SOME EARLY FORMS OF THE AUTOMOBILE.

The great interest and activity which have been shown during the present decade in the question of automobilism, and the fact that early in the previous decade such a thing as a practical automobile did not exist, would lead one to suppose that this was an entirely modern method of locomotion—an attempt, in fact, to extend the autotractive principles of the locomotive to our city streets and country highways. As a matter of fact, however, the automobile antedates the locomotive. The rude steam carriage of Cugnot was built over half a century before the locomotive, and a practical steam coach was carrying people on the roads several years before the railway was an assured success. Indeed, some excellently designed and successful steam coaches were in operation and running on a regular schedule during the early years of the steam railway, and had it not been for the sudden diversion of public interest and capital from road traction to rail traction, we would not at this late day be working on the problem of the best forms of body, frames, and motor for locomotion on the roads.

Unquestionably, the credit of having designed and constructed the first mechanical road carriage belongs to a Frenchman, Nicolas Joseph Cugnot, who built and ran in 1763 a successful model, and subsequently, in 1769, constructed for the French government a three-wheeled steam gun-carriage for transporting heavy ordnance. The well known illustrations of this carriage show it to have been a very crude affair. It was carried upon three wheels; the gun resting between the larger wheels, and the boiler and engines being placed so as to overhang the trolley. This single wheel was both driving and steering wheel in one, and it turned about a king-pin, the vertical engines being so mounted as to permit this rotation. The boiler was a kettle-shaped affair, with a fire-box formed in its base, and a steam pipe which led from the dome-shaped top to a two-way valve, communicating with a pair of vertical bronze cylinders. The rotary motion was secured by means of pawls on the piston rods and ratchet wheels fixed to the driving wheel. Crude as Cugnot's machine was, he deserves every credit as the pioneer builder of an automobile carriage.

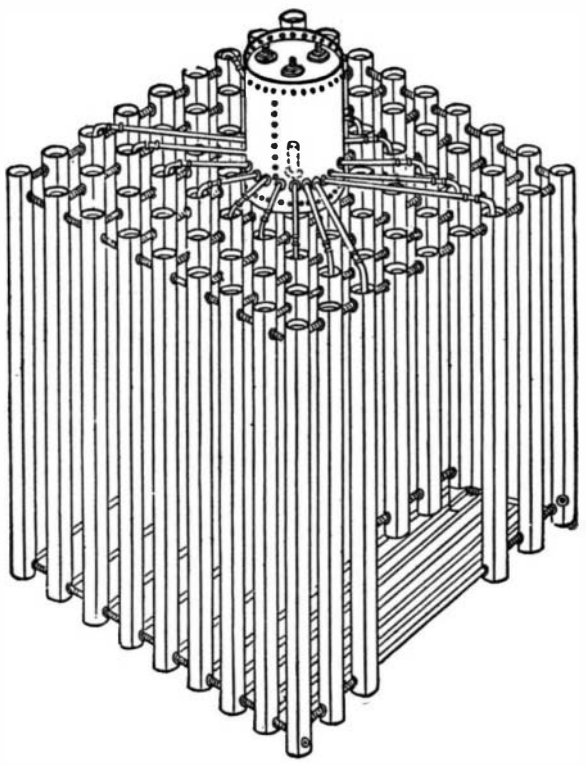
For the next practical carriage we must cross to England, where Murdoch, in 1781, built and ran a model steam tricycle which is now preserved in the Birmingham Museum. William Symington, whose name is closely associated with the early development of the steamship, turned his attention to steam road carriages, and in 1786 built a road coach in which the movements of two pistons were communicated to the driving wheels by racks and pinions.

In America the name of Oliver Evans is honorably associated with the history of the steam carriage. In 1786 he applied to the Legislatures of Pennsylvania and Maryland for a patent on steam wagons, and began the construction of one, although later he neglected it for other pressing and more profitable enterprises. About this time, however, he moved an engine from the factory, where it was made, to its final position by placing it on wheels and gearing the wheels to the crankshaft. Nathan Read, in 1790, applied for a patent on a steam carriage and constructed a model. He proposed to use two double acting steam engines, and his design is specially meritorious because he made use of his multitubular boiler—an indispensable element to the complete success of steam-driven carriages.

In tracing the growth of the automobile we must again cross to England and take note of the work of Trevithick, the man who, perhaps, more than all others, is entitled to be called the Father of the Locomotive. During the closing years of the eighteenth century be built several models, and in 1801 he built a full sized road coach which had its trial on Christmas eve of that year. A quaint account of the trip by an eye witness and participant will bear repetition: "In the year 1801, upon Christmas Eve, towards evening, Captain Dick (Trevithick) got up steam. . . . When we see'd that Captain Dick was a-going to turn on steam, we jumped up, as many as could—maybe seven or eight of us. 'Twas a stiffish hill going from the Weith up to Comborne beacon, but she went up like a little bird. . . . As we were very squeezed together, I jumped off. She was going faster than I could walk, and went on up the hill a quarter of a mile further." Pretty good work for a trial trip, up hill, with an overload of passengers, and in the year 1801!

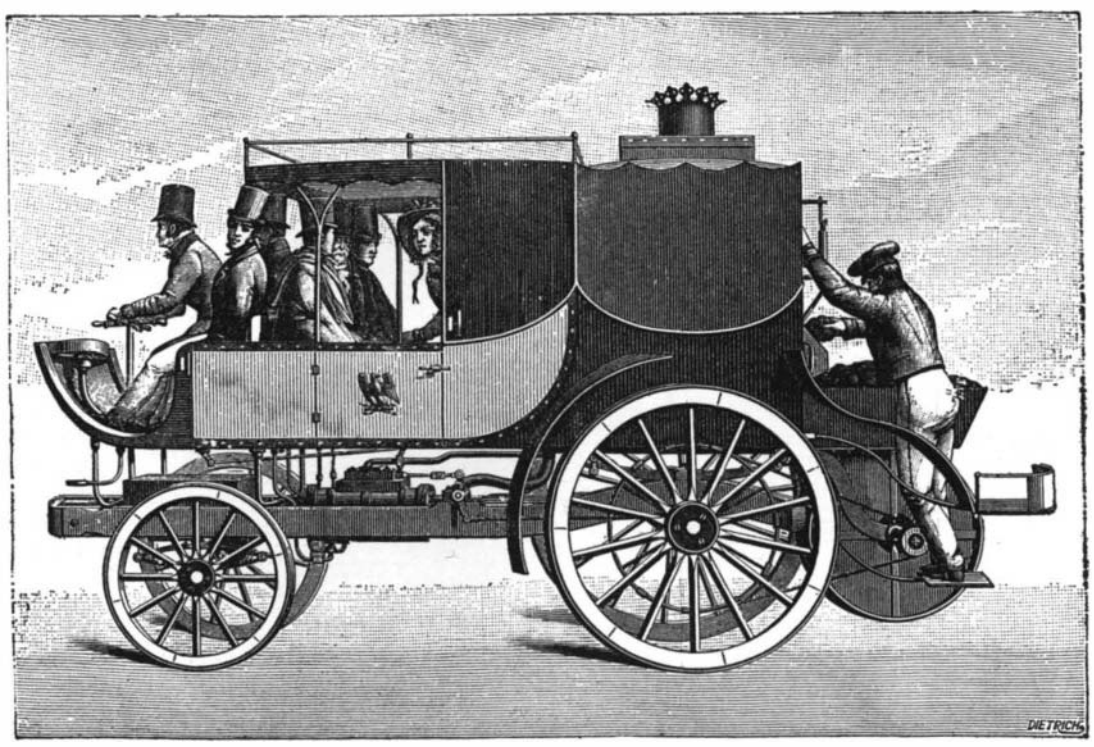
Trevithick, like many a pioneer inventor before and since, grew disgusted with the opposition or apathy of the public and turned his genius in other directions. He was succeeded by less talented and practical men, who, fearful that they could not secure sufficient adhesion, built rack railways, or attempted, like Brunton in 1813, to imitate the action of a horse's legs, and actually built machines that were prodded along by jointed iron legs that pushed against the ground.

The first attempt to place on the roads a mechanically propelled stage coach was made by W. James, assisted by Sir James Anderson. The illustrations show this very ambitious vehicle, which was capable of carrying twenty people, to have been modeled on the lines of the horse drawn stage coach. It was driven by a pair of two-cylinder engines, and it proved its carrying ability when, on the failure of one of the engines, it made the homeward trip from Epping Forest to London at seven miles an hour with a full load of passengers.



MACERONE AND SQUIRE'S WATER-TUBE BOILER. PRESSURE 150 POUNDS.

In 1822 Sir Goldsworthy Gurney, a man of high scientific attainments, took up the steam-carriage problem and placed several steam coaches on the highroads. He succeeded in climbing the steepest hills in and around London, and only gave up his attempts when the opposition of vested interests rendered them unprofitable. At the same period Hancock was achieving remarkable success in the construction of large steam omnibuses, of which he built nine in all.



THE MACERONE AND SQUIRE STEAM CARRIAGE, 1833.

Cylinders, 7⅛ inches by 15¾ inches; water-tube boiler, forced draught, and 150 pounds steam pressure; average speed, 14 miles an hour.

Upon the retirement of Gurney, one of his employes, J. Squire by name, constructed a steam carriage. Assisted by Col. Macerone, he subsequently built several practical carriages, one of which is shown in the accompanying illustration. It will be seen that it was a four-wheeled affair, with the passenger accommodation in front and the boiler behind. The latter was of the vertical, water-tube type (see cut) with a central steam receiver, and carried a working pressure of 150 pounds! Think of that! A pressure which engineers in most other lines of mechanical development did not venture to use until half a century later. The engines were mounted between the frames and connected to cranks on the rear axle. The cylinders were 7½ inches diameter by 15¾ inches stroke. The furnace, which was practically self-fed, was fed from a hopper, and forced draught was secured by means of a fan, driven by belting from a pulley on one of the rear wheels. This coach ran 1,700 miles without repairs. It used coke for fuel, at a cost of about seven cents per mile, and its average speed was 14 miles an hour.

It is beyond the scope of this article to pursue the subject further or speak of the labors of such men as Benstall and Hill, Anderson and James, Heaton, Church, and the great Scott-Russell, builder of the "Great Eastern," and others less known; but enough has been said to prove that the present activity in automobilism is merely a revival of an industry which, over sixty years ago, had advanced to a high stage of perfection, and but for the success of the railroad and the bitter opposition of the stage coach and other vested interests, would undoubtedly have kept pace in its own sphere of usefulness with the steam railroad. The attempt to establish the steam carriage on a permanent footing failed, and, except for occasional and widely separated attempts to improve on the early forms, nothing was done for a period of half a century. The next serious attempt to develop the automobile was to take place in the country of the pioneer builder of these machines, for to France belongs the credit for the modern revival of the mechanical road carriage. A condensed history of automobilism in Paris (which is France) will be found in another column.

A Novel Path for Bicyclists.

The lot of the wheelman is not a particularly happy one in the mountainous region about Los Angeles and Pasadena, in Southern California, for cycle paths are unknown, and beyond the city limits the country is so rolling that the pleasures of cycling are not commensurate with the pains. All this is to be changed, however, by the construction of an elaborate wheelway which is probably unique.

An elevated cycle path is to be erected between the two places, which will be nine miles long. It will be remembered that Pasadena and Los Angeles are sister cities, and the problem of transportation between them has been slow of solution, owing to the fact that the country between the two places is of such a rolling character, and also on account of the numerous waterways, or "arroyos secos," as they are called. The cities are now connected by three railroads and one electric road. There was, however, no foot road for cyclists. The common wagon roads, with their dust and mud and ruts, had to be followed, which made cycling anything but pleasant. In spite of these drawbacks, there was a certain amount of bicycle riding between the two cities, and in the face of discouraging circumstances, it was found that there were at least 30,000 wheelmen in Los Angeles County alone. In view of these facts, Mr. Horace M. Dobbins, of Pasadena, organized what is known as the "California Cycleway Company." The capital was quickly forthcoming, and plans were drawn for an elevated speedway between the sister cities, which is to be exclusively devoted to cyclists. The franchise and rights of way have now been obtained and the work has actually begun.

The path is supported by pillars of varying heights to take up the inequalities in grade. The floor is of boards and is 10 feet wide. There is a 4-foot lattice work fence on each side, to protect the cyclists. The pathway will be lighted by electric lights, staggered across at intervals, as on the Brooklyn Bridge. Midway between the two cities a park and casino will be built by the company. The charge for the use of the structure will be merely nominal, and annual passes will be issued with each share of stock. Special attention has been paid to the grades, and the trip northward to Pasadena from Los Angeles will be no hardship, as the grade is almost imperceptible. Cyclists will now be permitted to view the beautiful scenery without having to look out for ruts in the road.

M. Muzin, who obtained much valuable information about the Congo region by his journey to the center of Africa, made from 1889 to 1892, died at Zanzibar.