A NEW ELEVATED TRAMWAY WITHOUT RAILS.

The question of the Paris Metropolitan Railway is the order of the day, and not a week passes without the presentation of some new project, which is very naturally superior to all others—at least in the mind of its promoter.

Whatever be the future in store for the one that we desire to lay before our readers on the present occasion, it would be difficult to deny it its dominant character—originality. The following is a resume of the considerations through which Captain Edward Mazet was led to invent his "New Metropolitan Railway without Rails, Cars, Bridges, or Tunnels." The sequel will show in what measure the system justifies its appellation. Two systems of metropolitan railways are in presence, viz., the underground and the elevated. Captain Mazet makes short work of the former of these: "What prevents and always will prevent the establishment of the first of these systems in such a city as Paris, is that it would have been necessary at the original formation of the city, in view of its present and future extension, to combine in advance the different routes that would have to be taken later on, without any possible entanglements, by the sewers, the water and gas mains, and the telegraph and telephone tubes, etc., and finally to make provision for a free and sufficient space in which a double-track railway could run without the necessity of changing any of the sewers, mains, etc., now existing.

"But, as one could not foresee what Paris would become, any more than we can divine what it will be in future time, and as we are, moreover, convinced that this impossibility of divining will be perpetuated to future ages, we believe that we can put forth the opinion that the material and financial difficulties that have accumulated since the first tribe settled upon the banks of the Seine, up to our own day, will now and forever prevent the establishment of an underground line at Paris.

"In sum, the creation of such a line *should precede* the creation of the city in which it is to be established, since, when a city is in existence with all the arteries indispensable to its life, the material and financial difficulties that present themselves may be considered as insurmountable. In the second place, the creation of an underground railway *cannot precede* the creation of a city where it is to be established, since the necessity of such a line only makes itself felt when there is an agglomeration of inhabitants, that is to say, a city.

"We see that, on the one hand, they *ought to precede*, and that, on the other, they *cannot*, and so we conclude that city underground railways must be rejected."

Captain Mazet allows ten years for the construction of an underground, and passes in review the present means of locomotion, that have become entirely insufficient, in order to demonstrate that an immediate solution of the problem is necessary.

"It is necessary that we shall in six months be able to travel in Paris with a speed of 24 miles per hour, and that trains shall pass in all the principal streets every two minutes."

The following is the judgment that he pronounces upon elevated roads:

"Foreseeing the antipathy of the Parisian to an underground road, an endeavor had to be made to seek another mode of carriage, and, for a certain length of time, a project for a railway running over bridges has been under study.

"This would have required the erecting of bridges upon pillars in all the principal streets and boulevards, and it is upon these that the trains would have run on a level with the first stories of the houses, which then would have passed to the state of ground floors, while the shops, the ornaments of Paris, would have descended into the cellars. It would have been senseless—still more so than the underground. Paris, that coquette who passes all her time and spends all her money in embellishing herself, would have been forever disfigured.

"Hideous bridges of cold-gray cast iron, hiding the houses, the hotels, the *Opera*, would have proved a mortal blow to Paris, which would have soon passed to the state of a borough.

"Fortunately, the Opera was there, well seated upon its base; and strong in its majesty and popularity, it was able to say, 'You cannot pass!' This was the obstacle, the fortunate obstacle if there ever was one, that prevented the commission of a piece of foolishness without appeal.

"But, leaving the Opera out of view, would it have been possible to allow two elevated railways to pass in such streets as Montmartre, for example? These roads would have touched each other, and would have grazed the houses and completely closed the street. A new causeway would have been created on a level with the first stories, while horses and carriages would have moved about in a forest of cast iron pillars.

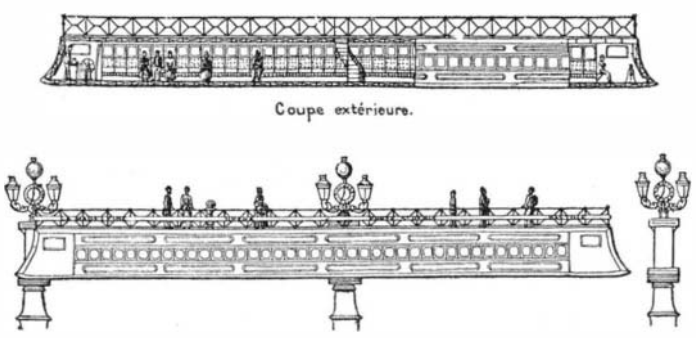

Fig. 1.

"Financially speaking, the affair was a colossal one. Mr. Songean, the president of the Municipal Committee, spoke of nothing less than a billion and a half. In face of these figures, which carry alarm with them, I shall go no further."

In the system proposed by Capt. Mazet there is no change made in the configuration of the city. In principle, it consists of a series of cast iron columns, 30 or 45 feet apart, upon which slides a boat or aerial car which is long enough to always rest upon *two* columns at once. This car is formed of double T irons connected by cross bars and diagonal stays made of light iron. The bottom slides, through the intermedium of rollers, in grooves in the columns serving as track

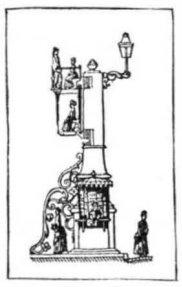

Fig. 2.

(Fig. 1). The engine room is in front, and the brake is at the rear. The rest is reserved for passengers. Fig. 2 gives a transverse section of the car, and shows how it is suspended, and also the form of the colnmns.

Fig. 3 is a perspective view showing the boat-cars running in the boulevards.

The lower part of the boat-car projects only about 3½ feet. Upon placing the columns in the line occupied by the trees, the external side of the car would be perpendicular to the edge of the sidewalk. The posts or columns replace the present lamp posts. They are about 15 feet in height, 4 feet in diameter at the base, and 20 inches at the top. The grooves are slightly fan-shaped on each side, to serve as a guide to prevent the car from missing a support, should the wind or vibrations give it an oblique direction.

"The motor may be either an electric one, supplied by Faure-Sellon-Volckmar, or Reynier, or Ayrton & Perry accumulators, or a steam one, without smoke, or a compressed air or carbonic acid one.

"If, in order to render the car lighter, or in order to obtain a greater seating capacity, the engine were done away with, the motive power would be furnished by a central station, which would set a roller or a wheel in motion.

"The lower part of the car, which passed over this roller or wheel, would be threaded so as to prevent sliding, and the car would follow its route by being carried along by the revolving rollers at each post.

"The power might be transmitted from the central station by means of an endless cable passing through underground tubes at the base of the columns, and actuating the rollers through intermediate gearing, or by means of compressed air, steam, electric conduits, etc."

We think it would be simpler and more practical to imitate what has been done in telpherage by Mr. Fleming Jenkins, to leave the motor on the car and lead the current from a central station by underground conductors, with contacts on each column. The endless cable arrangement appears to us impracticable. The same is the case with the system of propulsion consisting of a complication of racks and clicks, which would necessarily furnish abrupt and jerking movements.

We have no intention, however, of making a complete technical criticism of Capt. Mazet's project; it has sufficed to indicate the prominent lines of his very original idea. Carried out upon a small scale, it will obtain a certain success at fairs, and somewhat rejuvenate those wooden horses whose antique form is beginning to tire amateurs. Alongside of this recreative application there is another and more important one proposed by Capt. Mazet, and that is the use of the system for crossing rivers, marshes, plains, and precipices. This is shown in Fig. 4. Aside from the economic question resulting from the suppression of arches, and the facility of construction, a still more important advantage would be gained, and that is the facilitating of navigation through the rivers being no longer closed by those barriers which at present fix a limit to it. A glance at Fig. 4 will give a better idea of the matter than a long explanation.—*La Nature.*

Fig. 3.

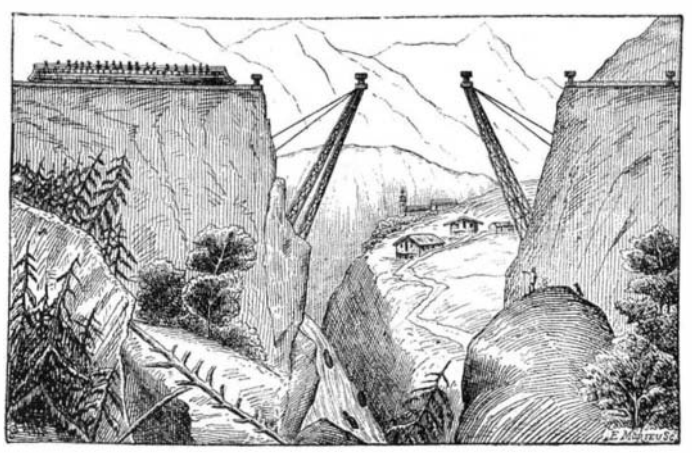

Fig. 4.

Liquefaction and Color of Ozone.

The most important discoveries during the past three years concerning the properties of ozone are those made by Hautefeuille and Chappuis. They found that ozone is a blue gas, the color appearing sky blue even when only so much ozone is present as is obtained in the ozonation of the oxygen contained in a tube a meter in length by the silent discharge. Furthermore, they found that under very great pressures the condensed gas becomes indigo blue. If the pressure is increased to 75 atmospheres and then suddenly relieved, a dense white cloud is formed, showing the beginning of liquefaction, while the same phenomenon does not take place with pure oxygen until a pressure of 300 atmospheres is attained. The ozone must be compressed slowly and with constant cooling, otherwise it will explode with evolution of heat and light. By mixing the ozone with carbon dioxide, and then submitting the mixture to great cold and pressure, Hautefeuille and Chappuis succeeded in obtaining a deep blue liquid, the blue color being due to the liquefied ozone.

The same observers have studied the absorption spectrum of ozone, and accurate measurements of the same have been made by W. N. Hartley. The latter has extended the research to the absorption of certain parts of the sun's rays by atmospheric ozone. By this new optical method he has arrived at the conclusions: 1st. That ozone is a constant constituent of the upper atmosphere. 2d. That it is present in larger amounts in the upper than in the lower part of the earth's atmosphere. 3d. That it is the cause of the blue color of the sky.—*Prof. A. R. Leeds.*

Scientific Ballast.

Some years ago a most interesting find of fossils was made at the Portland stone quarries. They were of high scientific value, and it was decided to send them to Yale College for preservation and study. They were accordingly loaded upon a flat car at Middletown and sent on their way, a car load of them. It was at that time that the fine stone bridge of the Consolidated road was being built across the Farmington River, at Windsor. After the arch of the bridge was set, the space was filled in on top with quantities of broken trap rock from the companies' quarries at Meriden. This broken stone at just this time was being drawn to Windsor by the cars for this purpose. The conductor of one train discovered the car load of fossils side-tracked at Berlin, and felt sure that it was a lot of ballast for the Windsor bridge which had been accidentally left behind. With commendable zeal he fastened to it at once, and drew it on to the bridge. There the rare fossils were dumped with the other stones, and there to-day they lie in the solid flooring of the massive bridge.—*Hartford (Conn.) Courant.*