THE CHASE-KIRCHNER AERODROMIC RAILROAD.

We have given considerable space in our columns to the experiments with aeroplanes, as executed by Prof. S. P. Langley, Hiram Maxim and others. These experiments have led to the determination of certain facts. A flat plate or surface maintained in a horizontal position and moved horizontally through the air experiences a greater resistance to its descent than it would if it descended vertically. If the surface is inclined so that its advancing edge is higher than the rear edge, it will experience a lifting effect, and under proper conditions will rise upward. Such a contrivance is termed an aeroplane. An aeroplane short in the direction of its motion receives a relatively greater sustaining effect per unit of its area than does a large one. A set of Venetian window blinds gives the idea of a good arrangement of aeroplanes.

In the present issue we illustrate a proposed high speed railroad, in whose operation aeroplanes take a part. By this system the attainment of a speed of 150 miles an hour is claimed to be possible, while for long distances a rate of 125 miles an hour is hoped for. The projectors hold that the railroad of the present time must be supplemented by some system admitting of higher speed.

To reach this speed, curves must be abolished, as the centrifugal force will be too great to be withstood. Accordingly, as far as possible, the line will go right across country from point to point, without regard to grade. Next, the road must be free from interruption; there must be no possibility of any obstacle getting on the track. This makes an elevated structure the proper one, and the one shown in the cut has been designed to secure the essential features of strength and safety. It includes an upper and a lower pair of rails, and a pair of trolley wires or leads.

The cars are of special design, with sharp ends, so as to encounter the minimum of air resistance. In cross section they are of sufficient dimensions to present the comforts of a Pullman car. They will have a trussed steel frame and metal sides, tops and floors. They are carried by wheels four to six feet in diameter, which wheels are to be placed near their tops, so that the cars will be virtually suspended from the upper rails. The axles of these wheels pass through journals near the car roof. One or more pairs of these wheels are to have two electric motors connected to their axles, so as to serve as driving wheels. The speed being so high, there will be no trouble in using direct connected motors without gearing.

The current is taken from each trolley wire by its trolley wheel, which works on an axle at about the level of the axle of the driving wheels. On the trolley wheel axle, which will be insulated, are secured collecting rings, against which brushes bear. A closed metallic circuit is to be used, two trolley wires and a pair of trolley wheels being used on each car.

So far all is simple enough, the peculiarities of the system centering on the points of straightness of line, lowering of center of gravity of car below the rails, and high speed. It is essential that there should be no curves, and any grade met is to be climbed; no deviation of route to secure an easy grade is to be allowed.

This will give many severe ascents to be overcome, and it is here that the distinguishing peculiarity of the system comes in. The car carries a series of aeroplanes, each one twenty to thirty feet long and four to five feet wide. They are mounted so as to be capable of setting at any desired angle. At a speed of 150 miles an hour, a slight inclination would give them a very powerful lifting effect. On the level they will be kept practically straight. When a grade is reached they will be set at an angle, so as to have a lifting effect. This will be graduated, so as to leave just enough traction in the driving wheels to propel the cars. It is obvious that the limit might be passed, and the wheels might turn without getting grip enough to drive the train. Here a self-regulating feature is apparent. If the wheels slipped, the car would move with reduced velocity and the aeroplanes would lift less weight. At once the traction would increase and the car would move forward, so that eventually an equilibrium would be established. It is claimed that the amount of work necessary to drive a car at high speed up a grade would be greatly diminished by the use of aeroplanes.

Underneath the car is a second set of wheels, ordinarily inactive. Above them is a line of rails inverted. By a system of levers and an air pump the engineer can throw these wheels upward at will, so that they will press against the lines of rails above them. This affords a means of increasing the traction to any desired extent, as the upper and lower wheels are thus made to act as the jaws of a clutch. The increased rolling friction thus produced may be applied for direct traction or for braking. These wheels also provide a safeguard against all swaying, or lifting of the car from the track by the aeroplanes.

In the running operation the engineer will be guided by the nature of the ground. On the level he would probably hold the aeroplanes flat and inactive. When a grade is reached, he will incline them enough to partially lift the car. The car then begins to move up in part at least upon an inclined plane of air. Its acquired velocity as well as direct traction assist this operation. It reaches the top of the grade with slightly reduced velocity, but very quickly recovers its loss. On a down grade the aeroplane may be inactive or may be turned so as to provide an enormously powerful aeroplane brake.

It is proposed to use alternating current motors, which on present lines would admit of a distance between power stations of some 200 miles. It is claimed for the system that it is as safe as the present one, has greater speed and equal comfort and luxury, is adapted to all kinds of traffic, and will be profitable. It is calculated that a straight line from New York to San Francisco would be 500 miles shorter than the present one. The construction of an elevated road across the continent seems an appallingly great piece of work, but in the United States to-day there are railroad bridges enough to give a continuous line of track from Sandy Hook to the Golden Gate. The absence of snow blockades and washouts, the abolishing of the expense of replacing railroad ties and of maintaining a ground track, the economy of the trolley system, the power to utilize water wherever met with near the line, are cited as advantages. New York and San Francisco would be brought within twenty-four hours of each other, and a route crossing Bering's Strait would bring Paris nearer in point of time than it now is by the ocean route. The use of the structure for pneumatic tubes, telephone and telegraphic wires, is obvious and is suggested by the projectors.

Electric Signaling Balloon.

The electrically signaling balloon which Mr. E. S. Bruce exhibited some two years ago, and which has since been approved by the British and Belgian governments, has now found favor with the Italian war department. The principle of the balloon is exceedingly simple. Inside a balloon with a translucent envelope a little ladder headed with six incandescent lamps is fixed, and the lamps are connected with a battery on the ground by a wire which runs side by side with the cable tethering the balloon. By means of a Morse system of long and short flashes, which illumine the balloon, messages can be telegraphed to distant points, the only requisite conditions being that the night shall be dark and clear enough. The simplicity of the invention is the most striking thing about it, and leaves one wondering that it was discovered only two years ago. The balloon which is being sent out to Italy, and which was on view recently at the Kensington town hall, is made of cambric and its envelope is perfectly translucent. It has a diameter of 18 ft. and a gas capacity of about 3,200 cubic feet. The lampholder for containing the six incandescent lamps, which are suspended inside the balloon, is in shape of a ladder, to admit of easy introduction into the narrow mouth of the balloon. The balloon equipment includes net, valve top, hose for filling, sand bags, and a special ventilated case for sea transport. The signaling lamps are sixteen candle power, fifty-five volts, and are specially constructed for the purpose. The signaling keyboard contains the Bruce signaling key, with removable carbon contacts, an ammeter, a switch to turn on the current to the lamps, either through the key for flashing signals or directly for continuous illumination, a switch to throw the ammeter into the circuit, and a safety cut-out. The weight of the whole thing amounts to less than 150 lb., and it can be packed into a receptacle the size of a lady's traveling basket.

Train Ferries.

"The people of this country," says the New York *Mail and Express*, "have for some time been familiar with car ferries which transport whole trains across rivers or estuaries so broad and deep that the traffic does not justify the expense necessary for bridging them. In New York Harbor this service has been extended, and both passenger and freight trains are regularly transported by boat the length of the East River and across the Hudson, making a railroad connection between New England and the Atlantic coast to the south of us without change of cars or break of bulk.

"The same service was inaugurated by the Central Pacific at the Straits of Carquinez, where the ferry steamer Solano carries twenty-four passenger cars or forty-eight freight cars, with the locomotive, across a strait in which the current attains a velocity of eight miles per hour, embarking and landing its train in about fifteen minutes. The New York, Philadelphia & Norfolk Railroad has for about ten years maintained a car ferry between Cape Charles and Norfolk, Va., a distance of thirty-six miles. There is also a car ferry at the Straits of Mackinac, which, by the aid of screws in the bow and stern, maintains regular trips through the heavy ice at the foot of Lake Michigan. All of the above mentioned ferries, except that between Cape Charles and Norfolk, are on sheltered routes, and are not exposed to rough weather.

"The Toledo, Ann Arbor & Northern Michigan Railroad Company, however, has inaugurated a line of ice-breaking car ferryboats to run sixty-five miles between Kewaunee, Wis., and Frankfort, Mich. These boats have been run through two winters and the intervening summer with entire success. The ice, unless over twenty inches thick, does not interfere with their movements, and the cars are so fastened that they do not roll on their trucks in the fiercest gales. This trip of sixty-five miles is made in five hours when there is no ice.

"It seems as if the experience we have gained in this country ought to be made available for our comfort when passing between London and Paris. The distance is less than one-third of the Lake Michigan trip, and although the rise and fall of the tides is greater than is the case with any American car ferry, the arrangement of the necessary docks and hinged bridges would require nothing more than an extension of principles and practices that are well understood in this country.

"There seems to be nothing in the way of running unbroken trains between London and Paris, except the necessary capital and the employment of sufficient technical skill. If the London, Chatham, and Dover would combine with the Northern of France and employ an experienced American engineer to plan and construct the docks and appliances for embarking and landing the trains, and at the same time send to any of the shipbuilding establishments on our great lakes for a man to construct the ferry boats, the arrangement could be perfected in a year and a half or two years, when freight and passengers could be transported from any part of Great Britain to the Continent, and eventually to all of Asia and Africa, without change of cars or break of bulk."

The Tannin of Tea.

A. Hilger and Fr. Tretzel have studied the chemical characters of this constituent of tea, in regard to which very discordant accounts have been given by various authorities. In order to obtain a pure product, green tea was operated upon by first extracting with boiling water, evaporating the clear liquor to the consistence of a thin sirup, and then shaking with acetic ether which had been digested with magnesia. The ethereal solution containing tannin, together with chlorophyl and products of its alteration, was then distilled, the residue treated with water, and on evaporating the clear water solution the tannin was obtained perfectly free from ash. It presented the appearance of a chocolate brown powder, readily soluble in water, alcohol, acetone, or acetic ether, sparingly soluble in ether, and insoluble in chloroform. The water solution gives with ferric chloride a deep blue coloration, with gelatin solution a precipitate. Elementary analysis and the behavior of the acetyl compound of this tannin show that it has the composition and general characters of an anhydride of digallic acid, and not those of a glucoside. By long continued action of dilute sulphuric acid, the tannin of tea is converted into gallic acid and a phlobaphen.—*Forsch. Ber. u. Lebensmittel*, 1893, p. 40.

Water Drinking in Typhoid Fever.

In the March number of the *Revue de Médecine* Dr. Hector Maillart, of Geneva, concludes an article on this subject. As a result of his study of it, he feels convinced that the treatment of typhoid fever by copious drinks may be recognized as a definite method. In order that the treatment may be efficacious, the patient should drink at least from five to six quarts of water daily during the whole febrile period. There is no contraindication to this treatment; feebleness of the heart, far from contraindicating the drinks, may become a special indication for them. The results are a progressive lowering of the fever, disappearance of the dryness of the tongue and mouth and pronounced sedation of all the alarming nervous, circulatory, and renal phenomena.

These results are due to the oxidation of toxines and refuse material, which are rendered soluble and eliminated. The oxidation is shown by the formation of great quantities of urea, and the elimination takes place by the skin and kidneys in the form of profuse sweating and abundant diuresis. This diuresis reestablishes the integrity of the renal filter, and that results in the rapid disappearance of albuminuria. This method of treatment has no notable influence on the course or the duration of the disease. No unpleasant consequences have been observed to result from the treatment, either during the fever, during convalescence, or after recovery. The treatment, which is very acceptable to the patient, is easily carried out, even in cases in which the nervous disturbances are very decided.—*New York Medical Journal.*

Dangers of Celluloid.

A clergyman writing to the London *Standard* comments upon the dangers of the highly glazed washable celluloid collars which have come into such general use of late. In the particular case mentioned by the clergyman, a boy's collar became ignited by a spark, and burning with the almost explosive violence characteristic of di-nitro-cellulose in the open air, so injured the lad that he soon died.

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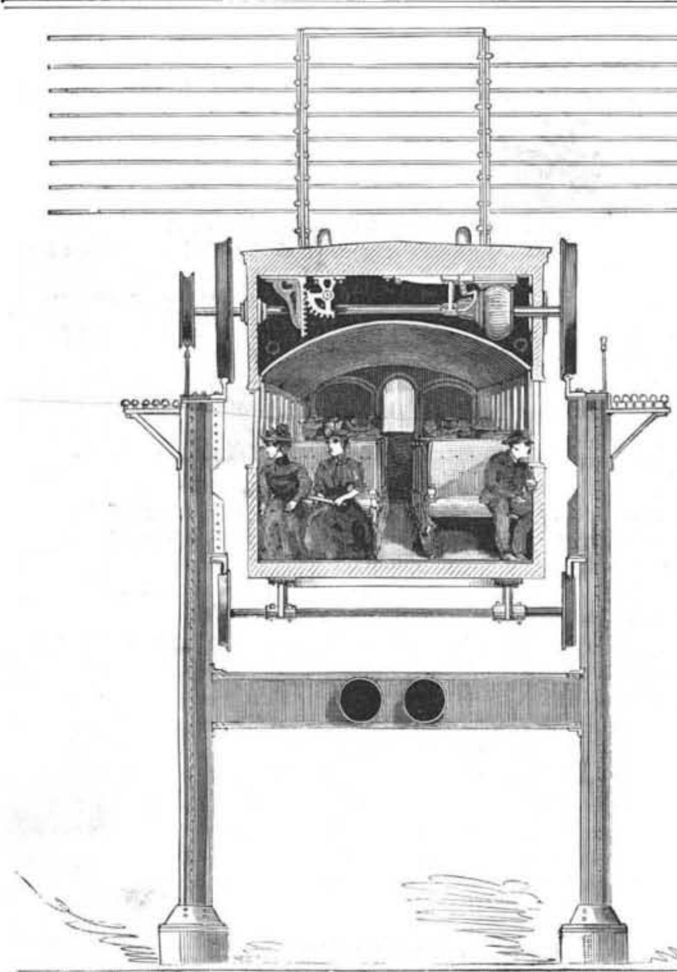

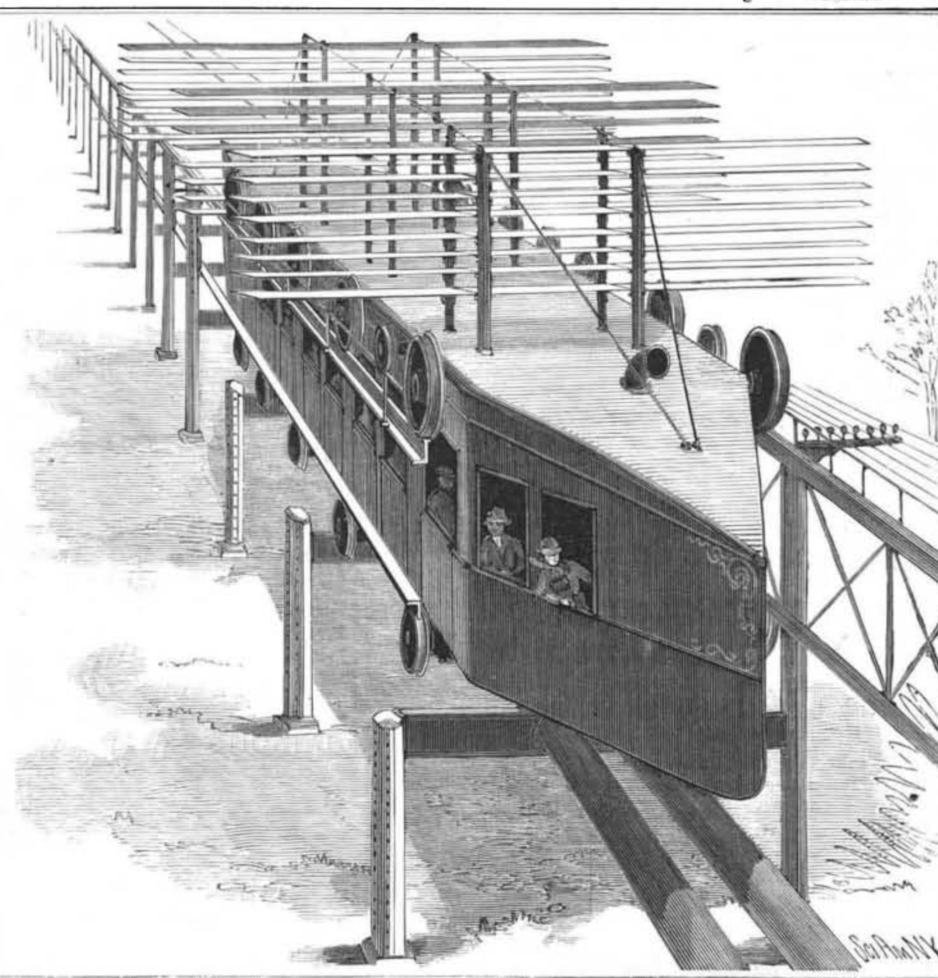

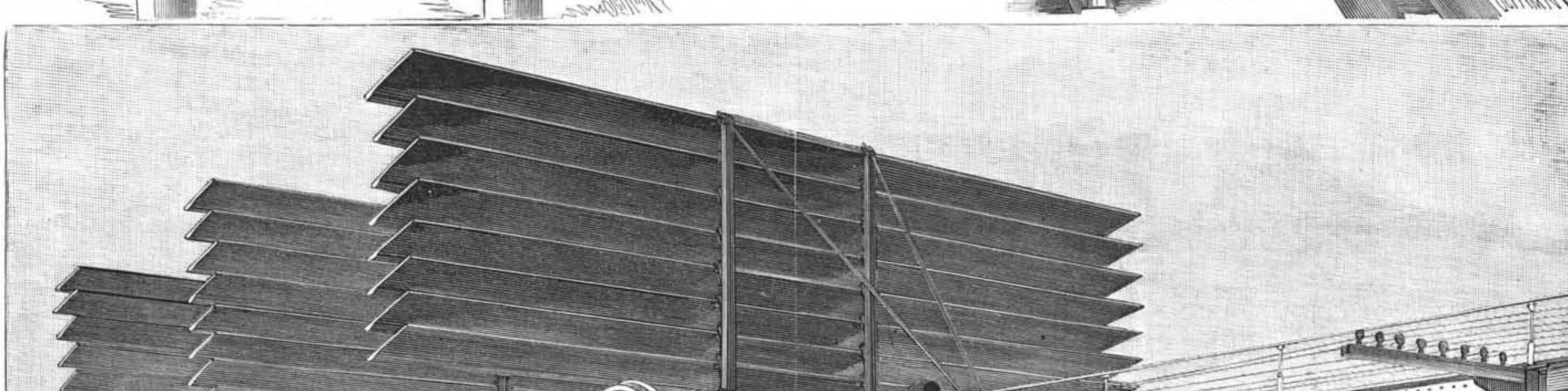

Section of car and track.

The station and car taking on passengers.

The car in motion.

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