

AUTOMOBILISM IN PARIS.

Great strides have been made in the world of automobiles within the last eight years. In 1890 Messrs. Serpollet and Archdeacon attempted the journey from Paris to Lyons. The difficulties they encountered from the very commencement were enormous and such as would very soon discourage any automobilist of the present day. Endowed as they were with a more than ordinary degree of perseverance and patience, they succeeded in effecting the journey in the time of ten days! In very truth, "tempora mutantur." Now the distance can be made in as many hours.

In any account of present day automobilism, the name of M. Pierre Giffard, the director of the Velo, and formerly on the staff of the Petit Journal, must be mentioned. Four years ago carriages with mechanical motors were practically unknown. At this time M. Giffard commenced a war against the prejudices of the public on this subject, and with the patronage of the Petit Journal, organized in 1894 the first great automobile race ever witnessed, from Paris to Rouen. Great excitement was manifested as to the issue of the race, and speculations were made as to the relative merits of steam and petroleum. The Count de Dion competed with a steam motor (see the SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 1080 and 1182), while Messrs. Levassor and Peugeot opposed him with petroleum-driven machines (shown in the SCIENTIFIC AMERICAN for July 20, 1895). Ten competitors appeared at the starting point at Neuilly. According to the regulations, it was not only the speed that would be considered by the judges in awarding the prize; the flexibility and power of endurance of the machines would also receive due allowance.

The race took place, and though the steam-driven machine came in easily first, the prize was not allotted to it alone. Messrs. Levassor and Peugeot were classed as winners on the same level as M. de Dion, and the future of the petroleum-driven motor car was assured. Qualities essentially practical were discovered in it, and the fact that any one, not necessarily an engineer, could steer and manage it, was sufficient assurance of the success it was destined to attain. The race is illustrated and described in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 979.

Six months later, at the exhibition of the Salon du Cycle, held in the Palais de l'Industrie, automobile carriages were permitted to appear; the crowd collected round these innovations in steam and petroleum, their interest in the bicycle stands being considerably diminished in favor of these novelties.

The following year it was felt that another race must be run, but this time no conditions should be laid which would leave in doubt the real merit of the different machines. Speed alone should decide the race and the whole unrestricted power of the motors should be exhibited.

The route decided upon was Paris to Bordeaux and back. Subscriptions rolled in, and one hundred thousand francs were quickly raised to meet the organization expenses and to pay for the prizes.

The advocates of steam for motors do not give in. Messrs. de Dion, Serpollet, and Bollée engage actively in the construction of machines which they hope will show to the world its superiority over petroleum.

The advocates of the latter, however, also prepare for an exploit which will, they feel confident, bring confusion and defeat on their rivals.

Electricity as a motor is also taken up by M. Jeantaud (see the SCIENTIFIC AMERICAN for March 23, 1895), who, at considerable expense, obtains a special train to place at periodical stages of the journey between Paris and Bordeaux fresh accumulators, etc., which his carriage is to take up on the way.

On June 10 the automobiles assembled at the Arc de Triomphe, in the presence of an enormous crowd. From there they went, at a moderate pace, to Versailles, where the real start was given. A few kilometers farther on the steam automobiles come to grief. Twelve hours pass, when news arrives that M. Levassor, on his petroleum auto-car, is an hour and a half ahead of his rivals. Twenty-four hours pass, and already he has reached Bordeaux and is back on the return journey to Paris, crossing his rivals on the road with an advance of four hours. No sign of fatigue either in man or machine can be seen. Porte Maillot is reached at last, the whole distance of 1,200 kilometers having been run in 48 hours 47 minutes. (See the account of the race published in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 1023.) Signal victory for the petroleum motor. The 1895 race bore fruit immediately. A great project had long been resolved upon in his mind by the Count de Dion to found a club for the defense and encouragement of automobile riding—to create the Automobile Club of France. The race from Paris to Marseilles in 1897 was a great success, and is described in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 1096.

At the present date automobiles form an important element in the circulation of our towns. Nowhere are they more popular than in Paris; nowhere is any real progress, any fresh idea, likely to receive encouragement so much as there. Every morning the Champs Elysées, the Bois de Boulogne, and the avenues branch-

ing off from the Arc de Triomphe are alive with these horseless carriages of all kinds and traveling at a speed far surpassing that of any rival vehicle. Especially on Sundays may they be seen to best advantage in this aristocratic quarter of Paris; in fact, the number of automobilists and cyclists seems to surpass the number of the pedestrians.

No sooner had the automobile been acknowledged to be a practical thing than the bicyclists themselves were the very first to become its votaries. Naturally they were already accustomed to the dangers of the roads and thus cut out to become excellent "chauffeurs;" in fact, it was through them that the automobile was first introduced to the public.

The best known cyclists quickly mastered all the details connected with the new sport and became trainers of the aristocracy, who so eagerly took up the new sport. René de Kuyff had the Prince of Wales as his pupil, while Lambajack, the famous tandemist, gave lessons to the Duchesse d'Uzès.

But if the automobile were to remain the exclusive property of the wealthy, and of those favored by fortune, it would never obtain the popular favor without which its success would not be assured. So that the question may be asked: Can an automobile be bought nowadays in full confidence? Will not the prices lower? The fact is that those who bought machines two years ago have gained small fortunes. The best constructors not being in a position for the last two years to deliver a machine ordered in a shorter time than eighteen months after the order had been given, it may easily be understood that a machine from the same firm, bought on the spot, has a far greater marketable value. A carriage ordered at the price of nine thousand francs in eighteen months is readily sold for eighteen thousand francs, payable at the present time. So that the speculation consists in immediately ordering carriages at catalogue price and selling them the day they are delivered for some thousands of francs more than they have cost one. Hence, from a pecuniary point of view, no loss may be feared in purchasing a machine from a reputable firm; one would, indeed, be more likely to gain than to lose. An automobile, however, should not be bought without taking the advice of a disinterested specialist.

Automobiles in actual use may be divided into three classes. First, motorcycles; second, carriages; third, heavy luggage vehicles.

First.—The motorcycle is a cycle furnished with a mechanical motor, often supplied with ball bearings, tube frames, pneumatic tires, etc., in fact, it is more of a cycle than a carriage.

The best known is that of the firm De Dion et Bouton, the "tricycle à pétrole," which has been in existence three years. The motor is vertical and is placed in the rear, while the explosive mixture is lit by an electric spark, so that besides the petroleum apparatus a galvanic battery, etc., must be carried. The working of the driving and steering arrangement is mere child's play and can be learned in half an hour.

The great advantage of De Dion's machine is its relative cheapness and the small amount of care and attention it necessitates.

The serious defect, in the opinion of many, of the petroleum tricycle is that there is only one seat. The simplest remedy to this is to convert the simple tricycle into a tandem tricycle by lengthening the frame. This only increases the weight by 3 or 4 kilos, the only inconvenience now being that the tricycle cannot be reduced to a machine with only one seat when only one rider wishes to mount it.

The most generally adopted solution is that of the "towing-carriage," the tricycle serving as traction motor, while an iron bar is attached to the shaft of a small spring carriage with pneumatic wheels in which two persons may be seated. Average hills are readily mounted, while a slight amount of pedaling is all that is needed during a steep ascent.

This motor of the firm De Dion et Bouton has had an enormous success and has been applied in numerous ways. With it there have been provided automobile bicycles, quadricycles, and even boats.

Another vehicle, the Bollée (see the SCIENTIFIC AMERICAN for October 17, 1890), is in the first rank of motorcycles. This is a long machine, very low and stable, with two seats, the lady seated in front, the gentleman behind, steering. This is also a tricycle, but with the direction effected by the two wheels, which are in front, and the propulsion only by one in place of two. The lighting is obtained by an incandescent tube. This is a very rapid machine and a very fine hill climber. Only a few months ago, during the "Critérium des motocycles," which took place from Etampes to Chartres, a "Bollée" automobile with double motor of 8 horse power, mounted by M. Leon Bollée, the inventor, accomplished the distance of 100 kilometers in 1 hour 52 minutes, i. e., at an average pace of 51 kilometers an hour! This is the world's record for that distance for any kind of road machine whatever.

The price of motorcycles is comparatively moderate and ranges between 1,000 and 3,000 francs. The fortune of the automobile certainly depends on the progress attained by this class.

Second.—The class of carriages is represented by a more considerable number of builders. Here the motors are more powerful, while the framework of the machine is as comfortable as an ordinary carriage. It is capable too of all the movements required of it if harnessed to a horse, while it may be specially noticed that a retrograde movement is possible, which cannot be said of the motorcycle.

The weight of the carriages of this second class varies considerably. Generally a carriage with two seats with a motor of approximately 3 horse power weighs about 400 kilos. For four places and 6 horse power it may weigh between 700 and 800 kilos. The weight diminishes, however, day by day in proportion to the improvements in manufacture. The firm Panhard & Levassor is the most important in this class. Its principal rival is Peugeot, a firm which won the demonstration races from Paris to Rouen and Paris to Bordeaux in 1894 and 1895 respectively.

Petroleum is used by all the models in this class, though there are not lacking defenders of steam as a motive power.

M. Serpollet, the constructor of the Serpollet trams circulating in Paris, has brought out apparatus which seem as though they would finally give steam the superiority. These new types comprise very light generators, the heating of which is effected by petroleum burners, which give a flame great in proportion to the quantity of water to be converted into steam. The pressure of these burners varies between 50 grammes and 3 kilos., thus bringing into instantaneous equilibrium the effort of the motor and the resistance of the road.

The motor used on these carriages is of an entirely new system, requiring no care so far as oiling is concerned, so that steam may again speedily become a formidable rival to petroleum. The carriage is illustrated in the SCIENTIFIC AMERICAN for February 21, 1891.

Electricity, too, has made its "debut" in locomotion. An almost perfect electric motor has been found.

Backward and forward motion, and excellent brake arrangement, by the play of a simple commutator placed under the driver's hand, absence of noise, smell, or vibration, are only a few of the qualities of this wonderful motor.

It has only one fault, an immense quantity of electricity is wanted. Special accumulators, the charging of which is slow, though their emptying is rapid enough, have to be taken up. These accumulators are very heavy; 400 or 500 kilos. of them are required for a carriage in advancing 60 kilometers. Then they have to be refilled at the works. Accordingly, electric carriages can only be employed within a small radius of these works, from which the supply of energy is obtained. Still, they seem to be destined for a great future in town locomotion by reason of the ease with which accumulators may be obtained.

Third.—The third class of automobiles, public or heavyweight carriages, is necessarily restricted. They are all moved by steam. A curiosity may be mentioned, the automobile rolling house. When small, and arranged for two persons only, a petroleum motor of 12 horse power drags it along at the rate of 15 kilometers an hour. When large and containing a regular apartment for two couples and four servants, a steam motor of 35 horse power is required, though it is not safe to travel at a fast rate than 8 kilometers per hour.

Special police regulations are necessarily required, and it is found that the only regulation to-day applicable to automobile locomotion dates from 1893, at a period when the automobile, such as it appears now, was practically non-existent. According to this law, the pace ought not to exceed 8 kilometers per hour (the average speed of automobiles is 45 kilometers), the minimum for an ordinary cab.

The "chauffeur" is not permitted to leave, even for a moment, his automobile along the curb of the footpath, unless under supervision. Now, the automobile, once the motive power is turned off, cannot gallop away like a horse. To be just, a limit of speed, difficult to fix upon though it be, ought to be imposed on all kinds of mechanical carriages, as well those which now seem to enjoy a monopoly of speed as on the inoffensive automobile.

Another thorny question: Is the automobile dangerous to foot passengers? The compact mass of the iron steed rushing along at a great speed is certainly an object of dread to the passer-by. Ignorance, however, is the cause of his fear. Any automobile can be brought to a halt in two meters; a mechanical carriage of 700 kilos. possesses more rapid and powerful brakes than an omnibus with three horses, weighing 5,000 kilos. In reality there is no mechanism more inoffensive, no means of transport more sure and safe.

This industry, which has received its birth in France and has here reached its present stage of development, is yet young. Still, even in this its youthful age, the automobile can even now render good service and give a pleasure unobtainable by any other means. If there are faults (and no one denies the fact), only time is wanted to make them disappear, and it needs no great prophet to predict that within a very few years a

stage not far from perfection will have been reached. Meanwhile we can only keep pace with the time by studying this new device and watching its progress, which, if we do, we shall be astonished at the rapid strides being made in our midst by science in this its most attractive manifestation, appealing to the present age more from an eminently practical standpoint than from any other. A. HENRY.

Paris, France.

WOODS' ELECTRIC MOTOR VEHICLES.

The art of motor vehicle construction has made such progress in the United States that one firm, the Fischer Equipment Company, of Chicago, are enabled to present twenty-nine different types of vehicles, including road wagons, runabout buggies, park buggies, park traps, brakes, stanhopps, phaetons, spiders, full mail phaetons, demi-mail phaetons, physicians' coupes, hansom cabs, victoria hansom cabs, landaus, station wagons, coach delivery wagons, hood delivery wagons, theater buses and depot buses. In fact, the company has about the same range of diversity in design that is offered by the large carriage manufacturers' catalogues of ordinary horse-drawn vehicles. The company are sole manufacturers of the "Woods' moto-vehicles," as they are pleased to term them. Elsewhere in this issue we give an illustration of a group of these vehicles as assembled before the Calumet Club, Chicago, preparatory to a run on the boulevards and avenues of that city.

The different types and characters are well set forth, and show that the art of the carriage builder has been admirably combined with the work of the electrician and the mechanic. The work of Mr. Woods on behalf of his company has been exclusively toward the production of fine artistic carriages and all the various styles and characters known to the carriage maker's trade, rather than the mere production of a self-propelling machine. The company is thoroughly well equipped for the manufacture of horseless carriages, and every part of them, with the exception of the rubber tires, is made in the factory. This insures a uniformity of workmanship and interchangeability of parts which is entirely advantageous to the purchasers.

Our engravings represent the Woods' hansom cab and a two-seated trap. The hansom cab is a particularly fine specimen of the carriage builder's art. The driver sits back of the passenger and from his seat controls the motors and steers the vehicle. So simple is the mechanism that any driver of ordinary intelligence can learn to operate it in a very short time. The cab is equipped with two motors giving $6\frac{1}{2}$ horse power, that is, sufficient battery capacity to run thirty miles with one charge of batteries. There are electric lights in the side lanterns and electric lights and electric foot warmers in the interior of the body. It is designed for use on any and all streets and runs at speeds which vary from 3 to 12 miles an hour. The total weight of these cabs is 2,600 pounds. Our other engraving shows an admirable two-seated trap to accommodate four persons.

The Fischer Equipment Company are making arrangements to build a large number of Woods' electric cabs for use in the city of Chicago, and in some of the large cities they have been received with so much favor that they are filling many orders for private use, and are building a number of vehicles for European trade.

The Woods' moto-vehicles are admirably designed, and one noticeable thing is that wood wheels and hard rubber tires are used almost exclusively. In practical tests of both wire wheels and pneumatic tires and wood wheels and solid rubber tires, it has been demonstrated to the satisfaction of the designer that the latter are far more desirable and endurable in many ways than the former, and present a more satisfactory appearance, and all annoyances due to punctures are done away with.

The control and operation of these vehicles has been reduced to much simplicity, so that it does not take

long to acquire the skill necessary to operate them satisfactorily. One important feature is, that it is impossible to apply the brake to any of these vehicles without first cutting the power off from the motors. It is, also, impossible to apply the power without first liberating the brake. This is accomplished by an interlocking device between the brake and controller, the opera-

In the light road buggy one motor is used with a differential gear, but in all the Woods' motor vehicles for hard and heavy work two motors are provided, one attached to either rear wheel, and every provision is made for automatic adjustment for the turning of corners or the turning of the vehicle completely around. The motors themselves are built with ironclad arma-

tures and special coil windings, which coils are wound before being placed upon the armature. This enables the coils to be shipped anywhere, so that they can be fitted into the armature without any difficulty whatever by those who understand nothing about armature winding. The batteries may be charged while in the vehicle or duplicate sets may be substituted for them. The batteries are economical and the stated mileage capacity is conservative, and, under the proper conditions, the carriages will do 25 per cent more than their actual guaranteed figure.

The Consulting Cyclist.

The growing use of the bicycle and its frequent prescription as a means to health suggests, as a possibility, which, in fact, is already not far from its accomplishment, the evolution of a new kind of medical specialist, the consulting cyclist, who will devote himself to giving medical and practical advice as to all that concerns the use of the machine; whether to ride or not; what sort of a machine to ride; at what pace to ride; how the saddle is to be adjusted; where the handles are to be set; how the machine should be geared, etc.; all being things which differ for each individual. For, in truth, the fitting of the machine to the individual is a matter of no small nicety, and is one in regard to which the advice of a medical man knowing in such matters is of considerable importance. Many a doctor recommends the use of a 'cycle who is himself no cyclist, just as he may recommend hydropathic treatment, although he may know but little about the various combinations of bath treatment which will be found of greatest use at the particular spa resorted to. In stating the broad fact that cycling will do good, he is acting within the range of his own knowledge and experience; but when he is asked about speed and gears and lengths of run, unless he is a cyclist as well as a medical man, he is apt to find himself at sea, and so is tempted either to deal with these matters "on general principles" or to refer his patient to the dealer. But surely the decision as to all the details of bicycling, especially when bicycling is undertaken for health purposes, is a medical affair, and is also one which may very properly be made a specialty.—Hospital.

Bridges for Russia.

The Phoenix Bridge Company, of Phoenixville, Pa., has just received a contract for twelve steel bridges for the Russian government, and work will be commenced at once. The bridges are for the Eastern Chinese Railway, the southeastern extension of the Trans-Siberian Railroad. Work will be hastened as much as possible, in order that the material will reach its destination before winter begins. It will be shipped to St. Petersburg and thence by rail to Vladivostock. An engineer of the railway is now in Phoenixville, superintending the work.

Fall of Meteors in Indiana.

Two meteors fell at Vincennes, Indiana, on May 1. One struck a slab of stone on a Baltimore & Ohio freight car just as the train had crossed the Wabash bridge, and the slab was shattered by it. The other meteor struck a pile of brick with a loud noise and broke it into small fragments. It is doubtful if the fragments have been examined by scientific men as yet, but from newspaper accounts they appear to have been of a rocky rather than a metallic nature.

WYCLIFF'S English Bible, usually known as the Bramhall manuscript, from the Ashburnham collection, was sold at auction for \$8,750, on May 1.



WOODS' VICTORIA HANSON CAB.



AN UP-TO-DATE VEHICLE MADE BY FISCHER EQUIPMENT COMPANY.

tion of both being effected by the manipulation of a single handle. A separate reversing switch is used which is provided with a lock, so that when the key is removed the vehicle cannot be operated by anyone not possessing a key. The various speeds are obtained by series paralleling the batteries, and in this work great pains have been taken to insure a uniformity of discharge from the batteries when in parallel; and contacts and connections of nearly four times the cross section ordinarily required are used, so that the resistance may be perfectly uniform.