McClure's Magazine
July, 1899

The Automobile in Common Use

What it Costs – How it is Operated – What it Will Do

YESTERDAY, a mere mechanical wonder fresh from the hand of the inventor; today, a gigantic industry on two continents—that is the history in brief of the motor vehicle. Five years ago there were not thirty self-propelled carriages in practical use in all the world. A year ago there were not thirty in America. And yet between the 1st of January and the 1st of May, 1899, companies with the enormous aggregate capitalization of more than $388,000,000 have been organized in New York, Boston, Chicago, and Philadelphia for the sole purpose of manufacturing and operating these new vehicles. At least eighty establishments are now actually engaged in building carriages, coaches, tricycles, delivery wagons, and trucks, representing no fewer than 200 different types of vehicles, with nearly half as many methods of propulsion. Most of these concerns are far behind in their orders, and several of them are working day and night, A hundred electric cabs are plying familiarly on the streets of New York, and 200 more are being rushed to completion in order to supply the popular demand for horseless locomotion. At least two score of delivery wagons, propelled chiefly by electricity, are in operation in American cities, and the private conveyances of various makes will number well into the hundreds. A motor ambulance is in operation in Chicago; motor trucks are at work in several different cities; a motor gun-carriage for use in the army will be ready for service in the summer. The Santa Fe railroad has ordered a number of horseless coaches for an Arizona mountain route, and at least two cities are using self-propelled fire-engines. A trip of' 720 miles, from Cleveland to New York, over all kinds of country roads, has actually been made in a gasoline carriage, and an enthusiastic automobile traveler is now on his way from New England to San Francisco. And all of these doings are chronicled in a weekly journal devoted exclusively to the new industry.

These are a few of the important things which have been accomplished in America almost within the year. Never before has Yankee genius and enterprise created an important business interest in so short a time. The experimental plaything has become a practical necessary. And yet the motor vehicle in America is in its babyhood compared with what it is in France and England. Here it has hardly passed the stage of promotion and promise; there it has become an established and powerful factor in the common affairs of life, as well as a fashionable fad. France has an automobile club numbering 1,700 members. At its last exhibition 1,100 vehicles were shown, representing every conceivable model, from milk-wagons to fashionable broughams and the huge brakes of De Dion and Bouton, which carry almost as many passengers as a railroad car. Some of the expert chauffeurs of Paris have ridden thousands of miles in their road wagons, have climbed mountains and raced through half of Europe, meeting new accidents, facing new adventures, and using strange new devices for which names have yet to be coined. In Paris, electric motor cabs are becoming quite as familiar as the old-fashioned horse cabs. Before the

opening of the Paris Exposition, 1,200 of them will be in operation. In the country districts thousands of grocers, milkmen, market-men, and peddlers are the engineers of their own gasoline carts.

A French statistician has given some significant figures as to the enormous increase of the horse-slaughtering industry in Paris during the past two years, and he lays it largely to the thousands of motor vehicles which are making the horse more valuable for ragouts than for racing. The august French Academy has paused in its consideration of literature and art, to take cognizance of the motor vehicle, and has bestowed upon it the formal name of "automobile," which it expects the entire world to adopt. The French law has quietly absorbed its unfamiliar terms, and has decreed that every vehicle must be registered in its own commune, the same as a horse and carriage; it has laid down formal articles for the regulation of builders and operators, and provided for races and speed limits. The French Minister of War has numbered and described every vehicle in the republic, and has quietly arranged to seize them all for military purposes when France shall go to war. In this way the motor vehicle in France has assumed the settled importance of a governmental institution, as well as a great business industry.

England has not gone so far as France with the automobile, and yet it has several powerful associations devoted to its development, and a large number of vehicles in actual use. With his hard-headed, practical business sense, the Englishman is looking with greater care and interest into the development of the trucking vehicle, for carrying heavy loads, than to the lighter pleasure carriage. He has an eye to the enormous freight-rates of his railroads and to the crowded condition of his narrow streets. One successful exhibition of auto-trucks has already been held in Liverpool, under the auspices of the Self-Propelled Traffic Association, and a second, which is already anticipated with the keenest interest, will take place next August.

In general, France leads in gasoline vehicles, and England in steam vehicles, while America, as was to be expected, is far in the lead in electrical conveyances of all kinds. Belgium and Germany, and to some extent Austria, are also experimenting with more or less success, but no such progress has been made in these countries as in France. Spain rubbed its eyes last spring at the sight of its first motor vehicle, which rolled through Madrid with half a dozen little policemen careering after it. Indeed, the new industry is everywhere awakening the most extraordinary interest among all classes of people.

And yet the great public is far from feeling familiar with the motor vehicle. The prospective buyer, and there are many thousands of him in America, is at once confronted with the bewildering variety of models which the manufacturers place before him. He discovers that there are the most pronounced variations in price, cost of maintenance, speed, ease of management, and general efficiency.

It was with the idea of clearing up this confusion and giving some exact conception of what the motor vehicle of today really is, what it can do, what it costs, and what may be expected of it in the future, that I visited and talked with a number of the most prominent American manufacturers.

In a general way, it may be said that the best modern motor vehicle, whatever its propelling power, is practically noiseless and odorless and nearly free from vibrations. It is still heavy and clumsy in appearance, although it is lighter than the present means of conveyance when the weight of the horse or horses is counted in with the carriage. And invention will soon lighten it still further. It cannot possibly explode. It will climb all ordinary hills, and on the level it will give all speeds from two miles an hour up to twenty or more. Its mechanism has been made so simple that any one can learn to manage it in an hour or two. And yet it is mechanism;

and intelligence, coolness, and caution are required to manage a motor vehicle in a crowded street. The operator must combine the intelligence of the driver with that of the horse, and he does not appreciate the almost human sagacity of that despised animal until he has tried to steer a motor vehicle down Fifth Avenue on a sunny afternoon. Six different motive powers are now actually employed in this country: electricity, gasoline, steam, compressed air, carbonic acid gas, and alcohol. The first three of these have been practically applied with great success; all the others are more or less in the experimental stage.

The electric vehicle, which has had its most successful development in this country, has its well-defined advantages and disadvantages. It is simpler in construction and more easily managed than any other vehicle: one manufacturer calls it "fool proof." It is wholly without odor or vibrations and practically noiseless. It will make any permissible rate of speed, and climb any hill up to a twenty per cent, grade. On the other hand, it is immensely heavy, owing to the use of storage batteries; it can run only a limited distance without recharging, and it requires a moderately smooth road. In cost it is the most expensive of all vehicles. And yet for city use, where a constant supply of electricity can be had, electrical cabs, carriages, and delivery wagons have demonstrated their remarkable practicability.

The vital feature of the electric vehicle is the storage battery, which weighs from 500 to 1,500 pounds, the entire weight of the vehicles varying from about 900 to 4,000 pounds. A phaeton for ordinary use in carrying two people will weigh upwards of a ton, with a battery of 900 pounds. This immense weight requires exceedingly rigid construction and high-grade, expensive tires. The electrical current is easily controlled by means of a lever under the hand of the driver, the propelling machinery being comparatively simple. When the battery is nearly empty, it may be recharged at any electric lighting station by the insertion of a plug, the time required varying from two to three hours. Or, if the owner prefers, he can own his own charging plant and generate his own electricity; it will cost him from $500 to $700. The current not only operates the vehicle, but it lights the lamps, rings the gong, and in cabs and broughams actuates a push-button arrangement for communication between passenger and driver. The limit of travel without recharging is from twenty to thirty miles. Mr. C. E. Woods, a leading manufacturer, gives the cost of maintenance of storage batteries per year as varying from $50 for light buggies to $300 for heavy omnibuses, the entire cost of operation being from three-quarters of a cent to four cents a mile. A good electric carriage for family use cannot be obtained for much less than $2,000, although one or two manufacturers advertise runabouts and buggies at from $750 to $1,500. An omnibus costs from $3,000 to $4,000. The Columbia Automobile Company has made an interesting comparison showing the cost of horse and electric delivery wagons:

FIRST COST

HORSE WAGONS		ELECTRIC WAGONS	
Wagon	$380	Electric wagon complete	$2,250
Two horses at $125	$250		
Harnesses	$ 75		
	$705		

MAINTENANCE PER YEAR

HORSE WAGONS		ELECTRIC WAGONS	
Interest on Investment at 5 percent	$ 35.25	Interest on investment at 5 percent	$112.50
Stabling two horses at $36.50 both, or $18.25 each, per month	$438.00	Cost of electric current at ordinary central station, rates for 12,000 miles per year	$300.00
Shoeing two horses	$ 30.00		$412.50
Harness repairs, two Horses	$ 20.00		
	$523.25	OR:	
		Interest	$112.50
		Current, if generated in private plant	$21.30
			$133.80

"In this table we omitted to mention repairs or the expense of a driver," the Columbia people said, "because we calculate that they are the same in both cases. And battery deterioration will offset horse deterioration. But in using the electric vehicle all stable odors and flies are done away with, and a second man is never necessary to 'watc h the horse.' Moreover, an electric wagon can be kept in a quarter of the usual stable space, or even in the store itself."

The company which operates the electric cab system in New York has a most extensive charging plant. Two batteries are provided for each vehicle, so that, when one is empty, it may be removed by the huge fingers of a traveling crane, placed on a long table, and recharged at leisure, while a completely filled battery is introduced in its place. This change takes only a few minutes, and the cab can be used continuously day and night.

The "lightning cabby" is a product of the new industry. He wears a blue uniform somewhat resembling that of a fireman, and he is a coolheaded, intelligent fellow, who can make ten miles an hour in a crowded street without once catching the suspicious eye of a policeman. Most of the "cabbies" have had previous experience as drivers, but they are given a very thorough training before they are allowed to venture on the streets with a vehicle of their own. A special instructor's cab is in use by the company. It has a flaring front platform with a solid wooden bumper, so that it may crash into a stone curb or run down a lamppost without injury. The new man perches himself on the seat behind, and the instructor takes his place inside, where he is provided with a special arrangement for cutting off the current or applying the brakes, should the vehicle escape from the control of the learner. It usually takes a week to train a new man so that he can manage all the brakes and levers with perfect presence of mind. Both of his hands and both of his feet are fully employed. With his left hand he manages the power lever, pushing it forward one notch at a time to increase the speed. With his right hand he controls the steering lever, which, by the way, turns the rear wheels and not the front ones, as is done with horse-propelled vehicles. His left heel is on the emergency switch, and his left toes ring the gong. With his right heel he turns the reversing switch, and he can apply the brake with either his right or his left foot. When he wishes to turn on the lights, he presses a button under the edge of the

seat. Hence, he is very fully employed, both mentally and physically. He can't go to sleep and let the old horse carry him home.

In France the system of instruction for drivers or *chauffeurs* (stokers), as they are called, is much more complicated and extensive, but hardly more thorough. There the cab company has prepared a 700yard course up hill and down, and paved it alternately with cobbles, asphalt, wooden blocks, and macadam, so as to give the incipient "cabby" experience in every difficulty which he will meet in the streets of Paris. Upon the inclines are placed numerous lay figures made of iron—a typical Parisian nursemaid with a bassinet; a bicycle rider; an old gentleman, presumably deaf, who is not spry in getting out of the way; a dog or two, and paper bricks galore. Down through this throng must the motorman thread his way and clang his gong, and he is not considered proficient until he can course the full length of the "Rue de Magdebourg," as the cabbies call it, without so much as overturning a single pastry cook's boy or crushing a dummy brick.

New York cabs will run twenty miles without recharging. But it is not at all infrequent for a new man to have his vehicle stop suddenly and most unexpectedly; the current deserts him before he knows it. He must let the central office know at once, and the ambulance cab comes spinning out, hooks to the helpless vehicle, and drags it in to the charging station. The company expects soon to have ten charging stations in operation in various parts of the city, so that a cab will never have far to go for a new charge of electricity. Indeed, all the manufacturers of electrical vehicles speak with confidence of the day when the whole of the United States will be as thoroughly sprinkled with electric charging stations as it is today with bicycle roadhouses. One manufacturer has already issued lists of hundreds of central stations throughout New England, New York, and other Eastern States where automobiles may be provided with power. It is not hard to imagine what a country touring station will be like on a sunny summer afternoon some five or ten years hence. Long rows of vehicles will stand backed up comfortably to the charging bars, each with its electric plug filling the battery with power. The owners will be lolling at the tables on the verandas of the nearby roadhouse. Men with repair kits will bustle about, tightening up a nut here, oiling this bearing, and regulating that gear. From a long rubber tube compressed air will be hissing into pneumatic tires. There will also be many gasoline carts and road-wagons and tricycles, and they, too, will need repairs and pumping, and their owners will employ themselves busily in filling their little tin cans with gasoline, recharging their tanks, refilling the water jackets, and looking to the working of their sparking devices. And then there will be boys selling peanuts, arnica, and court-plasters, and undoubtedly a cynical old farmer or two with a pair of ambling mares to carry home such of these newfangled vehicles as may become hopelessly indisposed. Add to this bustling assembly of amateur "self-propellers" a host of bicycle riders—for there will doubtless be as many bicycles in those days as ever—and it will be a sight to awaken every serious-minded horse to an uneasy consideration of his future.

Nor is this dream so far from being a picture of actual conditions. In Belgium a company has recently been formed to establish electric posting stations. Its promoters plan to have a bar and restaurant connected with the charging-plant, a regular medical attendant, and an expert mechanic who will know how to remedy all the ills of motor vehicles. In the larger cities the time must soon come when there will be coin in the slot "hydrants" for electricity at many public places from which owners of vehicles may charge their batteries while they wait.

The new electric cabs are unquestionably immensely popular as fashionable conveyances. A number of the wealthy people of New York, including Mr. Frank Gould, Mr. Cornelius Vanderbilt, Mr. O. H. P. Belmont, and Mr. Richard McCurdy, have a cab or brougham

and driver constantly on call at the home station of the company, for which they pay at the rate of $180 a month. Several prominent physicians are similarly provided, motor vehicles being especially adapted to the varied necessities of a physician's practice. A motor vehicle is always ready at a moment's notice—it does not have to be harnessed. It can work twenty-four hours a day. When it is left in the street outside, the doctor takes with him a little brass plug, or key, without which the vehicle cannot run away or be moved or stolen. And, moreover, it is swifter by half than the ordinary means of locomotion, so that in emergency cases it may mean the saving of a life. One New York physician recently put an electric cab to a most extraordinary use. His patient had a broken arm, and he wished to photograph the fracture with Roentgen rays, but there was no source of electricity available in the residence of the patient. So he made a connection with the battery in his cab, which stood at the door, the rays were promptly applied, and the injury was located.

While the electric vehicle has been winning plaudits for its work in the cities, where pavements are smooth and hard, the gasoline vehicle has been equally successful both in the city and in the country. For ordinary use the gasoline-propelled vehicle has many important advantages. It is much lighter than the electric vehicle; it requires no charging station, gasoline being obtainable at every crossroads store; and it is moderately cheap. All of the famous long-distance races and rides in Europe have been made in gasoline vehicles. On the other hand, most of the gasoline vehicles are subject to slight vibrations due to the motor, and it is almost impossible to do away entirely with the unpleasant odors of burnt gases. Gasoline vehicles are never self-starting, it being necessary to give the piston an initial impulse by hand. In general, also, they are not as simple of management' as the electric vehicle; there is more machinery to understand and to operate, and more care is necessary to keep it in order. But when once the details are mastered, the traveler can go almost anywhere on earth with his gasoline carriage, up hill and down, over the roughest roads, through mud and snow, a law unto himself. He can make almost any speed he chooses. It is said that Baron De Knyff, of Paris, made fifty miles an hour for a short run, and Count Chesset Loubat has surpassed even this record.

The power principle of the gasoline vehicle is very simple. It is a well-known fact that when gasoline is mixed with air in proper proportions and ignited, it explodes violently. By admitting this mixture at the end or head of the engine cylinder, and exploding it at the proper moment, the piston is driven violently forward, and then, by the action of the flywheel or an equivalent device, it is forced back again, and the motor is kept in motion. Most gasoline engines are of what is known as the four-cycle variety. During the first impulse of the piston the vapor is drawn into the end of the cylinder, during the second it is compressed by the return of the piston, in the third it is exploded, and in the fourth the products of the combustion are driven out, and the end of the cylinder is ready for another charge. The explosion of the gas is produced in the most approved motors by means of an electric spark, there being no fire anywhere connected with the machine. Owing to the constant compression of the gases and the succeeding explosions, a gasoline motor becomes highly heated, and in order to maintain a normal temperature, it must be provided with a jacket of cold water, or a peculiar ribbed arrangement of iron for increasing the radiating surface. A vast number of ingenious devices are used for making all of these processes as simple as igniter is necessary, the gas being compressed in the cylinder to such a degree that it explodes of its own heat, thereby doing away entirely with electricity or any other sparking device. In France most of the gasoline vehicles are still provided with what are known as "carburetters," or small chambers where the gas and air are mixed in the proper

proportions and heated before they are driven into the cylinder. In this country carburetters have been largely done away with, the gas being mixed as it passes into the cylinder.

Every driver of a gasoline vehicle must know these general facts about the mechanism of his motor. He must know how to fill the gasoline and water tanks, how to replenish or regulate the battery which ignites the gas, and he must understand the ordinary processes of cleaning and oiling machinery. When he is ready to start, he must connect up the sparking device and turn the wheel controlling the piston until the explosions begin. After that, he must see that the valves which admit the air and the gas are carefully adjusted, so that the mixture is admitted to the cylinder in the proper proportion, and then he is ready to go ahead, steering and controlling his engine by means of levers, and operating the brake and gong with his feet. All gasoline vehicles are provided with several appliances for stopping besides the ordinary brake, so that there is practically no possible danger of a runaway. The Duryea vehicle, for instance, has no fewer than five different means of turning off the power of the motor, all within convenient reach. The secretary of the company that manufactures this vehicle told me that he had often stopped his carryall within twenty feet when going at a speed of twenty miles an hour, without great inconvenience to the passengers. By a clever arrangement for changing gearings the gasoline vehicle can be made to ascend almost any hill, and it can be turned in half the space necessary for a horse vehicle.

It is astonishing how little fuel it takes to run a gasoline vehicle. Mr. Fischer, of the American Motor Company, showed me a phaeton, weighing 700 pounds, which, he said, would run 100 miles on five gallons of gasoline, a bare half-dollar's worth. A tricycle manufactured by the same company, weighing 150 pounds, will run eighty miles on three pints of gasoline.

Gasoline vehicles vary in cost over an even wider range than electrical vehicles. A tricycle can be obtained as low as $350, while an omnibus may cost well into the thousands. A first-class road carriage built with all the latest improvements and highly serviceable in every respect can be obtained for $1,000. At this price, the manufacturers assert that gasoline power is much cheaper than horse power. Mr. A. S. Winslow, of the National Motor Carriage Company, has made some interesting comparisons, based on an average daily run of twenty-five miles for five years— more than the maximum endurance of a first-class horse. His estimates represent ordinary city conditions, and rate the cost of the gasoline used at one-half cent a mile:

GASOLINE MOTOR VEHICLE

Original cost of vehicle	$1,000.00
Cost of operation, 1 cent per mile, twenty-five Miles per day	456.50
New sets of tires, during five years	100.00
Repairs on motor and vehicles	150.00
Painting vehicle four times	100.00
Storing and care of vehicle, $100 per year	500.00
	2,306.50

HORSE AND VEHICLE

Original cost of horse, harness, and vehicle	$ 500.00
Cost of keeping horse, $30per month, five years	1,800.00

Repairs on vehicle, including rubber tires	150.00
Shoeing horse, $3.00 per month, five years	180.00
Repairs on harness, $10.00 per year	50.00
Painting vehicle four times	100.00
	2,780.00

"At the end of five years," said Mr. Winslow, "the motor vehicle should be in reasonably good condition, while the value of the horse and carriage would be doubtful. There is always the possibility that at least one of the horses may die in five years, while the motor vehicle can always be repaired at a comparatively nominal cost. But even assuming that the relative value of each is the same at the end of five years, the cost of actual maintenance during that period would be $1,306.50 for the motor vehicle and $2,280 for the horse and vehicle, or $973.50 in favor of the motor vehicle. This comparison is really doing more than justice to the horse, because a motor vehicle can do the work of three horses without injury."

Steam has been successfully applied to the heavier grades of vehicles, notably trucks, fire-engines, and omnibuses; and two or three American manufacturers have gone still further, and have produced light and natty steam buggies and runabouts, and even steam tricycles. Steam vehicles are easily started and stopped, and fuel and water are always readily obtainable; but there is also the disadvantage of a slight cloud of steam escaping from the exhaust, accompanied by more or less noise. Moreover, in many States there are regulations (mostly unenforced in the case of motor vehicles) against the operation of steam engines except by licensed engineers, and it is probable that steam automobiles will not be widely accepted for pleasure purposes until the inventors have succeeded in producing a strictly automatic engine.

Much has been said recently as to the use of compressed air for heavy trucks, and several immense corporations have been organized to promote its use. At least one truck has actually been constructed. The air is compressed at a central station, and admitted to heavy steel storage bottles, or tubes, connected with the truck, and is used much like steam. The main difficulty in the process has been the sudden cooling of the machinery when the air is released from pressure and begins to take up heat. Often the pipes and valves are frozen solid. To deal with this problem, a jacket of water heated by a gasoline flame is provided for "reheating" the air, a difficult and cumbersome process. Owing to the weight of the steel tubes, the compressed-air vehicles are enormously heavy, and, like electric vehicles, they must return to some charging station, after traveling twenty or thirty miles, for a new supply of power. And yet both inventors and financial promoters are sanguine of ultimate success with them.

A Chicago inventor has been building a truck in which he combines gasoline and electrical power. An eight-horsepower gasoline engine situated over the front axle drives an electrical generator, which in turn feeds a small storage battery, thus producing power as the vehicle moves, and rendering it entirely independent of a charging-station. One man can handle the entire truck, and it is said that the cost of operation will not exceed 80 cents a day. The main objection to this system, as with compressed air, is the enormous weight of the vehicle, which is upwards of 9,000 pounds. The truck has a carrying capacity of eight tons, making a total of 25,000 pounds. Such a vehicle presents problems which modern pavement builders have yet to solve.

But the time is certainly coming, and that soon, when all heavy loads must be drawn by automobiles. Recent English experiments, already mentioned, have established the feasibility of the auto-truck even in its present experimental stage, and the inventor needs no further

encouragement to prosecute his work. It is hardly possible to conceive the appearance of a crowded wholesale street in the day of the automatic vehicle. In the first place, it will be almost as quiet as a country lane—all the crash of horses' hoofs and the rumble of steel tires will be gone. The vehicles will be fewer and heavier, although much shorter than the present truck and span, so that the streets will appear much less crowded. And with larger loads, more room, and less necessary attention, more business can be done, and at less expense.

A New York manufacturer produces an odd variation of the motor vehicle in what he calls a "mechanical horse." It is a one or three-wheeled equipment provided with an electric motor, and it can be attached to almost any kind of carriage or wagon and made to draw like a veritable mechanical horse. In this connection, a French manufacturer of a similar equipment says that of the 7,750,000 horse vehicles now used in France, 4,000,000 could be transformed into automobiles, although such a change would probably be impracticable.

Although the American public has not adopted the motor vehicle as rapidly as the French and English, American manufacturers are already well in the lead. It is a significant fact that more vehicles, five times over, are already being exported than are sold here at home.

A well-known engineer who has just returned from an exhaustive investigation of automobiles in France says that the European takes an absolutely different view of the automobile from the American.

"The Frenchman," he says, "seems to love his mechanical effects. He makes no attempt to conceal the machinery of his vehicle or to avoid the staggering effect upon the uninitiated of a complex mechanism. His gears are unhoused and his gliding surfaces are left exposed to dust and mud, and he sits among his wheels and levers and brakes and pulleys, a veritable god in the machine. He evidently takes pride in exhibiting his ability to manipulate such a complicated mass of machinery. In America, public enthusiasm has not yet reached the stage in which it can bear the shock of an ordinary examination of such vehicles. We are building carriages, not machines, and making them so simple that a child can run them. Perhaps that is the reason why foreigners are so fond of our vehicles."

As to just what form the future motor vehicle will take there is the widest diversity of opinion. Business clashes with art. Horse carriages are built high so that the driver can see over the horse and avoid the dust. The first motor vehicles were merely "carriages-without-the-horse," and some of them looked clumsy and odd enough, "bobbed off in front," as one man described them. Strangely enough, however, manufacturers say that at present the public demands just such vehicles, the low, light, and comfortable models being too much of an innovation to sell.

"But you may depend upon it," one manufacturer told me, "the future motor vehicle will be within a step of the ground, with an artistically rounded front, neither a machine nor a carriage-without-the-horse, but a new and distinct type—the motor vehicle."

The utility of the automobile in any city is in direct proportion to the condition of its streets. It is hardly surprising that manufacturers are receiving the greatest number of inquiries from cities like Buffalo and Detroit, where the pavements are good, and from California and part of New England. The automobile has had such acceptance in France because the highways are all as smooth as park paths. Bicycling already has had a profound influence in spurring the road-makers, and the introduction of the motor vehicle will be still more effective. Colonel Waring estimated that two-thirds of all street dirt is traceable directly to the horse. At present it costs New York nearly $3,000,000 a year to clean its streets. With new pavements such as the new soft-tired vehicles and the absence of pounding hoofs would make possible, street cleaning

would become a minor problem. And new asphalt pavement, the best in the world, could be put down at the rate of forty miles a year for what New York now spends for half cleaning its streets.

As yet American lawmakers have hardly touched on the subject of motor vehicles. In New York, if drivers keep out of Central Park, display a light, ring a gong, and do not speed faster than eight miles an hour, no one interferes with them. Similar regulations prevail in Boston and in other American cities. In Brooklyn, the parks are free. France and England, on the other hand, hedge in automobile drivers with all manner of rules and regulations, and require them to be officially licensed. In France, by recently promulgated articles, every type of vehicle employed must offer complete conditions of security in its mechanism, its steering-gear, and its brakes. The constructors of automobiles must have the specifications of each type of machine verified by the Service des Mines. After a certificate of such verification has been granted, the constructor is at liberty to manufacture an unlimited number of vehicles. Each vehicle must bear the name of the constructor, an indication of the type of machine, the number of the vehicle in that type, and the name and domicile of its owner. No one may drive an automobile who is not the holder of a certificate of capacity signed by the prefect of the department in which he resides.

The regulations are most explicit on the important question of speed. In narrow or crowded thoroughfares the speed must be reduced to walking pace. In no case may the speed exceed eighteen and one-half miles an hour in the open country or twelve and one-half miles an hour when passing houses. Relative to signals, the regulations say that “the approach of an automobile must, if necessary, be signaled by means of a trumpet.” Each automobile must be provided with two lamps, one white, the other green. Racing is allowed, provided an authorization is obtained from the prefect and the mayors are warned. In racing, the speed of eighteen and one-half miles an hour may be exceeded in the open country, but when passing houses, the maximum of twelve and one-half miles must not be exceeded.

One curious difficulty in connection with the new vehicle is the difficulty of finding suitable English names to designate it and its driver. The French, with characteristic readiness in getting settled names for things, have, as already noted, formally adopted the word “automobile” for the vehicle and “chauffeur” (stoker) for the driver. But we of the English tongue are slower. At least a dozen names have been used to a greater or less extent, such as “motor carriage,” “auto-carriage,” and “horseless carriage.” In England, “self-propeller” is popular and so is “auto-car,” the latter being apparently the favored designation. Mr. E. P. Ingersoll of the “Horseless Age,” who has canvassed the question thoroughly, says that “motor vehicle” seems to be the more generally accepted designation in this country. But whatever it is, or is yet to be, called, the thing itself must now be rated an accepted and established appliances of everyday life. Even if it stopped in its development just where it now is, it must still be accounted of positive and enduring utility; and with the simplifications and cheapening that are sure to be effected by inventive genius and commercial shrewdness in a very short time, its universal adoption is inevitable, and is probably very near.