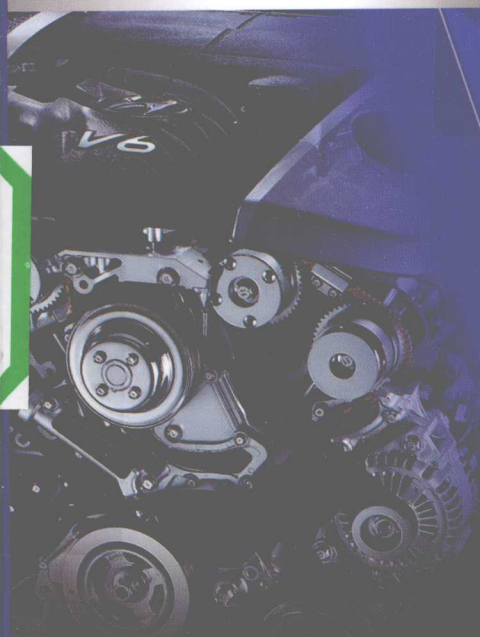


21世纪汽车运用与维修系列规划教材

汽车专业 **英语**



主 编 吴芷红
副主编 李新雷 纪世才



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第 1 章 绪论

1.1 汽车专业英语的特点及学习目的

21 世纪汽车运用与维修系列规划教材

1.2 汽车专业英语的教材体系

1.3 汽车专业英语的学习方法

汽车专业英语

主 编 吴芷红

副主编 李新雷 纪世才

本书可作为高等院校汽车专业及相关专业的教材，也可供从事汽车工作的工程技术人员参考。

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副 编 者	李新雷 纪世才
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内 容 提 要

本书参考了国内外知名教材和权威网站的专业文献,在注重介绍当今主要汽车新结构、新技术的同时,加强了汽车服务类专业人员所需汽车服务信息的内容,满足了汽车类专业学生综合性专业知识结构的要求。本书每篇课文提供相关的专业背景资料,便于课文内容的理解。对于课文中一些重点内容,给出了相关的参考译文,对于重点词汇也有释义。同时在每篇课之后,本书还提供一篇与课文内容相关的专业文献,作为泛读内容。因此本书涵盖的信息量大大增加,弥补了以往此类教材信息量较少的不足。

本书可供普通高校汽车工程类专业教学使用,也可作为国内汽车工程类专业就业群体学习提高和汽车工程行业职工培训教材或教学参考读物使用。

本书配有电子教案和素材文件,读者可以到中国水利水电出版社网站或万水书苑免费下载,网址: <http://www.waterpub.com.cn/softdown/>或 <http://www.wsbookshow.com>。

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前 言

随着我国汽车工业和汽车服务业的迅速发展,使得汽车厂商与服务商对高素质的汽车从业人员的需求变得更为迫切。这种背景下,为了提高从业人员的专业素养,增加他们对国外先进技术的认知和吸收能力,有必要组织一套便于学习、反映国外先进技术的专业英语教材,以期能够在课时不多的情况下,快速提高学生的专业英语素养,达到能够消化与吸收英文专业文献的目的。

本书结合汽车专业英语的教学经验,注重培养学生的综合能力;内容主要选自国内外知名教材、权威网站,力求反映当今主要汽车的新结构、新技术;注重信息的筛选,深度适宜,篇幅符合大多数高等院校的教学要求;由浅入深,循序渐进,符合认知规律,便于学习;条理清晰,文字规范,语言流畅,图文结合,便于理解。本书主要特点如下:

1. 专业方向明确,针对性强。面向汽车类相关专业,考虑汽车类相关专业的培养目标,注重汽车技术阐述的同时,将汽车维护、营销、保险等汽车售后服务市场的服务性专业文献纳入教材,符合汽车类专业学生就业知识结构拓展的要求,使毕业生不再局限于仅仅了解一些专业术语,而是能够从容面对工作中的专业英语所需,不再恐惧外语专业文献。国内高校汽车类专业英语课程的课时安排从24学时到50学时不等,各高校可根据实际情况酌情选用。

2. 内容安排合理,便于教师和学生选择学习与阅读。教材前部分内容重点讲述汽车构造与理论,以及当今先进汽车技术的阐述;后部分内容重点讲述汽车维护,汽车营销,汽车保险以及汽车评估等内容,基本涵盖汽车类专业毕业生的大多数就业方向,便于针对学生的专业方向进行选用。

3. 内容新颖,译注准确。教材内容选自国内外知名教材,权威网站的最新英文科技资料,既有汽车专业的基本概念、结构和技术,又有一些汽车专业领域的最新成果,具有一定的技术领先性。提供的参考译文和注释全部经专业老师审阅修改,翻译准确,专业术语规范。课文的参考译文请从中国水利水电出版社网站下载使用,并欢迎使用者与我们联系,进行交流,以便共同提高教学质量。

4. 每篇课文提供相关的专业背景资料,便于课文内容的理解。每课之后提供一篇与课文内容相关的专业文献,作为泛读内容以供选择,增大了信息量的涵盖性,弥补了以往此类教材信息量较少的不足。

本书由山东交通学院吴芷红任主编,山东交通技术学院李新雷与山东交通职业学院纪世才任副主编,参编人员有山东联合大学王玉岭、周晓飞与烟台职业学院刘静静、鲁哲、于莎莎等。

本书编写过程中,参阅了国内外有关的书籍杂志和网页资料,在此向相关的网站、作者致以最衷心的感谢。本书的编写得到山东交通学院汽车系、山东交通技术学院、山东交通职业学院、山东联合大学、烟台职业学院、中国重汽集团和广汽丰田汽车有限公司客户服务部等单位的大力支持和协助,在此对向相关的网站、作者、单位和个人表示衷心感谢。

由于时间仓促,本教材定有许多不足之处,敬请广大读者与同仁阅读使用后批评指正,以便教材再版时加以修正。

编 者

2010年5月

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Lesson 1 History of the Automobile

The history of the automobile begins as early as 1769, with the creation of steam-powered automobiles capable of human transport. Steam-powered self-propelled vehicles are thought to have been devised in the late 18th century. Nicolas-Joseph Cugnot demonstrated his *wardier à vapeur*, an experimental steam-driven artillery tractor, in 1770 and 1771. By 1784, William Murdoch had built a working model of a steam carriage in Redruth, and in 1801 Richard Trevithick was running a full-sized vehicle on the road in Camborne. Such vehicles were in vogue for a time, and over the next decades such innovations as hand brakes, multi-speed transmissions, and better steering developed. At the 1900s some steam-powered self-propelled vehicles were commercially successful in providing mass transit, until a backlash against these large speedy vehicles resulted in passing a law, the Locomotive Act, in 1865 requiring self-propelled vehicles on public roads in the United Kingdom be preceded by a man on foot waving a red flag and blowing a horn^[1]. The law was not repealed until 1896, although the need for the red flag was removed in 1878.

German engineer Karl Benz, inventor of numerous car-related technologies, is generally regarded as the inventor of the modern automobile. The four-stroke petrol (gasoline) internal combustion engine that constitutes the most prevalent form of modern automotive propulsion is a creation of German inventor Nikolaus Otto. Early attempts at making and using internal combustion engines were hampered by the lack of suitable fuels, particularly liquids, and the earliest engines used gas mixtures^[2]. A later version was propelled by coal gas. Karl Benz built his first automobile in 1885 in Mannheim(Fig.1.1). Benz was granted a patent for his automobile on 29 January 1886, and began the first production of automobiles in 1888. Soon after, Gottlieb Daimler and Wilhelm Maybach in Stuttgart in 1889 designed a vehicle from scratch to be an automobile, rather than a horse-drawn carriage fitted with an engine.

1 Veteran Car Era

By 1900, mass production of automobiles had begun in France and the United States. By the start of the 20th century, the automobile industry was beginning to take off in western Europe, especially in France, they produced 30,204 in 1903, representing 48.8% of world automobile production that year. Innovation was rapid and rampant, with no clear standards for basic vehicle architectures, body styles, construction materials, or controls^[3]. Automobiles were seen as more of a novelty than a genuinely useful device. Breakdowns were frequent, fuel was difficult to obtain, roads suitable for travelling were scarce, and rapid innovation meant that a year-old car was nearly worthless. Major breakthroughs in proving the usefulness of the automobile came with the historic long-distance drive of Bertha Benz in 1888, when she traveled more than 80 kilometres (50 mile) from Mannheim to Pforzheim, to make people aware of the potential of the vehicles her husband,



Karl Benz, manufactured.

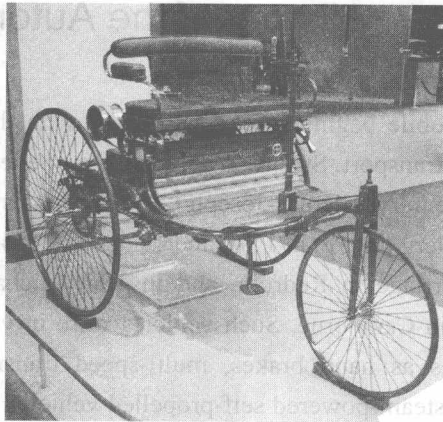


Fig.1.1 1885 built Benz patent motorwagen

2 Edwardian Era

Edwardian era lasted from roughly 1905 through to the beginning of World War I in 1914. Throughout this era, development of automotive technology was rapid, due in part to a huge number (hundreds) of small manufacturers all competing to gain the world's attention^[4]. Key developments included electric ignition system (by Robert Bosch, 1903), independent suspension, and four-wheel brakes (by the Arrol-Johnston Company of Scotland in 1909). Transmissions and throttle controls were widely adopted, allowing a variety of cruising speeds, though vehicles generally still had discrete speed settings, rather than the infinitely variable system familiar in cars of later eras.

Some examples of cars of the period included the following:

1908–1927 Ford Model T(Fig.1.2) — the most widely produced and available car of the era. It used a planetary transmission, and had a pedal-based control system.

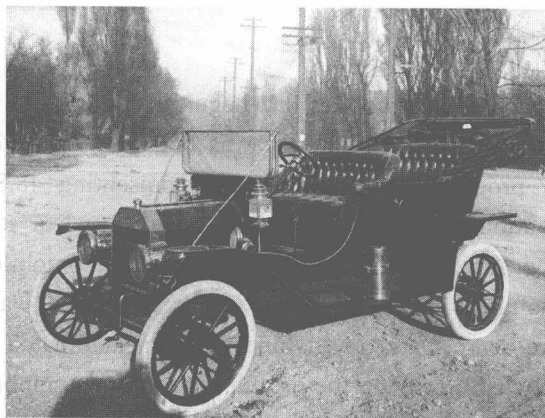
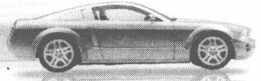


Fig.1.2 1910 Model T, photographed in Salt Lake City



1910–1920 Bugatti Type 13 — a notable racing and touring model with advanced engineering and design. Similar models were the Types 15, 17, 22, and 23.

3 Vintage Era

The vintage era lasted from the end of World War I (1919), through the Wall Street Crash at the end of 1929. During this period, the front-engined car came to dominate, with closed bodies and standardised controls becoming the norm. In 1919, 90% of cars sold were open; by 1929, 90% were closed. Development of the internal combustion engine continued at a rapid pace, with multi-valve and overhead camshaft engines produced at the high end, and V8, V12, and even V16 engines conceived for the ultra-rich.

Exemplary vintage vehicles:

1924–1929 Bugatti Type 35 (Fig.1.3) — the Type 35 was one of the most successful racing cars of all time, with over 1,000 victories in five years.

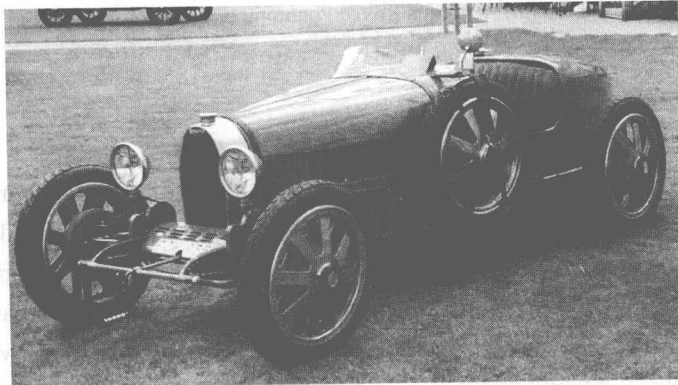


Fig.1.3 Bugatti Type 35A Grand Prix Racer 1925

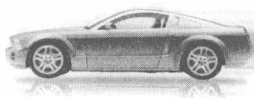
1927–1931 Ford Model A — after Model T in production for too long, Ford restarted its model series with the 1927 Model A. More than 4 million were produced, making it the best-selling model of the era.

4 Pre-WWII Era

The pre-war era began with the Great Depression in 1930, and ended with the recovery after World War II, commonly placed at 1948. By the 1930s, most of the mechanical technology used in today's automobiles had been invented. After 1930, the number of auto manufacturers declined sharply as the industry consolidated and matured.

Exemplary pre-war automobiles:

1932–1948 Ford V-8 — introduction of the powerful Flathead V8 in mainstream vehicles, setting new performance and efficiency standards.



1934–1940 Bugatti Type 57 — a singular high-tech, refined automobile for the wealthy.

1938–2003 Volkswagen Beetle—a design for efficiency and low price, which progressed over 60 years with minimal basic change.

1936–1939 Rolls-Royce Phantom III (Fig.1.4)—V12 engined pinnacle of pre-war engineering, with technological advances not seen in most other manufacturers until the 1960s.

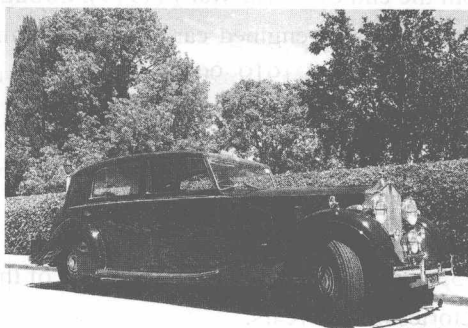


Fig.1.4 Rolls Royce Phantom, circa 1936

5 Post-War Era

Automobile design finally emerged from the shadow of World War II in 1949. The unibody/strut-suspended 1951 Ford Consul joined the 1948 Morris Minor and 1949 Rover P4 in waking up the automobile market in the United Kingdom. In Italy, Enzo Ferrari was beginning his 250 series. Throughout the 1950s, engine power and vehicle speeds rose, and cars spread across the world. The market changed somewhat in the 1960s, as Detroit began to worry about foreign competition, the European makers adopted ever-higher technology, and Japan appeared as a serious car-producing nation^[5]. BMC's revolutionary space-saving Mini, which first appeared in 1959, captured large sales world-wide. In America, performance became a prime focus of marketing, exemplified by pony cars and muscle cars. In 1964 the popular Ford Mustang appeared. But everything changed in the 1970s as the 1973 oil crisis, automobile emissions control rules, Japanese and European imports. Small performance cars from BMW, Toyota, and Nissan took the place of big-engined cars from America and Italy. The biggest developments of the era were the widespread use of independent suspensions, wider application of fuel injection, and an increasing focus on safety in the design of automobiles.

Exemplary post-war cars:

1959–2000 Mini — this quintessential small car lasted for four decades, and is one of the most famous cars of all time.

1964–present Ford Mustang (Fig.1.5) — the pony car that became one of the best-selling and most-collected cars of the era.



Fig.1.5 1974-1978 Mustang II

6 Modern Era

The modern era is normally defined as the 25 years preceding the current year. Without considering the future of the car, the modern era has been one of increasing standardisation, platform sharing, and computer-aided design. Some particularly notable advances in modern times are the widespread of front-wheel drive and all-wheel drive, the adoption of the V6 engine configuration, and the ubiquity of fuel injection. Body styles have changed as well in the modern era. Three types, the hatchback, minivan, and sport utility vehicle, dominate today's market, yet are relatively recent concepts^[6]. The rise of pickup trucks in the United States, and SUVs worldwide has changed the face of motoring, with these "trucks" coming to command more than half of the world automobile market. The modern era has also seen rapidly rising fuel efficiency and engine output.

Exemplary modern cars:

1966–present Toyota Corolla — a simple small Japanese saloon/sedan that has come to be the best-selling car of all time.

1973–present Mercedes-Benz S-Class — electronic Anti-lock Braking System, supplemental restraint airbags, seat belt pretensioners, and electronic traction control system all made their debut on the S-Class.

1977–present Honda Accord saloon/sedan — this Japanese sedan became the most popular car in the United States in the 1990s, pushing the Ford Taurus aside, and setting the stage for today's upscale Asian sedans.

New Words & Terms

devise	[di'vaiz]	v. 策划; 发明; 想出
artillery	[ɑ:'tiləri]	n. 炮, 大炮
backlash	['bæklæʃ]	n. 后冲; 后坐力
prevalent	['prevelənt]	adj. 盛行的, 流行的
hamper	['hæmpə]	vt. 妨碍, 限制
rampant	['ræmpənt]	adj. 无法控制的
novelty	['nɒvəlti]	n. 新颖; 新奇性
genuinely	['dʒenjuɪnli]	adv. 真地; 真正地
scarce	[skæəs]	adj. 罕见的



breakthrough	['breik'θru:]	n.突破点
throttle	['θrɒtl]	n.节气门
discrete	[dis'kri:t]	adj.分离的, 离散的
infinitely	['ɪnɪnɪtli]	adv.无限地
norm	[nɔ:m]	n.标准, 规范
exemplary	[ɪg'zempləri]	adj.杰出的; 值得效仿的
vintage	['vɪntɪdʒ]	adj.古老的; 过时的 (尤指曾经一度为最佳的)
victory	['vɪktəri]	n.胜利, 成功
consolidated	[kən'sɒlɪdeɪtɪd]	vt.& vi. (使) 巩固; (使) 加强
mature	[mə'tjuə]	v.发育成熟; 长大
minimal	['mɪnɪməl]	adj.极少的
emerge	[i'mə:dʒ]	vi.出现, 形成, 发生
unibody	['ju:nɪ'bɒdi]	n.单片式汽车车身
prime	[praɪm]	adj.首要的; 基本的
exemplify	[ɪg'zemplɪfaɪ]	vt. ...的典型, 举例证明
quintessential	[kwɪn'təsənʃ(ə)l]	adj.精髓的; 典型的
ubiquity	[ju:'bɪkwəti]	n.普遍存在
pretensioner	[pri:'tenʃənə]	n.自命不凡者
debut	['deɪbjʊ:]	n.<法>首次演出
sedan	[si'dæn]	n.小轿车
strut	[strʌt]	n.支柱
in vogue	正在流行	Locomotive Act 红旗法
Edwardian era	爱德华七世时代	planetary transmission 行星齿轮器
Vintage era	卓越成就时代	Great Depression (美) 大萧条
pony car	赛车型小车	muscle cars 外形硬朗的车 (多指跑车)
supplemental restraint airbags	SRS 辅助约束气囊, 即常说的安全气囊	

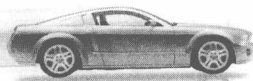
Notes

1. At the 1900s some steam-powered self-propelled vehicles were commercially successful in providing mass transit, until a backlash against these large speedy vehicles resulted in passing a law, the Locomotive Act, in 1865 requiring self-propelled vehicles on public roads in the United Kingdom be preceded by a man on foot waving a red flag and blowing a horn.

在 1900 年代, 在提供物资运输方面蒸汽机车取得了商业成功, 直到一个阻碍大型车辆高速行驶的法案-机车法 (红旗法) 出现, 在 1865 年在英联邦公共道路上自行行驶的车辆必须有一个人步行在车的前面摇动一面红旗并且吹号 (示意公众)。

2. Early attempts at making and using internal combustion engines were hampered by the lack of suitable fuels, particularly liquids, and the earliest engines used gas mixtures.

早期制造、使用内燃机的尝试受到缺乏适合的燃料, 尤其是液体燃料的限制, 因此最早的发动机利用混合燃气作燃料。



3. Innovation was rapid and rampant, with no clear standards for basic vehicle architectures, body styles, construction materials, or controls.

因为没有明确的关于汽车制造、造型设计、制造材料以及控制方面的明确标准，相关的发明又多又乱。

4. Throughout this era, development of automotive technology was rapid, due in part to a huge number (hundreds) of small manufacturers all competing to gain the world's attention.

部分由于有很多的小制造商都在争取获得世人的瞩目，整个这个时代汽车技术的发展很快。

5. The market changed somewhat in the 1960s, as Detroit began to worry about foreign competition, the European makers adopted ever-higher technology, and Japan appeared as a serious car-producing nation^[5].

在1960年代市场有了一些变化，因为底特律开始担心外来的竞争：欧洲的制造商采用了高科技，日本呈现出汽车生产大国的趋势。

6. Three types, the hatchback, minivan, and sport utility vehicle, dominate today's market, yet are relatively recent concepts.

掀背式、小厢式、SUV三种统治今天市场的汽车仅仅是近期的概念。

Questions

1. Who had built a working model of a steam carriage in Redruth?
2. What is Locomotive Act?
3. What did Detroit begin to worry about in the 1960s?

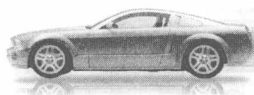
Reading Materials

The Development of Automobile

Unlike many other major inventions, the original idea of the automobile cannot be attributed to a single individual. The idea certainly occurred long before it was first recorded in the *Iliad*, in which Homer (in Alexander Pope's translation) states that Vulcan in a single day made 20 tricycles, which Leonardo da Vinci considered the idea of a self-propelled vehicle in the 15th century. In 1760 a Swiss clergyman, J.H. Genevois, suggested mounting small windmills on a cartlike vehicle, their power to be used to wind springs that would move the road wheel. Genevois's idea probably derived from a windmill cart of about 1714. Two-masted wind carriages were running in the Netherlands in 1600, and a speed of 20 miles (30 km) per hour with a load of 28 passengers was claimed for at least one of them. The first recorded suggestion of wind use was probably Robert Valturio's unrealized plan (1472) for a cart powered by windmills geared to the wheels.

Other inventors considered the possibilities of clockwork. Probably in 1748 a carriage propelled by a large clockwork engine was demonstrated in Paris by the versatile inventor Jacques de Vaucanson.

The air engine is thought to have originated with a 17th-century German physicist, Otto von Guericke. Guericke invented an air pump and was probably the first to make metal pistons, cylinders,



and connecting rods, the basic components of the reciprocating engine. In the 17th century a Dutch inventor, Christiaan Huygens, produced an engine that worked by air pressure developed by explosion of a powder charge. Denis Papin of France built a model engine on the vacuum principle, using the condensation of steam to produce the vacuum. An air engine was patented in England in 1799, and a grid of compressor stations was proposed to service vehicles. An air-powered vehicle is said to have been produced in 1832.

Steam propulsion was proposed as early as the 16th century, and in 1678 Ferdinand Verbiest, a Belgian Jesuit missionary to China, made a model steam carriage based on a principle suggestive of the modern turbine.

In the 18th century a French scientist, Philippe Lebon, patented a coal-gas engine and made the first suggestion of electrical ignition. In Paris, Isaac de Rivas made a gas-powered vehicle in 1807; his engine used hydrogen gas as fuel, the valves and ignition were operated by hand, and the timing problem appears to have been difficult.

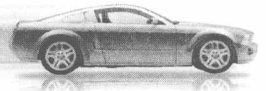
1 The age of steam

Most historians agree that Nicolas-Joseph Cugnot of France was the constructor of the first true automobile. Cugnot's vehicle was a huge, heavy, steam-powered tricycle, and his model of 1769 was said to have run for 20 minutes at 2.25 miles (3.6 km) per hour while carrying four people and to have recuperated sufficient steam power to move again after standing for 20 minutes. Cugnot was an artillery officer, and the more or less steam-tight pistons of his engine were made possible by the invention of a drill that accurately machined cannon bores. A replica of Cugnot's second vehicle, partially original, is preserved in the Conservatoire National des Arts et Métiers in Paris.

Cugnot's successors were soon at work, notably in England, although the first post-Cugnot steam carriage appears to have been built in Amiens, France, in 1790. Steam buses were running in Paris about 1800. Oliver Evans of Philadelphia ran an amphibious steam dredge through the streets of that city in 1805. Less well-known were Nathan Read of Salem, Mass., and Apollon Kinsley of Hartford, Conn., both of whom ran steam vehicles during the period 1790–1800. In March 1863 the magazine *Scientific American* described tests of a vehicle that weighed only 650 pounds (about 300 kg) and achieved a speed of 20 miles (30 km) per hour. Another American, Frank Curtis of Newburyport, Mass., is remembered for building a personal steam carriage to the order of a Boston man who failed to meet the payment schedule, whereupon Curtis made the first recorded repossession of a motor vehicle.

English inventors were active, and by the 1830s the manufacture and use of steam road carriages was flourishing. James Watt's foreman, William Murdock, ran a model steam carriage on the roads of Cornwall in 1784, and Robert Fourness showed a working three-cylinder tractor in 1788. Watt was opposed to the use of steam engines for such purposes; his low-pressure steam engine would have been too bulky for road use in any case, and all the British efforts in steam derived from the earlier researches of Thomas Savery and Thomas Newcomen.

Richard Trevithick developed Murdock's ideas, and at least one of his carriages, with driving



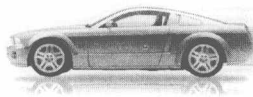
wheels 10 feet (3 metres) in diameter, ran in London. Sir Goldsworthy Gurney, the first commercially successful steam carriage builder, based his design upon an unusually efficient boiler. He was not, however, convinced that smooth wheels could grip a roadway, and so he arranged propulsion on his first vehicle by iron legs digging into the road surface. His second vehicle weighed only 3,000 pounds (1,360 kg) and was said to be capable of carrying six persons. He made trips as long as 84 miles (135 km) in a running time of 9 hours and 30 minutes and once recorded a speed of 17 miles (27 km) per hour.

Gurney equipment was used on the Gloucester-Cheltenham service of four daily round trips; under favourable conditions the equipment could complete the 9 miles (15 km) in 45 minutes. Between Feb. 27 and June 22, 1831, steam coaches ran 4,000 miles (6,400 km) on this route, carrying some 3,000 passengers. The equipment was noisy, smoky, destructive of roadways, and admittedly dangerous; hostility arose, and it was common for drivers to find the way blocked with heaps of stones or felled trees. Nevertheless, numerous passengers had been carried by steam carriage before the railways had accepted their first paying passenger.

The most successful era of the steam coaches in Britain was the 1830s. Ambitious routes were run, including one from London to Cambridge. But by 1840 it was clear that the steam carriages had little future. They had had much to contend with, including the anti-machinery attitude of the public and the enmity of the horse-coach interests, which resulted in such penalties as a charge of £5 for passing a tollgate that cost a horse coach only three pence. The crushing blow was the Locomotives on Highways Act of 1865, which reduced permissible speeds on public roads to 2 miles (3 km) per hour within cities and 4 miles (6 km) per hour in rural areas. This legislation was known as the Red Flag Act because of its requirement that every steam carriage mount a crew of three, one to precede it carrying a red flag of warning. The act was amended in 1878, but it was not repealed until 1896, by which time its provisions had effectively stifled the development of road transport in the British Isles.

The decline of the steam carriage did not prevent continued effort in the field, and much attention was given to the steam tractor for use as a prime mover. Beginning about 1868, Britain was the scene of a vogue for light steam-powered personal carriages; if the popularity of these vehicles had not been legally hindered, it would certainly have resulted in widespread enthusiasm for motoring in the 1860s rather than in the 1890s. Some of the steamers could carry as few as two people and were capable of speeds of 20 miles (32 km) per hour. The public climate remained unfriendly, however.

Light steam cars were being built in the United States, France, Germany, and Denmark during the same period, and it is possible to argue that the line from Cugnot's lumbering vehicle runs unbroken to the 20th-century steam automobiles made as late as 1926. The grip of the steam automobile on the American imagination has been strong ever since the era of the Stanley brothers—one of whose “steamers” took the world speed record at 127.66 miles (205.45 km) per hour in 1906. The car designed by them and sold as the Locomobile became the first commercially successful American-made automobile (about 1,000 were built in 1900). It is estimated that in the



year 2000 there were still some 600 steam cars in the United States, most of them in running order.

2 Early electric automobiles

At the beginning of the 20th century, 40 percent of American automobiles were powered by steam, 38 percent by electricity, and 22 percent by gasoline. In the face of the gasoline car's unreliability, noise, and vibration and the steamer's complications and thirst, the electric offered attractive selling points: notably, instant self-start, silent operation, and minimal maintenance. The first automobile to exceed 100 km (60 miles) per hour was an electric (Camille Jenatzy's *La Jamais Contente*, 1899). An electric, also Jenatzy's, had been the easy winner in 1898 of a French hill-climb contest to assay the three forms of power.

Invention of the storage battery by Gaston Planté of France in 1859–60 and its improvement by Camille Faure in 1881 made the electric vehicle possible, and what was probably the first, a tricycle, ran in Paris in 1881. It was followed by other three-wheelers in London (1882) and Boston (1888). The first American battery-powered automobile, built in Des Moines, Iowa, c. 1890, by William Morrison, could maintain a speed of 14 miles (23 km) per hour.

The popularity of the electric car was hampered by a lack of battery-charging infrastructure. Prior to 1910, few private homes, even in cities, were wired with electricity, and community charging stations and battery exchange schemes failed to catch on. By 1912 the problem had been overcome, and the electric had its heyday. Some 20 companies were in the trade and 33,842 electric cars were registered in the United States, the country in which they had maximum acceptance. It was another application of battery power, the electric self-starter, that did as much as anything to doom the electric car by eliminating the dreaded hand crank and making the internal-combustion engine car amenable to operation by women. Further, the electric had never really been suited to other than limited urban use because of its low speed (15–20 miles, or 24–32 km, per hour), short range (30–40 miles, or about 50–65 km), and lengthy time required for recharging. The heyday of the electric car in America had ended by 1920, although a few manufacturers offered them on special order until World War II. The war, however, gave rise to experiments with small electric cars in fuel-starved France and resulted in extensive use of electric vehicles for milk delivery in Britain, which continued in urban areas there for the rest of the century.

3 Development of the gasoline car

Most authorities are inclined to honour Karl Benz and Gottlieb Daimler of Germany as the most important pioneer contributors to the gasoline-engine automobile. Benz ran his first car in 1885, Daimler in 1886. Although there is no reason to believe that Benz had ever seen a motor vehicle before he made his own, he and Daimler had been preceded by Étienne Lenoir in France and Siegfried Marcus in Austria, in 1862 and 1864–65, respectively, but neither Lenoir nor Marcus had persisted. Benz and Daimler did persist—indeed, to such purpose that their successor firm of DaimlerChrysler AG can trace its origins back to 1895 and claim, with the Peugeot SA firm of France, to be one of the oldest automobile-manufacturing firms in the world. Oddly, Benz and