

Automotive Developments 1600-1929

No matter how well automobiles run, people complained about this or that and wanted continual improvements made. Pioneer drivers fretted about pesky details such as the buttoning down of side-curtains in a sudden storm; the stoking of a Clark charcoal auto heater; the frustration of a broken drive-chain wrapped around a rear axle and the feeble flicker of the carbide lamp on the dark country roads. Something had to be done to stop all the complaining!

1600 - The Dutch employed wind power to propel sail-mounted carriages which raced along at 20 mph and held scores of passengers. It is quite probable that both speed and load capacity were exaggerated. Later, small carriages were equipped with wind-mills, the mill vanes geared to the wheels. These were probably the first land vehicles to be propelled by anything other than animal or human muscle power, but people complained because the vehicles depended on the whim of a breeze.

1680 - Sir Isaac Newton conceived of a vehicle propelled by a "rearwardly directed jet of steam." This idea didn't evolve for use in the automobile, but it was later used in rocket thrust.

1698 - Thomas Savery invented the first steam engine in Britain. It was crude, inefficient, and even dangerous, since it blew up quite often.

1711 - Thomas Newcomen, an English blacksmith, improved upon Savery's engine.

1769 - James Watt, a Scottish instrument maker, patented a steam engine that became widely used in British mines, mills, and factories.

Nicholas Joseph Cugnot, an officer financed by the French government, built a steam-propelled, 3-wheeled artillery wagon, which raced along at 3 mph. In a demonstration, it went out of control and ran into a wall. Most automotive historians trace the beginning of the true automobile back to Cugnot's cannon.

1801 - Richard Trevithick, an engineer in Cornwall, built an experimental road steamer. Two years later, he improved on his invention, which was demonstrated in London and proved itself to have sustained, reliable performance at its maximum speed of 12 mph.

1804 - American road steamers were built by Apollo Kinsley in Connecticut, Nathan Read in Massachusetts, and Oliver Evans in Pennsylvania. Evans' vehicle was 30 feet long and weighed 15 tons. Evans had applied for a patent on a "Steam Land Carriage" in 1792. He was commissioned in 1805 by the city's board of health to build a versatile steam-driven dredge. He added the

idea that the machine also travel on land under its own power. A series of belts and gears transmitted the power of the boat's engine to the wagon wheels. On its first run, it clanked slowly along on huge iron wheels, frightening onlookers on its way to the Schuylkill River where its energy was diverted from the land wheels to a paddlewheel in the stern.

1830s- Britain was providing a network of passenger and freight services which were steam-powered in a handful of cities.

1831 - Michael Faraday discovered the principles of the induction coil.

1839 - The first electrically-powered road vehicle is believed to have been built in Scotland by Robert Anderson, but it and others built in Britain in the next several years were mostly unsuccessful. Around 1880, longer-lasting batteries were developed, but these were cumbersome and bulky and needed frequent recharging. Electric cabs, however, appeared on the streets of London in the late 1800s.

1845 - A Scot called Thomson patented a type of pneumatic tire, but John Boyd Dunlop is usually given credit for their development.

1850 - A method of obtaining liquid hydrocarbons from coal and shale was patented by James Young, a Scotsman. This "coal oil" took the pressure off the dwindling numbers of whales which until that time had been a prime source of oil for lamps.

1859 - On August 27, an ex-railroad conductor, Edwin L. Drake, made a revolutionary discovery with a 69-foot well at Titusville, Pennsylvania. "Rock oil" had previously been collected from ground seepage pools and used for medicinal and other limited purposes. With Drake's discovery on Oil Creek leading the way, great volumes of petroleum became available in the United States. It provided kerosene for millions of lamps, paraffin for candles and candy, hoof and harness oils, lubricants for ships and mills, a "miracle" salve called Vaseline, and many by-products to make varnishes, lacquer, oilcloth and patent leather. One of the waste products of the distilling process was an explosive, inflammable substance called "gasolene."

1860 - Etienne Lenoir built and patented the first commercially satisfactory gas engine. Two years later, he constructed a crude vehicle on which to test his engine. Although it was crude, it worked, but ran so slowly (about 1 mph), he became discouraged and stopped his efforts. Lenoir's engine used an electric spark plug system.

1864 - In Vienna, Austria, Siegfried Marcus built a one-cylinder engine that used a primitive carburetor and a magneto arrangement to create small explosions that applied alternating pressures against the piston within the cylinder.

- 1872 - George Brayton of Boston patented a gasoline engine.
- 1874 - H. J. Lawson invented the first so-called safety bicycle, a chain-driven device with two medium-sized wheels of equal diameter.
- 1875 - Siegfried Marcus built his second gasoline-powered vehicle, which is preserved in the Technical Museum in Vienna; Marcus mysteriously washed his hands of the whole idea, deciding it to be a waste of time.
- 1876 - In Deutz, Germany, Eugene Langen and Nikolaus August Otto improved upon Marcus' engine and introduced the first workable 4-stroke internal combustion gas engine after many years of experimental work. Gottlieb Daimler, an employee of Langen and Otto, was involved in the engine's design.
- 1879 - George B. Selden, an attorney in Rochester, New York (who, at the time, had never built a motor vehicle), applied for and finally received U.S. patent No. 549,160 (1885)). As a result, claims against automobile manufacturers clouded the industrial scene for years.
- 1883 - In Bad Cannstatt, Germany, Wilhelm Daimler succeeded in producing a more efficient, 4-stroke, gasoline-fueled engine which was granted a patent. (Earlier "gas" engines had been fueled by hydrogen or turpentine vapors or by coal gas.) Daimler's first engine was mounted on a sturdy bicycle and operated well on a test run in 1885. This is the prototype of the modern motorcycle.
- 1885 - Carl Benz successfully tested his first gasoline engine motor vehicle at Mannheim, Germany; a 1-hp, 1-cylinder engine; a refinement of the 4-stroke engine which was designed by Otto. This 3-wheeler had all the essential elements characteristic of the modern automobile: electrical ignition, differential, mechanical valves, carburetor, a water cooling system, oil and grease cups for lubrication, and a braking system. He received a patent for his "carriage with gas engine" in 1886. It had a tubular steel chassis and an open wooden two-seater body. The single front wheel steered by means of a tiller, and the two large rear wheels were driven by chains. The single-cylinder engine was mounted horizontally over the rear axle. At 250 to 300 rpm, it produced about 1/2 horsepower and drove the car at about 8 to 10 mph (13-16 kph).
- 1887 - Building on his experience with the motorcycle, Daimler built and installed his vertical single-cylinder engine into a 4-wheeled, converted carriage with encouraging results. It had an increased horsepower of 900 rpm (as compared to Benz's 300 rpm) and was the first high-speed internal combustion engine, developing one and one-half horsepower.

1888 - John Boyd Dunlop introduced pneumatic bicycle tires for the safety bicycles.

1892 - The Harris motor wagon, built in Baltimore, operated successfully before Duryea brothers' cars. It was a sightseeing bus rather than a conventional auto and ran on hard rubber tires. Maybach introduced the first float-type carburetor at this time.

1893 - Charles E. and J. Frank Duryea introduced what has been recognized as America's first successful internal combustion horseless carriage at Springfield, Massachusetts. This vehicle, called a "buggyaut" by its producers, was a well-worn, high-wheeled carriage with a small, one-cylinder gasoline engine mounted on its back.

1894 - Vacheron introduced the steering wheel.
The Michelin brothers produced a pneumatic tire for cars.
Edgar and Elmer Apperson celebrated the 4th of July in Kokomo, Indiana, by unveiling a car they had built, based on plans conceived by Elwood G. Haynes.

Automotive Developments 1895-1907

1895 - The Duryea brothers established the Duryea Motor Wagon Company which was the first firm in America organized to make gas cars commercially.
Charles R. Black had a Benz-type auto in Indianapolis and John Lambert had operated a gas-mobile in Ohio. Ransom E. Olds had also constructed a workable gas-burning automobile.
Lancaster introduced a propeller shaft transmission.
Mors and Daimler built a multi-cylinder (V4) engine (four in line).

1896 - Henry J. Ford built an internal combustion engine from plans he read in a magazine. He mounted it to a bicycle-wheeled, tiller-steered two-seater, which had neither brakes nor reverse gear and was so noisy it was condemned as a public nuisance. Alexander Winton, a bicycle builder in Cleveland, Ohio, produced his first experimental car. Years later, he formed the Winton Motor Carriage Company, and started to sell two-seaters (one seat faced frontwards and the other faced the back). In England, the "Red Flag Act" was repealed. This was celebrated by the first Emancipation Run from London to Brighton, about 60 miles (96 km), which is still held annually as a reliability trial for Veteran cars. (Veteran cars are those built before 1918; "Vintage" cars were built between 1918 and 1930.)

1897 - Thomas B. Jeffery built his first experimental Rambler in a machine shop of his Chicago bicycle factory.

1898 - Ford built a second motorcar which was a vast improvement over his first. He persuaded a few people to back him in producing it commercially, but the enterprise failed after only one year.

Pioneer designers experimented with seating arrangements as they did with all other details on the first cars. One of the most impractical was a two-seater in which lady passengers sat in the front seat to serve as windbreakers (and presumably bugcatchers as well), while the gentlemen steered from the rear. The ladies didn't help the driver's vision much either.

1899 - Camille Jenatton, of France, drove a Jeantaud electric a record of sixty miles an hour on April 29. The high speeds, however, burned out both the specially fabricated batteries and French interest in electric cars.

The Studebaker name had been applied to vehicles as early as 1852 when the products were wagons, buggies, and carriages. In 1899, the firm entered the auto industry as a body-maker. Three years later, it produced its first car, an electric runabout.

The first Baker Electric was manufactured by the Baker Motor Vehicle Company of Cleveland, Ohio.

The Akron Police Department acquired a brand-new motorized wagon to speed up the business of hauling lawbreakers off to jail.

B. F. Goodrich pioneered pneumatic tires for automobiles.

Freelan O. Stanley demonstrated the power of the Stanley Steamer by driving one up Mt. Washington in New Hampshire. The following year, John Brisben Walker drove another to the top of Pikes Peak.

The U.S. Post Office Department bought its first motor vehicle on an experimental basis. In Milwaukee, the Johnson Service Company built 8 custom steamers to fulfill postal contracts there.

Other innovations in 1899 were the honeycomb radiator, gate gearchange, and floor-mounted accelerator (Daimler); and the universal joint for shaft drive to sprung rear axles (Renault).

1901 - Ransom E. Olds became the first mass-producer of gasoline automobiles with the completion of 425 curved-dash Oldsmobiles in a single year. Olds instituted a system of contracting with several machine shops to make required parts for him to his design specifications - transmissions from one shop, steering gear from another shop, carburetors from another, etc. The first changes from tillers to steering wheels were made at about the turn of the century.

By the early 1900s, induction coils were being used to produce electrical discharges in low pressure gases, leading to the

discovery of x-rays and cathode rays.

1902 - The American Automobile Association was organized in Chicago on March 4, symbolizing the broad interest in the new mode of transportation.

The one-cylinder, 3-hp, tiller-steered model Olds with bicycle type wheels and a curved dashboard sold 2,500 automobiles by introducing quantity production to the industry.

Thomas B. Jeffery and his son, Charles T., began manufacturing one-cylinder Ramblers for public sale in Kenosha, Wisconsin.

The first horseless carriage in Minnesota was an electric six-seater (three rows of seats) with high wheels and friction brakes applied to the surface of the rear tires. It had an unusual bare bulb headlight.

David Dunbar Buick, a successful manufacturer of enamel bathtubs and other plumbing fixtures, ventured into the automobile business. He produced his first car with the help of Walter L. Marr, but his company was not successful until William Durant bought it and reorganized it.

1903 - The Ford Motor Company was established in Detroit with the Model A, a small, light-weight, powered by a 2-cylinder, 8-hp engine which sold for \$850.

The invention of demountable rims helped the tire situation somewhat. It was no longer necessary to change tires at the scene of a flat tire; mounted spares made it possible to make a reasonably fast switch-over, but road conditions made it common practice for a driver to limp home on flats or a bare rim even after using a couple of spare tires.

Two Frenchmen, Georges Bouton and Count Albert de Dion, led to the development of lightweight, high speed engines. Their 1903 "Polulaire" produced 8 hp at 1500 rpm, with a cubic capacity of 846 cm³ (52 in³) and a weight of only 40 lb (18 kg). To handle the requirements of this high speed air cooled engine, Bouton designed an ignition system that bore many similarities to the modern contact breaker ignition.

The Mercedes Company (formerly Daimler) made a braking system with internally-expanding shoes inside a brake drum.

1904 - Ford added the Model B, a 4-cylinder, selling for \$2,000. Carl Graham Fisher and James A. Allison organized the Prest-O-Lite Company and introduced a new system of acetylene gas head-lights.

1905 - Electric cars and trucks were efficient for in-city driving, but drivers had to be alert to get back to garages before the batteries ran down.

1906 - The Stanley Steamer, nicknamed the "Flying Teapot," clocked a

remarkable 127.6 miles per hour in Ormand Beach, Florida. Ford added the Model K, which made that year and that car model important milestones in automotive history. Ford's Model K had a 40-horsepower engine and could push its 2,000-pound weight up to 60 mph. It was a dismal failure to the company at \$2,800 per car, but turned out to be the making of the Ford Company. In this year, cars began to abandon their carriage look and to assume a motor-age appearance.

The "Coyote," produced in California, introduced a power plant very different from those of the past: a V-8 engine. A very frail front bumper was the beginning of many important safety devices.

The first driver's license was issued in Denver, Colorado, for a cost of \$1.00. Other cities required engineers' permits to operate steamers which were classed as mobile boilers. The Waltham (Mass.) Manufacturing Company introduced the Orient buckboard for postal delivery. It had a mail case with pigeon-hole compartments directly in front of the driver.

1907 - In Seattle, Washington, John McLean, a representative of the Standard Oil Company of California, opened what is claimed to be the first service station in America. It consisted of an old hot-water tank and a hose under a rough wooden canopy. The gas was delivered into the tank by gravity.

The Automobile Gasoline Company and the Oriental Oil Company opened stations in St. Louis, Missouri, and Dallas, Texas. The former is credited with the first chain of automobile service stations.

Within five years, Memphis, Tennessee, could boast a thirteen-pump outlet, complete with a ladies' restroom and a maid who served ice water to the customers. The pumps, however, were in the backyard, not on the street, and the super-service was ahead of its time.

1908 - The Ford Model T was unveiled for the first time. It was powered by a 4-cylinder, 20 hp engine, had two forward speeds and a reverse controlled by pedals. It was also equipped with a throttle mounted on the steering column, and got about thirty miles to a gallon of gasoline. If the purchaser requested it, he could have extra-cost options of headlights, speedometer, and a spare tire. Buyers could choose their cars in red, green, or baby blue. Later, it could be purchased in any color the buyer desired, "as-long-as-it's-black."

The automobiles of this year had air-cooled motors, since there were no water-filled radiators to freeze in the winter time; the passengers were usually air-cooled as well because there were usually no roofs over them.

C. Harold Wills developed the use of vanadium steel for Ford. Charles Y. Knight was perfecting his sleeve-valve engine. The Fisher brothers founded a company which gained rapid fame as a producer of closed auto bodies. The Fisher Body Company was established by brothers Fred and Charles (there were five other brothers).

Charles Frank Kettering of the Dayton Engineering Laboratories Company helped bring about innovations in the electric starter and ethyl gasoline.

Harvey S. Firestone, B. F. Goodrich, Arthur W. Grant, and many others struggled to overcome tire deficiencies.

The first brakes were based on those used on the horse-drawn vehicles and on bicycles. A solid block of wood, leather or metal was forced against the wheel rims by a hand-operated lever, or a contracting band of friction material acted upon the propeller shaft in conjunction with externally-contracting brakes fitted to drums on the rear wheels. In 1908, Herbert Frood patented the asbestos brake linings in England. These were much more effective than the cotton based linings then in use.

The coil and distributor ignition was introduced, comprised of a battery, contact breaker, induction coil and spark plugs.

Automotive Developments 1908-1929

1909 - William A. Besserdich and his brother-in-law, Otto Zachow, were young blacksmiths in Clintonville, Wisconsin, when they built America's first successful four-wheel-drive motor car. Their "Badger Four Wheel Drive Auto Company" was formed on January 9th; later the "Badger" and "Auto" dropped from the title. The firm finally switched from cars to trucks.

Dayton Engineering Laboratories Company (Delco) was founded. Charles F. Kettering, a genius of the automotive industry, was one of Delco's founders.

1910 - The Fisher Body Company received an order from Cadillac for first quality production of closed bodies - 150 units. Curb-side pumps began to appear about this time, though they were forbidden by law in some communities. Custom-made ambulances made an appearance in the first decade of 1900 and played a major role in World War I.

1911 - By this time, the automobile industry had, for the first time, securities listed on the New York Stock Exchange. The Buick Motor Company, the Olds Motor Works, the Cadillac Automobile Company and the Oakland Motor Car Company had already achieved

success and had been combined with other firms by William Crapo Durant into the General Motors Company. Durant, having lost control of the company, moved into building and selling a new auto, designed by and named for Louis Chevrolet, a French race driver. Another manufacturer-promoter, Benjamin Briscoe, had brought some 130 different companies together to form the United States Motor Car Corporation. This ambitious combination ran into financial difficulties and was doomed to receivership in 1912.

The first production four-wheel-drive automobile, built by FWD Corporation, rolled out of Clintonville, Wisc. It was first used as a demonstrator, and when the firm shifted entirely to truck manufacturing, it was used for nearly 35 years to haul mail to and from the post office.

First four-wheel braking was employed by the Italian company of Isotta-Franchini.

Other innovations were an improved electric starter, the dynamo, and a car telephone.

1912 - Edward G. Budd, a young Philadelphia engineer, is credited with the concept of the all-steel auto body. In 1912, he convinced the Oakland and Hupmobile people to try his all-steel body frames, and the next year received his first large contract from John and Horace Dodge.

Charles F. Kettering introduced his greatest contribution to the automotive industry, the electric self-starter.

Henry M. Leland introduced the self-starter in his 1912 Cadillac.

1913 - Dr. William M. Burton improved production of anti-knock additives for gasolines, but not the firing of the larger kerosene molecules mixed in with gasoline.
Henry Ford's first moving assembly line revolutionized auto production.

The Gulf Oil Company was the first U.S. petroleum firm to distribute free road maps.

1914 - Horace and John Dodge were wealthy manufacturers of components for Olds Motor Works, then for Ford Motor Company, before they introduced their own automobile. The first Dodge was delivered to them on November 14, 1914.

Cleveland, Ohio, installed the nation's first traffic lights.
At about this time, the International Harvester Auto-Wagon, a high-wheeled, hard-tired pioneer version of the pickup truck, appeared.

Most pioneer motorists stored their cars in the winter months, due to clogged roads and operating difficulties. Anti-freeze, winter oils, efficient heaters and other cold weather needs were still to come.

1915 - Ernest Holmes Company of Chattanooga, Tennessee, was one of the pioneers in the field of auto rescue, although the mechanism of the wrecker was pretty complicated.

1916 - Studebaker instituted the "pay-as-you-ride" slogan and sold automobiles on time payments.

1917 - From 1910 to 1917, company crews from B. F. Goodrich erected thousands of signs on some 110,000 miles of U.S. roads. These were guide posts - round metal signs on twelve-foot poles, each of which gave the name of the nearest town, the next large city and the ultimate destination of the route.

1918 - A German named Lankensperger took out a British patent on a system of steering in which the steering wheels are separately pivoted at the ends of the shaft.

1919 - The U.S. Army started its first transcontinental truck convoy. Second in command of the caravan was a Lieutenant Colonel, Dwight D. Eisenhower.

1920 - Jonathan Dixon Maxwell's popular automobile succumbed in the mid-20s. It had spring-suspension wheels (unusual for the times).

Hydraulic braking was introduced.

By this time, mass production methods were well-established, and this led to the availability of a wide range of cheap, reliable and comfortable cars which found a ready market in the affluent '20s.

1921 - The U.S. Bureau of Public Roads was created right after WWI. In 1921, a second Federal Highway Act more clearly defined the aid program to develop a gigantic national road system. The Kahn-Wadsworth Bill made possible the distribution of more than 25,000 surplus army trucks and other equipment to the state highway departments for road-building purposes.

1923 - Tetraethyl lead was discovered.

1924 - Walter P. Chrysler, the head of the Maxwell Motor Corporation, introduced an auto bearing his name. Fred Zeder was one its key designers. The Chrysler was so successful it brought about the death of the Maxwell.

A California innkeeper erected the first "Motel" sign outside his establishment.

General Motors and Standard Oil Company of New Jersey formed Ethyl Gasoline Corporation to make and sell the new additive, tetraethyl lead.

1926 - The first "Burma Shave" jingles were posted in Minnesota.

1927 - The first drive-up mail box was installed in Houston, Texas.

1929 - The short-lived Ruxton was an unusual front-wheel-drive luxury automobile manufactured by New Era Motors of New York from 1929 to 1931. Although it did not fare well, it marked a new beginning in the automotive age.