

THE AUTOMOBILE

**A Chronology of Its Antecedents,
Development, and Impact**

CLAY MCSHANE

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For Kevin and Kelly, Susan and Sharon, Molly and Michael

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Contents

Tables	ix
Preface	xi
Acknowledgments	xiii
1. Prelude to 1885	1
2. From Benz to Ford: 1886–1907	19
3. The Model T Era: 1908–1926	39
4. Peace and War: 1927–1945	69
5. The Age of Muscle and Smog: 1946–1964	95
6. End of the Honeymoon: 1965–1980	123
7. Revival: 1981–1994	149
Appendix A: Tables	171
Appendix B: North American Car Museums	179
Index	197

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Tables

All tables appear in Appendix A, which starts on page 171.

- A.1 Ford and Cadillac Prices, 1900–1990
- A.2 Ford and Cadillac Horsepower, 1900–1990
- A.3 Ford, Toyota and Volkswagen Horsepower, 1960–1990
- A.4 Sales by Detroit's Big Three Automakers, 1910–1990
- A.5 Share of the U.S. Market, by Firm, 1915–1990
- A.6 European Car Production, by Country, 1920–1940
- A.7 European Car Production, by Country, 1945–1990
- A.8 World Oil Consumption, by Continent, 1950–1990
- A.9 U.S. Gasoline Prices, 1925–1988
- A.10 U.S. Petroleum Production and Consumption, 1960–1990
- A.11 World Auto Registration, 1950–1990
- A.12 Persons per Car, United States, 1925–1990
- A.13 Persons per Car, Selected European Countries, 1930–1960
- A.14 Persons per Car, Selected European Countries and the United States, 1965–1990

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Preface

This chronology seeks to list the major events in the history of the automobile. I have sought to be comprehensive. The automobile cannot be understood without knowing something about its pre-history, including such technologies as railroads, carriages, wagons, bicycles and trolley cars. I have included materials on these to the extent that they represented preludes to the modern car culture. This work also includes the materials usually found in automotive histories about the technology, design and production of cars and the companies that make them. The car also demanded a revolution in ancillary fields such as oil production and refining, machine tools and road building. I have covered those topics as well.

The modern automobile is more than just a machine: It created a social revolution. At the simplest level this is geographic—the shape of our metropolitan areas has changed dramatically to incorporate the car. Suburbanization, the evolution of the roadside strip, the emergence of cities without centers and much population migration in the twentieth century are products of the motor car. The car is also a powerful cultural symbol denoting wealth, status and the expression of other social labels. Much of our lives is car-centered. Most Americans sit through two traffic jams daily. At those times the car also acquires an entertainment function. The car is still a major locus for courtship and for family activities. A motor vehicle carries us to our graves.

Finally, the car has generated considerable political activity. Road building has been the most expensive activity pursued by most American states in this century. The car has called forth regulation in other ways, because it

has created major new health hazards in the form of accidents and illnesses related to air pollution. The revolutionary land use that accompanied the automobile has required entirely new sorts of land use regulation.

While this work focuses primarily on the United States, it also pays attention to developments elsewhere. The modern auto was a European invention, but technical dominance passed to the United States around 1900. In recent times innovation has occurred more in Europe or East Asia, rather than on this continent. As auto ownership increases in Latin America, Asia, and Africa, it seems to recapitulate the patterns of Europe and North America. Historically, the sources of energy and their management were largely a North American preoccupation. Obviously, this too has changed in recent years.

I have also included in Appendix B a listing of all the automobile museums in the United States, since the best way to understand much of the history of cars is through artifacts.

As with all compilations of this sort, errors and omissions are inevitable, although I hope minimal. Readers who spot any should contact me at the History Department of Northeastern University, Boston, MA 02115, USA, so that they may be corrected in any future editions.

Acknowledgments

This compilation had its origins in course handouts for the class that Gerald Herman and I teach, the History of the Automobile, at Northeastern University. Professor Herman collaborated in its conception and has contributed many items, corrections and bibliographical hints. The work has also benefited from suggestions and faultfinding from students in that course. These include Russell Powers, Martin Sumbung, Katherine Sivak and Brian Cullinane. I would like to acknowledge the assistance of my graduate assistants David Tannenbaum, Mark Szmigel, Margaret Gourley, and Patrick Preston. Brett Abrams did an extraordinary job of tracking down the governmental and industrial sources on which the statistical tables are based. Gary Degan and Jeanne Elizabeth McShane read the manuscript in its entirety and provided many astute comments. Everette Brewer at Northeastern, independent scholar Jane Holtz Kay, and Smithsonian auto maven Roger White all made valuable suggestions.

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Dennis McNew of the Library of Congress helped with some snags in using the library's American Memory Collection. Anybody concerned with

the American past should be familiar with this wonderful collection of over 75,000 downloadable images available at <http://lcweb2.loc.gov/ammem/amhome.html>, the library's home page. Russell Koonts helped guide me through the superb J. Walter Thompson Archives at the Duke University Library. Ford Motor Company graciously and promptly consented to the use of advertisements from the Thompson collection. Ford deserves special praise for its openness to historical researchers. General Motors and Chrysler were not helpful at all.

1

Prelude to 1885

c. 8000 B.C.E.

Domestication of animals.

c. 5000 B.C.E.

Sumerians invent the wheel.

c. 2400 B.C.E.

Egyptians build a paved road for sleds from a quarry to the Nile near modern Cairo.

c. 2200 B.C.E.

First suburbs reported, under the wall of Ur in Mesopotamia.

c. 2000 B.C.E.

Babylonians pave their streets and a highway to Memphis, Egypt.

c. 1700 B.C.E.

First chariots.

c. 1000 B.C.E.

In Book 18 of the *Iliad* Homer describes a wheeled, self-propelled tripod built by Hephaestus, blacksmith of the gods.

612 B.C.E.

Biblical book of Nahum celebrates the fall of Nineveh: "The Chariots rage in the streets, they rush to and fro through the broad ways; they gleam like torches, they dart like lightning."

450 B.C.E.

Greek architect Hippodamus lays out the city of Piraeus with a gridiron.

312 B.C.E.

Appius Claudius builds the first paved Roman road, the Appian Way.

170 B.C.E.

Rome paves its streets to ease both travel and drainage.

c. 100 B.C.E.

Following the invention of the camel saddle, the Middle East largely abandons wheeled vehicles for camels.

45 B.C.E.

Julius Caesar bans carts and chariots from Rome during daylight hours to relieve traffic jams.

50

Hero of Alexandria speculates about a steam-powered vehicle.

100

Chinese invent the wheelbarrow.

846

Arab geographer Ibn Khurdadbih publishes the first book of road maps.

c. 900

Western Europe makes great improvements in horse power with the development of horse shoes, the collar harness and the stirrup.

950

Caliph of Cordova, Spain, orders the streets paved and lighted.

1135

King Henry I orders that all British roads should be two chariots wide.

1184

Paris begins to pave its streets.

1209

London Bridge built—360 meters.

1272

Roger Bacon forecasts self-propelled carriages.

1274

British Parliament authorizes the first toll road.

1300

The Strand becomes London's first paved street.

1395

Paris prohibits residents from dumping chamber pots on the street.

1478

Leonardo da Vinci fantasizes about a spring-driven horseless carriage.

1493

Columbus lands Andalusian horses, the first in the Americas.

1525

Public coach services introduced in Milan.

1532

Spanish conquistadors find a 2,400-kilometer paved, tree-lined Inca highway, far longer than any paved way in Europe.

1540

Paris requires horses to walk, not gallop, and bans U-turns.

1553

Queen Mary rides in an imported coach during her coronation.

1555

First enclosed private coaches in London, named after the Hungarian town of Kocsi, where the leather-sprung vehicles originated.

1610

First English stagecoach.

During the “starving time,” Jamestown residents consume their horses.

1625

First hackney coaches for hire in London, forerunners of the taxicab.

1636

Massachusetts Bay requires its townships to appoint road surveyors.

1645

France issues a patent to Jean Thesson for a four-wheel cycle, which the rider propels by pushing his feet along the ground.

1650

Boston begins to pave streets.

Charles II tries to ban hackneys from London because they are slowing down the carriages of the nobility.

1652

New York City bans galloping.

1656

New York City paves Stone Street.

1661

Spain’s Infanta Maria has glass windows placed in her coach, a sign of smoother roads and better suspension.

Philip di Chiesa puts iron springs on a carriage.

1662

Philosopher Blaise Pascal opens a bus service in Paris. Government regulation limits ridership to the bourgeoisie.

1667

In his epic, *Paradise Lost*, John Milton writes about a highway to hell paved “with asphaltic slime.”

1673

Post riders take two weeks in the first Boston–New York mail service.

1675

First road link between New York and Philadelphia.

1678

Jean d’Hautefeuille adopts a cylinder and piston to pump water.

1680

Sir Isaac Newton predicts steam-powered vehicles.

1688

Denis Papin builds a primitive steam engine in Kassel, Germany.

1690

Iron rim brakes developed.

1699

Visitor to Boston: “Its streets, like the hearts of the male inhabitants, are paved with pebbles.”

1706

Thomas Newcomen develops a steam engine to pump water from mines.

1710

Antoine de la Mothé Cadillac founds Detroit.

1719

Philadelphia paves its sidewalks.

1722

Traffic required to keep to the left on London Bridge, the beginning of the English drive on the left policy.

1736

Saxony requires traffic to keep to the right.

1747

École des Ponts et Chaussées, Paris, first highway engineering program, opens.

1750

Horace Walpole complains that London merchants, in imitation of the nobility, are buying country villas in the London environs to be within daily traveling distance of work.

1755

English General Braddock begins first road across the Appalachians from Maryland to Pittsburgh. George Washington surveys the 3.5-meter-wide highway.

1756

First stagecoach service between New York and Philadelphia takes three days.

Ben Franklin produces 150 Conestoga wagons for the British army.

British Parliament requires all traffic to keep to the left.

1761

Philadelphia raises money through a lottery to pave its streets.

1766

John Gwynn, in *London and Westminster Improved*, an important city-planning text, argues for new residential squares in London to allow wealthy merchants to separate home and work.

1768

Boston, the largest city in the colonies, has 22 wheeled vehicles.

Steel springs improve coach efficiency, helping to reduce the London-Manchester trip from 62 to 27 hours.

1769

Nicholas Cugnot builds a steam-powered gun carriage, which he runs into a wall.

Alessandro Volta proves that an electric spark can ignite gases.

C. Varlo places roller bearings on a carriage.

1776

France ends the *corvée*, forced labor on roads in place of taxes.

1782

James Watt introduces the crank to harness rotary power in England.

1785

Thomas Jefferson writes John Jay about the new French idea of interchangeable parts.

1787

Oliver Evans, an American millwright, builds a continual process, automated flour mill, ancestor of assembly lines.

1789

Daily coach service (6–9 day trip) between Boston and New York.

1791

New York City creates its first one way street. Drivers ignore the regulation.

Pierre L'Enfant introduces the word “avenue” into English in his plan for Washington, D.C.

1792

First U.S. toll roads open in Pennsylvania and Connecticut. The Lancaster-York one requires driving on the right.

French revolutionary parliament requires driving on the right. Napoleon's army will spread the rule elsewhere in Europe. These rules probably only followed existing practice.

1797

In his extremely influential *A Practical View of the Prevailing Religious System of Professed Christians, in the Higher and Middle Classes of This Country, Compared with Real Christianity*, London merchant William Wilberforce argues for separating women from urban life and restricting them to the home. Wilberforce has resigned from his clubs and denounced urban life as immoral and destructive of the family.

1799

Eli Whitney develops the idea of interchangeable parts for muskets.

1800

Wilberforce and 72 other commuters move their families to the London suburb at Clapham Common. Almost all the families are evangelicals.

1801

First steam coach built by Richard Trevithick in England.

1802

U.S. Army Corps of Engineers, which will build roads all over the West, is created.

1803

First coal gas factory illumination (Britain).

1804

New York State requires driving on the right.

English inventor Obadiah Elliot introduces elliptical springs for carriages, the key invention in advancing carriage technology.

1805

George Stephenson constructs the first successful steam locomotive.

Oliver Evans builds the first U.S. self-propelled vehicle, an amphibious steam dredge called the *Orukter Amphibolos*.

Two-wheeled cabriolets, ancestors of modern cabs, imported from Paris to London.

1807

Britain issues a patent for a gas-driven road vehicle.

New Yorker Robert Fulton invents the first practical means of long distance mechanical travel, the steamship.

U.S. government begins construction of the trans-Appalachian National Road.

1808

U.S. Secretary of the Treasury Gallatin calls for national government construction of “artificial” (gravel) roads.

1813

Concord (New Hampshire) coach sets pattern for U.S. stagecoaches.

1814

London requires hackney cabs to carry a number.

1815

First macadam (named after its Scottish engineer, John Macadam) broken stone road—beginning of modern pavement design.

1816

Baron Karl von Drais of Karlsruhe starts a fad with his two-wheeled, walking “hobby horse” or *Draisenne*.

1817

New York Stock Exchange formed, meets in Wall Street under a buttonwood tree. Streets are still often more meeting places than arteries.

1818

London builds the traffic-free Burlington Arcade.

1819

Beginning of English experimentation with mechanical devices needed for road steamers. Rudolph Ackerman invents knuckled steering gear in England, a premature idea. Louis Gompertz devises a primitive rack and pinion steering mechanism. Others devise primitive propeller shafts, universal joints and differential joints. All will be reinvented 70 years later.

1822

President Monroe vetoes a bill calling for tolls on the National Road.

1823

Perhaps the first traffic jam in the United States occurs when too many carriages take the same road in New York City to get to the horse race between Eclipse and Sir Henry on which over \$100,000 had been wagered. There is one major chain reaction accident.

Early planned suburban subdivision, Park Village, at Regent’s Park, London.

1824

Sadi Carnot, a French engineer, writes *Reflections on the Motive Force of Fire*, a pioneering work in engineering thermodynamics that leads to experiments in internal combustion.

George Kale suggests that steam-driven vehicles will create their own roadways by compressing soil under them.

English inventor Joseph Aspdin develops portland cement, later a vital component of roads.

1827

First American railroads chartered in South Carolina and Maryland.

1830

With the Maysville Road veto, President Andrew Jackson establishes the constitutional doctrine that road-building is a state, not a national, function.

Edwin Budding secures a British patent on the lawn mower, an indispensable adjunct to the new suburban lifestyle.

1831

William Hancock operates a steam omnibus route in London for several months. Eight years later, he will build a lightweight steam phaeton.

1833

First balloon frame building (i.e., using 2" x 4" structural members) built in Chicago—key to cheap suburban housing.

Alexander Jackson Downing publishes *Rural Residences*, establishing the idea of suburban homes with large yards for the American middle class.

1834

American inventor Thomas Davenport builds an experimental electric car.

First inexpensive two-wheeled hansom cab in London.

1835

England ends the *corvée*.

Duke of Wellington opposes railroads because "they only encourage common people to move around needlessly."

Mary Griffith's urban utopian novel, *Three Hundred Years Hence*, predicts "curious vehicles that moved by some internal machinery."

1837

English developer builds Victoria Park, Manchester, prototype of the planned suburban community.

1839

New York City bans steam vehicles from downtown streets. The city worries about traffic accidents, boiler explosions and coal fumes.

Scottish inventor Kirkpatrick MacMullin builds a direct pedal two-wheel bike with a steerable 30-inch front wheel and a pedaled 40-inch rear wheel.

Baedeker publishes the first European travel guides.

1840

Francis Hill covers 100 miles (169 km) in his English steam coach.

1841

Thomas Cook starts the first travel agency.

1842

An English judge rules in *Winterbottom v. Wright*, a case widely cited in the United States, that coach riders injured in an accident could only sue the coach operator, not its maker.

1844

Friedrich Engels notes that the classes are becoming increasingly segregated in Manchester as the bourgeoisie moves to the suburbs.

Charles Goodyear patents the rubber vulcanization process.

Karl Benz born at Karlsruhe.

1846

Robert Thompson patents the pneumatic tire in Britain, another premature invention.

1849

British scientist James P. Joule formulates the first law of thermodynamics.

1850

Paris begins to lay asphalt pavements. Military engineers urge its adoption, because mobs cannot build barricades with the smooth material.

1852

Richard Dudgeon drives his experimental steam wagon from his Long Island home to his New York office.

1853

Indiana passes the first Dram Shop Act, making tavern keepers responsible for accidents caused by drunken customers.

1854

King Frederick Augustus II of Saxony killed in a coaching accident.

1855

Baron Haussmann completes the Rue di Rivoli, the first of his boulevards that will remake Paris and become a model for similar streets throughout the world. The Parisian bourgeoisie, in part because of government subsidies, choose to live in apartments on these boulevards, rather than Anglo-American style suburbs.

First self-propelled, steam fire engine in United States patented by A. B. Latta.

Yale professor Benjamin Silliman demonstrates that kerosene distilled from petroleum can serve as an illuminant.

1856

Alexander Jackson Davis designs Llewellyn Park, New Jersey, the first suburban subdivision in the United States. Planned in the romantic style with curving, non-gridiron streets.

Isaac Singer begins modern consumer durable industries by selling home sewing machines on an installment plan, first use of that sales device.

Henry Bessemer discovers a process for making inexpensive steel in England.

1857

Frederick Law Olmsted designs New York City's Central Park with the first limited access, grade-separated parkways. Elite carriage owners use the drives to display their status.

British railroads originate automatic signals, with red meaning stop and green meaning go. The colors are borrowed from ships, which are supposed to pass each other on the side with green lanterns. They, in turn had adopted it from a British lighthouse with a red warning light.

1858

Vienna builds its pioneer urban boulevard, the Ringstrasse.

Mechanical stone crushers and steam rollers lessen cost of macadam road construction.

1859

By this date the British physicist Lord Kelvin and German physicist Rudolph Clausius have established the second law of thermodynamics, which Clausius calls “entropy.”

Gaston Plante devises the storage battery. Improvements in 1880 allow sufficient storage for vehicles.

Hausmann’s Parisian boulevards impress visiting American park planner Frederick Law Olmsted.

E. L. Drake brings in the world’s first oil well, in Titusville, Pennsylvania.

1860

Alexander Holley and J. K. Fisher publish “History of Steam on Common Roads in U.S.,” which advocates the use of steam autos.

New York City bans speeding by horse-drawn omnibuses.

Traffic count in London shows 57,765 vehicles enter the city daily.

U.S. kerosene exported to St. Petersburg, Russia.

1861

James Hobrecht plans Berlin’s boulevards.

First oil gusher in Pennsylvania explodes, killing 19.

First U.S. kerosene exports sent to London.

1863

Jean-Joseph Etienne Lenoir, a Belgian living in Paris, builds a self-propelled internal combustion (i.c.) vehicle and drives it on a nine-kilometer round trip.