment within an uplifting environment.

Coney Island and Atlantic City became more crowded than ever. Both had begun as relatively quiet resort areas, until commercialized attractions superseded the lure of their beaches and scenery. A boardwalk erected in 1870 in Atlantic City soon became a crowded promenade lined with

concessions, a place to see and be seen. This resort came to be known as a mecca of millions, where the middle and working classes could imitate the ways of the rich. The size and variety of its amusement areas made Coney Island particularly famous during the first decade of the 20th century. Heavy visitation encouraged further expansion, and by 1900, both Coney Island and Atlantic City sported numerous concessions, contrived attractions, live entertainments and mechanical rides.

Mountain resorts continued to cater to upper-class vacationers until, like other types of resorts, they experienced an influx of a more mixed clientele, and old hotels were replaced by new, larger ones. Resorts in New York's Catskills and in New Hampshire's White Mountains remained popular, but people with more time, money and the desire for exclusivity sought relaxation in the less accessible Adirondacks area of upper New York State and in the Rockies in the West. As modest hotels sprouted in the Adirondacks, the wealthy moved to private camps and estates in more secluded areas.

By the 1890s, the large resort hotel was beginning to lose some of its popularity. Vacationers increasingly expressed concern about heavy food, outmoded sanitary facilities and overheated, badly ventilated rooms of these larger establishments. Many wanted some relief from the imposed idleness of traditional resort life and looked to hiking, horseback riding, bicycling, tennis and golf to provide some vigorous activity. Growing numbers of middle-class families began to rent rooms in farmhouses and smaller hotels, as well as summer cottages, so as to be in closer contact with nature and "old-fashioned rural values." Entire middle-class families – now including the tired, overworked men of the household – began to vacation together. Some pundits advocated vacationing in farmhouses or cottages as a way of reinforcing family unity.

More and more tourists chose to spend vacation time in a major urban center. Cities not only delighted tourists with artistic and scientific curiosities and live entertainment but in general offered variety, adventure and freedom from routines of daily life. Exhibitions and world's fairs held in the

major American cities confirmed perceptions of the nation's industrial and cultural progress and evoked admiration for the accomplishments of the cities in which they were held. The popularity of [cities as tourist destinations](#) spurred growth of [commercial sightseeing tours](#) and such auxiliary services as restaurants, hotels and guidebooks.

As railroad networks extended across the country, the West gained new distinction as a travel destination. In the 1870s and 1880s, a vacation trip westward was expensive, available only to the rich. Although travel literature identified the West with Old World beauty and a certain amount of "roughing it," vacationers nevertheless expected to find a considerable number of amenities to make the experience as "civilized" and familiar as possible.

Except for those who vacationed in resort areas like Colorado Springs or San Diego, California, most tourists followed a standard sightseeing circuit, traveling by railroad and spending only a few days in any given area. During the 1870s, a typical route might start at the Chicago Stockyards, continue through the Colorado Rockies to Salt Lake City, then go on through the California Sierras to Yosemite Valley and San Francisco, ending up at the luxurious Hotel del Monte in Monterey. By the 1880s, Yellowstone National Park in Wyoming and scenic areas of Alaska, Canada and Mexico had been added to the railroad package tours offered by various travel agencies. Side trips off the main circuit were more difficult and expensive. However, by the 1890s, many railroad excursion cars and stagecoaches could provide sufficient convenience and comfort to make daylong sightseeing trips appealing.

By the end of the 19th century, the West had come to be closely associated with the vanishing wilderness and an idyllic past. In an era of growing nationalism and nostalgia, the West became a mecca for tourists wishing to gain a sense of their country's frontier heritage. Rodeos, fairs and festivals, and a few early dude ranches, all added to the West's distinctive character and appeal.

As the dangers and uncertainties of cross-country travel faded, and as Americans sought more active pursuits, a substantial back-to-nature movement developed to spur pleasure

travel to backwoods areas. Although it was English in origin, Americans associated this movement with their own frontier and pioneer past.

Members of the urban middle class were particularly vocal advocates of this return to nature. These people considered resorts, the outlying areas of cities and country roads to be natural buffers against unhealthy and crowded urban conditions. A home in the suburbs or the country provided yet another form of escape from urban ills. Larger, more unspoiled natural areas were looked on as particularly revitalizing to the spirit, and thousands of people joined conservation crusades to help preserve federal and state lands from economic exploitation. In "Our National Parks," published in 1901, naturalist John Muir enthusiastically reported "the tendency nowadays to wander in wildernesses is delightful to see. Thousands of tired, nerve-shaken, over-civilized people are beginning to find out that going to the mountains is going home; that wilderness is a necessity; and that mountain parks and reservations are useful not only as fountains of timber and irrigating rivers, but as fountains of Life."

An interest in camping also arose out of this new appreciation of natural scenery. As early as August 1874, Scribner's Monthly reported that "camping out [was] rapidly growing in favor," providing city dwellers with temporary relief from artificiality and confinement.

The back-to-nature movement was organized and institutionalized through the formation of various clubs, including the Appalachian Mountain Club (1876), the American Scenic and Historical Preservation Society (1895) and the Sierra Club (1892). Local garden clubs women's clubs, and horticultural societies augmented the movement, and an increased interest in birdwatching led to the formation of several local Audubon societies and Junior Audubon clubs during the first two decades of the 20th century.

Nowhere was the ideal of living a more strenuous life in the out-of-doors more successfully embodied than in the Boy Scout movement. Organized in 1908 by a British general, Sir Robert Baden-Powell, the movement took root in the United States in 1910. It was thought that as members of the Boy Scouts American boys could develop the sort of frontier

skills and values that would lead the nation to emphasize once more the rugged outdoor life that their ancestors had experienced. The Boy Scouts rapidly became the largest youth organization in the country. Soon other “Backwoods Brotherhoods” were organized, along with similar girls’ organizations, including the Girl Scouts and Campfire Girls.

The importance accorded to children’s appreciation and understanding of nature contributed to the proliferation of summer camps for them. These camps evolved from day-long excursions to natural areas into semipermanent resorts where city children could enjoy communion with nature while engaging in a variety of organized activities. Almost unknown in 1900, summer camps had become “the customary thing” for affluent children by 1915.

The popular interest in nature led to increased governmental regulation of parks and forests. Even before the back-to-nature movement gained hold, the government had moved to preserve certain “freaks and phenomena of Nature” for public enjoyment. In 1864, for example, it set aside Yosemite Valley in California expressly for public use, resort and recreation. And in 1872, the government created Yellowstone National Park in Wyoming as a “public park or pleasuring-ground for the benefit and enjoyment of the people.” In the 1880s, the growing belief that exposure to nature could serve as an antidote to urban problems contributed to the designation of Niagara Falls as a public park and the establishment of the Adirondack Forest Preserve. The view that the Adirondacks were a place where rest, recuperation and vigor could be gained by supposedly highly nervous and overworked people became a major rationale in changing its status to a state park in 1892.

Theodore Roosevelt was a keen advocate of wilderness conservation, and many more natural areas were given governmental support during his term of office. During the first decade of the 20th century, the government designated several more landmarks as national parks, and the national forest system was greatly expanded. The passage of the Antiquities Act in 1906 allowed Roosevelt and succeeding presidents to designate “objects of historic or cultural interest” as “national monuments.”

In 1908, some 69,000 people visited national parks, and that number multiplied as parks began to admit automobiles. Railroads provided access to the parks via elegant railroad cars that made the trips fairly comfortable. An increasing number of hostelrys, roads, trails and other tourist amenities softened the rawness of the parks. But the major development of tourism in the national parks did not take place until after World War I.

Improvements in the speed, comfort and cost of transatlantic voyages by steamer led many more Americans than before to travel abroad for pleasure, while new tourist services in Europe made the sightseeing trips there more inviting. Although such trips were still too expensive for the average American, a growing number of upper-middle-class families began to vacation abroad. Many took advantage of travel agents and standardized package tours to lessen the risks and uncertainties of travel in foreign countries. The tremendous popular success of Mark Twain’s travel satire, “Innocents Abroad,” published in 1869, further enhanced the appeal of foreign travel.

Between the 1860s and the 1880s, the number of Americans traveling abroad had doubled, and by the turn of the century, Americans were “looking outward” as never before. Foreign destinations closer to home became accessible to American vacationers as resorts were developed in the Caribbean countries, Canada and Mexico. American travel to the “exotic lands” of the Middle East, India, South America and the Orient also increased at this time.

Large numbers of Americans were traveling in Europe at the outbreak of World War I. According to the 1914 summer issue of *Travel*, the wartime suspension of travel to Europe lent “an immense fillip” to a new “See America First” campaign. The Pan-Pacific International Exposition held in San Francisco in 1915 served as a potent inspiration to national travel, attracting some 13 million visitors.

The Era of Mass Pleasure Travel: Since World War I

Increased discretionary time, rising income levels and technological advances in transportation led to a further democratization of pleasure travel after World War I. Shorter work weeks (especially after New Deal labor legislation in the 1930s) and the introduction of paid vacations (customary for both white-collar and production workers after World War II) provided new incentives for people to travel. Automobiles and, eventually, jet planes also helped transform travel from a diversion of the privileged to a major leisure activity for the general public.

After World War I, the automobile emerged as the principal mode of pleasure travel. In the first two decades of the 20th century, the number of private automobiles increased a thousandfold to 8 million in 1920 and nearly tripled again by 1930. From the 1930s on, about 80 percent to 85 percent of all vacation trips were taken by automobile. Motorists continued to emphasize the freedom, speed and comfort offered by automobile travel as opposed to other forms of transportation. No longer were the upper and middle classes bound by dictates of railroad and steamship lines, nor were the working classes trapped within their home cities or towns. Moreover, in many places blacks for the first time were able to [avoid segregated travel](#) on public means of transportation.

Increased automobile ownership after World War I intensified the demand for improved roads. The highway organizations of the teens (the most famous being the Lincoln Highway Association, founded in 1913) expanded in the early 1920s into more than 100 groups that sponsored at least 250 marked trails and installed every shape and size of road sign. The inauguration of a federal road system in 1925 for the first time standardized numbered routes and road signs across the country. Affixed to posts at every turn or crossroads “too plainly for even the worst blunderer to miss,” these signs became a “blessing to wanderers,” according to Frederic F. Van de Water in “The Family Flivvers to Frisco” (1927). Many roads were graded, straightened, widened and improved with asphalt. During the 1930s, lesser roads were brought into the

federal highway system, the number of landscaped “parkways” increased and Portland cement was introduced as a smooth, quiet and inexpensive road-paving material.

As automobiles became faster and more comfortable to ride in, travelers tended to become less interested in the passing scene. Motoring became a means to an end rather than an enjoyable experience in itself. The obsession with speed in automobile travel was reflected in Dallas Sharp’s “The Better Country,” published in 1928: “To push on from dawn to dark, and after dark, seeing nothing, resting nowhere, hailing no traveler nor station, is quite truly American.”

Many maps, guidebooks and itineraries transformed automobile touring into a more goal-oriented activity, while the installation of heaters, air-conditioners and radios in cars increased the traveler’s reluctance to stop. Ironically, rapid driving from destination to destination came to resemble closely the railroad-to-resort mode of travel that motorists had so fervently sought to avoid.

By 1956, a system of divided, limited-access interstate freeways had been adopted to cope with the overwhelming number of vehicles on the roads. These freeways and the system of toll highways increased travel speeds and eliminated congestion, but they also contributed to the increased monotony and homogeneity of automobile travel. Reflecting on this, John Steinbeck gloomily predicted in “Travels with Charley in Search of America” (1962) that “when we get thruways across the whole country, as we will and must, it will be possible to drive from New York to California without seeing a single thing.”

A host of services to facilitate the motorist’s passage, including gas stations, repair shops, eating places and lodging evolved along the growing network of paved roads. At first, eating and lodging places were fairly primitive and were located at unpredictable distances from one another, so that many motorists found it cheaper and more convenient to camp and cook their own meals along the side of the road. Large groups of these so-called “tin can tourists” traversed the countryside just after World War I, and specialized automobiles and equipment were designed for this pur-

pose. During the heyday of autocamping, the campers were likened to wandering gypsies and vagabonds or to America's self-reliant pioneers.

By the early 1920s, the nomadic, independent nature of autocamping was curtailed, as campers began to use centralized, municipal campgrounds. These free campgrounds, which offered security and such amenities as sanitation and cooking and laundry facilities, helped obviate complaints that autocampers were defiling private property and littering the roadside. Most autocampers welcomed these campground conveniences as a relief from their earlier self-sufficiency.

The free municipal autocamp was short lived. By the middle of the 1920s, camps began to charge entrance fees and institute registration requirements, occupancy limits and police supervision, claiming that this separated the "better class" of tourists from the "undesirables" (migrant workers, transients and the unemployed). In truth, it was not so much the "undesirables" that caused problems but general crowding, rowdiness and sanitation problems. As the wealthy left the autocamps to tour Europe or spend their time at private summer estates and the municipalities' enthusiasm for establishing camps waned, there was a major shift from public to private camps. From the late 1920s on, private operators controlled most of these facilities.

In an attempt to attract more tourists to their autocamps, private owners began to add permanent tents and, eventually, small cabins to their sites. Motorists found they could enjoy the same flexibility in travel as before, but with added privacy and convenience. Soon the word "cottage" crept into the names of these lodging sites, implying more permanent, winterized facilities with private bathrooms and running water. Individual units became integrated under a single roof, "cottage courts" evolved into "tourist courts." During the Great Depression, these types of lodgings dotted the roadside, offering affordable yet private accommodations.

At the same time that roadside lodgings became more sophisticated, restaurant meals began to supplant picnic lunches and campfire meals for hungry travelers on the road. During

the 1920s, downtown cafes evolved into tearooms and roadside stands, and in the 1930s into all manner of "drive-in" restaurants, diners and roadhouses.

After World War II, larger and more luxurious "motels" were built. The number of motels doubled in the decade from 1939 to 1948, and by 1960, there were twice as many again. Air-conditioning, television and swimming pools became standard motel amenities. Aging hotels were forced to modify their rates, spruce up their interiors and provide new enticements. Most of the motels were small scale and individually owned, and fierce competition caused many to close.

The trend toward massive highway development in the 1950s led to the construction of more elaborate, often multistoried, motor hotels and motor inns. These integrated the formality of a hotel with the recreational facilities and convenience of motels. Chain systems of motor inns featured recognizable architecture and familiar signs all across the country, easing travelers' anxieties with the assurance that, as the promotional materials of the Holiday Inn chain put it, the best surprise is no surprise.

As the design and function of highways and lodgings became more standardized, roadside restaurants followed suit. Diners, cafes and drive-ins serving simple, predictable food were largely superseded by fast-food and chain restaurants offering identical menus across the country.

Innovations in the design of motorized recreational vehicles corresponded with advances in automobiles. Before World War I, wealthy Americans had toured the countryside in luxurious, custom-built "house cars," just as they might have traveled in a yacht or private railroad car. Members of the middle class followed their lead, fashioning their own house cars or trailers. In the 1920s, several small companies produced specialized truck and car bodies for autocamping, but the popularity of these vehicles was short-lived. By the early 1930s, however, portable trailers had evolved into fully furnished house trailers, which far surpassed the earlier house cars in affordability and convenience.

After World War II, and especially from the 1950s on, the production of recreational vehicles developed into a major industry. Large numbers of luxurious, comfortable vacation vehicles were produced, including trailers, pickup campers, vans and motor homes. In 1973, Americans spent almost \$2.5 billion on recreational vehicles.

Passenger railroads reached the peak of their popularity around 1920 and declined thereafter. From that time on, the attention of the various railroad lines tended to focus on improving passenger comfort. Railroad companies made a valiant effort to revive their business in the late 1930s and 1940s by improving their operating efficiency through the use of new power sources and by adopting new, streamlined designs for their trains. The railroads continued to modernize and upgrade passenger service after World War II, but most of these improvements merely slowed the decline of the railroad as a major means of pleasure travel.

Railroad passenger travel shrank for a number of reasons, including the popularity of private automobiles, but also because of the appearance of motorized buses. Increasingly comfortable buses were built in large numbers during the 1920s by several small companies. In 1929, many of these merged into the Greyhound bus system. Along with its major competitor, Continental Trailways, the Greyhound system became a significant factor in vacation travel. Bus service has expanded tremendously since the 1930s, providing an inexpensive alternative to other forms of travel. Buses also have become a major mode of transportation for group travel on package tours and chartered trips.

Passenger airlines were first developed in the 1910s and 1920s, but it was not until considerable technological advances were made in aircraft design during the 1930s that they began to be considered a means of pleasure travel. After World War II, the airplane became a quick and dependable means for long-distance travel. By the mid-1950s, travel by air had become so efficient and affordable that millions of passengers chose this form of transportation, compared to only thousands before World War II.

From their inception in 1958, jet-powered passenger airplanes revolutionized American travel habits and patterns. Long-distance pleasure travel became affordable for people of all classes; those with the money and inclination to travel farther and see more of the world than the rest of the crowd became known as the “jet set.” The speed of jets put an end to special sleeping accommodations on airplanes and **made once-remote countries easily** accessible to pleasure travelers.

Since World War I, the tourist business has become a more lucrative economic enterprise than ever. As author Norman Miller put it in “The Leisure Age” (1963): *Literally thousands of business enterprises in scores of states flourish and grow as a direct result of the tourist industry. Hundreds of thousands of jobs are made possible by it. A large portion of money which is spent goes for meals, lodging, and refreshments. Millions are spent on gasoline and oil, rail, plane, bus, and steamship fares. The golf courses, gift shops, and stores benefit as do the dealers who outfit the tourist before he even starts on a vacation.*

By the late 1970s, about 8,000 travel agencies planned and arranged trips for domestic and foreign travelers. While travelers’ checks and gasoline company credit cards had been in use earlier, multipurpose credit cards (introduced in the late 1950s) have come to offer increased convenience to the pleasure traveler. Travel promotion through the media of film, radio, television, and—more recently—on the Internet, has become extremely sophisticated, while travel-related pamphlets, guidebooks, and newspaper and magazine articles abound.

Expanding Horizons

New and improved modes of transportation, especially the expanded to use of the automobile, increased the number of short outings and excursions undertaken by families and groups of friends. The amusements of nearby towns and cities, the scenery of the countryside and the attractions of outlying recreational facilities and bathing beaches were finally brought within the practical reach of millions of people.

The independence and flexibility of pleasure travel after World War I led to the tendency to view the country in terms of geographical regions rather than in terms of resort areas or towns. As the accelerating speed of the automobile and other modes of transportation blurred the landscape, the region became an organizing concept for the tourist—a means to impose order on the diversity of sights encountered in the course of travel. At the same time, with increasing cultural homogeneity nationwide, genuine regional diversity became more muted and was often overlooked in favor of stereotyped generalizations. These regional stereotypes have included the perceived Yankee culture of New England the wholesome, hometown image of the Midwest; and the slow-paced way of life in the South.

The West, considered the quintessential American region, has proven the most alluring to tourists. Its embodiment of the American frontier experience and its outstanding scenic beauty led John A. Jakle to write in “The Tourist: Travel in the Twentieth Century North America” (1985) that “one couldn’t know North America without traveling West.” Its vast scale and seemingly primitive character, together with romantic stereotypes of cowboys and Indians, have been publicized and popularized by moviemakers, who, according to Jakle, “elaborated on the myths of the frontier to produce a national fantasy.” The epitome of the Western stereotype lives on at Disneyland’s Frontierland in California.

In contrast to the civilized amenities stressed in 19th-century literature advertising the West, early 20th-century promotional literature depicted the region as wilder than it actually was. Romantic Western stereotypes were perpetuated through rodeos, festivals and re-creations of Western towns and at dude ranches. In 1933, Edward Dunn remarked on the contrived experience of the dude ranch in his “Double-Crossing America by Motor”: “Everyone dressed in western costumes from sombreros to high-heeled boots, and there was much talk of ‘wrangling,’ ‘roping,’ and ‘rounding up,’ despite the fact that there was not a sign of cattle within fifty miles.”

During the 1930s, the desert of the Southwest, which had been relatively untouched by tourism until then, became a fashionable destination for pleasure travel. Desert areas

like Phoenix, Arizona, and Palm Springs, California, gained popularity with sun-seekers, while sites like Lake Tahoe (on the California–Nevada border) and Lake Mead (on the Arizona–Nevada border) appealed to sports enthusiasts. Las Vegas, Nevada, also achieved new popularity, particularly after several large gambling casinos were constructed there in the 1950s. As automobiles became more efficient, and especially as airlines reduced cross-country travel time and expense, California became the favored destination for huge numbers of tourists. Many of them were eager to visit Hollywood (a district of Los Angeles) and, beginning in 1955, Disneyland. For more adventurous souls, tropical Hawaii and the “last frontier” of Alaska came to serve as popular vacation spots (especially after both obtained statehood in 1959).

The attraction of cities—with their abundant nightlife and major sporting events—is an enduring one for tourists, especially if a [world’s fair](#) or exposition is in progress. For general sightseeing, scores of guidebooks, pamphlets and bus tours orient visitors to particular districts and points of interest.

History of every sort has been a major attraction to tourists since World War I. Mass automobile travel has stimulated popular interest in historical restorations and local history. Signs and markers have sprouted at numerous historic spots along the roadside; larger attractions include historic houses, museums, and town and village restorations.

While many tourist destinations offer the flavor of an area or a greater understanding of America’s past, numerous other places lure travelers with nothing more than pure entertainment. A prime example is the theme park, conceived at Disneyland in 1955. Disneyland—along with the much more extensive Walt Disney World (near Orlando, Florida, 1971) and numerous other theme parks scattered across the country—features organized amusement areas centered around historical and other contrived themes. Secluded resort clubs, weekend hotel “getaways” and ocean cruises also offer entertainment and relaxation.

Pleasure travel in the 20th century has continued to have significant outdoor orientation; viewing nature and scenery has proven to be a main attraction in itself. Automobile

travel led to the revival of many resort areas, as lodges and motels offering extensive sports facilities attracted visitors. Following World War II, private cottages and cabins began to dot the great vacation regions of the country. Increased prosperity put these within the reach of growing numbers of Americans.

Tent camping underwent phenomenal growth from the 1920s on, as millions of travelers bypassed hotels, tourist courts and lodges to experience a more rigorous life outdoors. The emphasis of family togetherness helped renew the interest of camping. The majority of tent campers were vacationers accustomed to the outdoor life. As a result, specific areas were designated for public use, and rules and regulations were enacted to preserve the sanctity of particularly crowded spots. In the post World War II years, camping became more convenient and even luxurious, a trend reflected in the tremendous growth of the recreational vehicle industry and the proliferation of convenience-oriented campgrounds like Kampgrounds of America (KOA), founded in 1962.

Children's summer camps have spread across the country since the 1920s. Since the 1950s, a new type of day camping has evolved, combining recreational activities with the flavor of camping. Summer camps have increasingly concerned themselves with helping youngsters acquire athletic, artistic, and social skills, although special wilderness and survival camps continue the rugged traditions beloved by Theodore Roosevelt.

Nowhere has the interest in the outdoors, its accessibility by automobile and its increasing regulation been as evident as at the national parks. National Park Service statisticians claimed that the one in every three hundred Americans who visited a national park in 1916 had dramatically increased to one in three by 1954. And during the next two decades, visitation more than tripled.

The National Park Service, instrumental in national park development since 1916, made an early commitment to the concept of parks as public playgrounds. The Park Service not only helped make the parks more accessible to automobile travelers but also enhanced the appeal of the various

parks by increasing the number of tourist accommodations and recreational facilities, distributing millions of maps and guidebooks, instituting conducted tours and lectures by ranger-naturalists, and calling attention to special features at trailside museums. While the Park Service has been criticized for gearing the parks to visitors' whims rather than to the complex needs of their own ecological systems, the service has helped to ensure permanent public support by making the parks easily accessible and understandable to the general public.

In an attempt to alleviate increasing congestion in the long-established national parks, additional scenic and natural areas have been incorporated into a massive national park system, encompassing national recreation areas, seashores, parkways, lakeshores and rivers. National and state forests, state and metropolitan parks, and federal reclamation projects multiply the opportunities for outdoor recreation.

Since World War I, renewed public concern has evolved for preserving undeveloped wilderness areas. In 1924, the Gila National Forest, New Mexico, became the first of a number of such areas to be preserved. During the 1930s, an upsurge of interest in wilderness areas led to the extension of roads and trails into such areas, and river and pack-train excursions became popular. During the 1970s, wilderness recreation experienced a boom of unprecedented proportions, leading to the fear that these areas might be "loved to death." This has resulted in the imposition of quota restrictions on the use of back-country areas.

Travel abroad resumed after World War I. The pull of Europe remained as strong as ever, especially for the many Americans with family ties to the Old World. Foreign travel was encouraged by more efficient modes of transportation both en route to and in the European countries, and by improved tourist facilities there. Travel via ocean liner reached a peak in 1929. Even after the Great Depression curtailed such trips, the number of Americans traveling abroad remained surprisingly high.

Airplanes brought foreign travel within the reach of many more Americans in the post-World War II period. The speed and affordability of flying, especially after the introduction of

jet passenger planes in the late 1950s, allowed large numbers of people to consider travel abroad even during brief vacations. By 1960, some 75 percent of American travelers in Europe had gone there by plane; within a decade only 3 percent of all travelers abroad had journeyed to their destinations by sea. Since the advent of jet planes for commercial travel, distant lands—including the Orient, Australia, the Middle East and the African continent—have become popular destinations, while Canada, as well as countries in Central and South America and in the Caribbean, have continued to appeal to tourists who wish to stay closer to home.

The opportunities for Americans to travel for pleasure have changed and grown tremendously over the past 200 years. Improved modes of transportation and the growing ability and desire of Americans to “get away” for a break have worked hand in hand to expand tourism. The initial discovery of many travel destinations was made by loners attempting to avoid crowds, but they often ended up

beating a path for the very people they were trying to avoid. As areas close to home became crowded, the wealthy and, increasingly, the general public, sought destinations farther away. As the numbers of tourists increased, a specialized and highly complex industry evolved to guide, serve and occasionally exploit them.

Since World War I, tourism has become a well-organized and lucrative feature of America’s and the world’s economy. The democratization of travel has come close to eliminating the possibility of an exclusive few claiming a specific vacation spot for themselves. The desire to get away shows no signs of abating as Americans travel toward the farthest reaches of the globe in search of relaxation, variety, adventure and, sometimes, even their own identities.

Excerpted (and updated) from *Leisure and Entertainment in America*, by Donna R. Braden (Dearborn, Michigan: *Henry Ford Museum & Greenfield Village*, 1988).

Bibliography

Transportation: Past, Present and Future – Part 3

Primary sources are indicated by bold print.

Print

Belasco, Warren James. *Americans on the Road: From Autocamp to Motel, 1910-1945*. Cambridge, Massachusetts: The MIT Press, 1979.

Bossemeyer, James L. "Travel: American Mobility." *Annals, American Academy of Political and Social Science* 313 (Sept. 1957): 113-116.

Buchholtz, C.W. "No Trail Too Steep: The Dream and Reality of Recreation in Our Western National Parks." *Journal of the West* 13, no. 3 (July 1978): 96-106.

Cook's Excursionist (June 1909).

De Santis, Hugh. "The Democratization of Travel: The Travel Agent in American History." *Journal of American Culture* 1 (178): 1-17.

Dulles, Foster Rhea. *Americans Abroad: Two Centuries of European Travel*. Ann Arbor: University of Michigan Press, 1964.

Dunn, Edward. *Double-Crossing America by Motor*. New York: Putnam, 1933.

Huth, Hans. *Nature and the American: Three Centuries of Changing Attitudes*. Berkeley: University of California Press, 1957.

Independent. June 1, 1911.

Jakle, John A. *The Tourist: Travel in 20th-Century North America*. Lincoln: University of Nebraska Press, 1985.

Miller, Norman P., and Duane M. Robinson. *The Leisure Age: Its Challenge to Recreation*. Belmont, California: Wadsworth Publishing Co., Inc., 1963.

Muir, John. *Our National Parks*. Boston & New York: Houghton Mifflin, 1901.

Nash, Roderick. *Wilderness and the American Mind*. Revised ed. New Haven,: Yale University Press, 1979.

"On the Old Merrick Turnpike," *New York Times* July 28, 1895.

Pomeroy, Earl. *In Search of the Golden West: The Tourist in Western America*. New York: Alfred A. Knopf, 1957.

Scribner's Monthly (August 1874).

Sharp, Dallas. *The Better Country*. Boston & New York: Houghton Mifflin, 1928.

Steinbeck, John. *Travels with Charley in Search of America*. New York: Viking, 1962.

Travel (Summer 1914).

Tobin, Gary Allan. "The Bicycle Boom of the 1890s: The Development of Private Transportation and the Birth of the Modern Tourist." *Journal of Popular Culture* 7, no. 4 (Spring 1974): 838-849.

Pennell, J. and E. R. "Twenty Years of Cycling." *Fortnightly Review* (August 1897).

Van de Water, Frederic F. *The Family Fliivvers to Frisco*. New York: D. Appleton, 1927.

Online

“American Antiquities Act of 1906.” U.S. *National Park Service*. U.S. National Park Service, 2011.

“Antiquities Act of 1906.” *History E-Library*. U.S. National Park Service, 2004.
www.nps.gov/history/history/hisnps/npshistory/antiq.htm

Trollope, Anthony. *North America*. New York: Harper and Brothers, 1862.
books.google.com/books?id=hZMLAAAAIAAJ&printsec=frontcover&dq=Anthony+Trollope+North+America&source=bl&ots=LR1kdTo9am&sig=_pm1u1VH5xrKxCGsMB19cKkD408&hl=en&ei=17OPTdSYDomnnAefptC6Dg&sa=X&oi=book_result&ct=result&resnum=1&ved=0CBcQ6AEwAA#v=onepage&q&f=false

Flint, Timothy. *Recollections of the Last Ten Years*. Boston: Cummings, Hilliard, and Company, 1826.
books.google.com/books?id=iiMVAAYAAJ&pg=PP8&lpq=PP8&dq=1826,+Timothy+Flint+,+Recollections+of+the+Last+Ten+Years&source=bl&ots=W5-BE92o-n&sig=4OE61GnVtK-FkQR16cbv5Jg859s&hl=en&ei=vbsPTZL-Ls2UnQe699XZDQ&sa=X&oi=book_result&ct=result&resnum=2&ved=0CCAQ6AEwAQ#v=onepage&q=1826%20Timothy%20Flint%20%2C%20Recollections%20of%20the%20Last%20Ten%20Years&f=false

Grund, Francis J. *The Americans, in their Moral, Social, and Political Relations*. Boston: Marsh, Capen and Lyon, 1837.
http://books.google.com/books?id=pSrEoQwVUD4C&printsec=frontcover&dq=Francis+J.+Grund,++The+Americans,+1837,&source=bl&ots=IRnCRZoeTG&sig=G4od4cJbMm9JsNJA88faZzBc8Tw&hl=en&ei=krwPTdesE6GLnAfc9d22Bg&sa=X&oi=book_result&ct=result&resnum=6&ved=0CDoQ6AEwBQ#v=onepage&q&f=false