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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.


## THE COMEDY OF THE MANHATTAN BRIDGE.

Is there not a strong element of the ridiculous in the present hysterical attempts to solve the problem of the Brooklyn Bridge congestion by building a three-and-a-half-million-dollar station and a thirteen-million-dollar subway—provisions which can merely modify and never cure the evil—when the whole congestion could be relieved by building the Manhattan Bridge, whose construction was authorized nearly ten years ago? The Brooklyn Bridge is crowded to its maximum capacity, if not beyond it. Eight or ten years ago the crowding had begun, and to provide for the present congestion, which was even then foreseen, the city did the obviously best thing, namely, authorized the building of another bridge within a quarter of a mile of the Brooklyn structure, the capacity of the new bridge being fifty to sixty per cent greater than that of the old bridge. Plans were drawn up, and everything was ready for a vigorous prosecution of the work, when the politicians got hold of the enterprise, deliberately stopped the work, and have been playing football with this, the most badly-needed municipal work of the day, ever since.

The SCIENTIFIC AMERICAN has kept the public pretty well informed of the course of this disgraceful fiasco, and less than a year ago, wrote an open letter to the present Mayor, respectfully calling his attention to the delay, and asking that he use his authority to expedite the building of the bridge—a communication which proved of so much interest to His Honor, that he has not yet found time to acknowledge its receipt.

Although the piers for the Manhattan Bridge were completed, ready for the erection of the steel, four or five years ago, not a pound of structural material has been erected even at this late day. Meanwhile, instead of going ahead with the new bridge, which would bring instant and abundant relief, the city officials, from the Mayor down, have been worrying about the best kind of a terminal station to build at the Manhattan end of the old bridge. The plans have been drawn for a structure which would seem to be capable of handling at least twice as much traffic as the old bridge can ever bring into it.

As if to make the folly more complete, the city has now authorized the construction, between the Williamsburg and Manhattan bridges, of a subway loop into which the cars of the Brooklyn Rapid Transit, not being suitably constructed for subway service, can never enter. When the subway is completed, the cars of the most important branches of the Brooklyn system of transportation will be barred from its use.

We have always believed, and still do, that a temporary elevated loop, usable by the elevated cars of the Brooklyn Rapid Transit, should have been built and used, until such time as the subway loop could have been constructed, and the Brooklyn Rapid Transit equipped with cars suitable for subway service.

## MR. HILL ON THE RAILROAD CRISIS.

In the course of a recent letter to the Governor of the State of Minnesota, James J. Hill, who unquestionably understands the railroad situation better than any other man in the country, makes a masterly analysis of the recent report of the Interstate Commerce Commission, and proves that the present alarming congestion in railroad traffic is the inevitable outcome of the disparity between the enormous increase in traffic and the relatively small mileage of new railroad track which has been built to meet it. The letter is remarkably devoid of theory and speculation; it deals with the cold facts and figures of the Interstate Commerce reports, and the analysis and deductions are so clear and convincing that he who runs may read.

In proof of his statement that of late years, although the volume of business has increased enormously, there has been built a relatively decreasing amount of track and terminal facilities, Mr. Hill compares the statistics of the growth of railroad business in the ten years from 1895 to 1905. During that decade the track mileage increased from 180,667 miles to 218,101 miles, or 21 per cent. But during the same time the passenger mileage increased from 12 billion miles to nearly 24 billion miles, or 95 per cent, and the freight-ton mileage from 85 billion ton-miles to 186 billion ton-miles, an increase of 118 per cent.

The above figures are even more alarming than they look to be; for within the ten years above mentioned, there has been a steady increase in the annual percentage of increase of each year over the preceding. Thus in the ten years 1870 to 1880, the per cent increase per annum in the total mileage of track was 7; from 1880 to 1890 there was a 7.46 per cent increase; but from 1890 to 1904 the increase fell to 2.19 per cent, and in the two years 1904 to 1906 the increase has fallen to 1.45 per cent per annum.

The situation is tersely summed up by Mr. Hill when he says that the limit of service of a common carrier has been reached when it has moving at all times over its systems as many cars as can be run on its tracks with safety, and transferred and dispatched from its terminals and junction points without unreasonable delay. Beyond that point, increase of business cannot be handled by increasing the number of cars and engines. The disparity between the growth of traffic and the additions to railroad mileage and extension of terminals, shown by a new mileage of less than 1½ per cent since 1904, to take care of a traffic increase averaging 11 per cent a year for ten years past, presents and explains the real problem. That the railroads have been making strenuous efforts to meet the clearly foreseen crisis is shown by the facts that, not only were there 25 per cent more locomotives and 45 per cent more cars in service in 1905 than in 1895, but each engine and car did much more work. The passenger miles traveled per locomotive increased more than 68 per cent, and the ton miles per freight locomotive increased more than 57 per cent.

The remedy proposed by Mr. Hill is staggering in its proportions and cost. He states that the best judgment of many conservative railroad men in the country is, that an immediate addition of not less than 5 per cent per annum should be made to the railroad trackage of the country for the next five years. For modern requirements, the additional track and the needed terminal facilities would cost not less than $75,000 per mile; that is to say, the cost of the new work would amount to a total of five and one-half billion dollars, or a yearly average of one and one-tenth billion dollars. Two remedies are proposed. For the reason that any considerable enlargement of the present terminal facilities in the city is absolutely prohibited by the enormous cost of real estate, the terminal congestion will have to be met by a decentralization of traffic. New centers for the transfer and forwarding of freight must be secured at points where land can be bought in adequate quantities and at a reasonable cost. Furthermore, there must be an all-round decentralization of traffic, with more points for export and more interior markets. Mr. Hill suggests that a 15-foot canal or channel from St. Louis to New Orleans would do more to relieve the middle West and Southwest than any other work that could be proposed.

In this, as in all great crises, it is essential that there should be harmonious co-operation in working out the solution. Although the railroads, or many of them, have unquestionably shown in the past too little inclination to strike a fair balance between their own interests and those of the general public, we believe that the fault has by no means lain entirely with the railroads. Mr. Hill says truly that it was not by accident that railroad building has declined to its lowest within a generation at the very time when all other forms of activity have been growing most rapidly. The investor declines to put his money in enterprises which are under the ban of unpopularity, and even threatened with confiscation and transfer to the State. This feeling must be removed, and greater confidence mutually established, if any considerable portion of the vast sum necessary to meet the crisis is to be available for the work.

## BROOKLYN BRIDGE TERMINAL STATION AND SUBWAY LOOP.

The new Brooklyn Bridge Terminal, for which the Board of Estimate has recently appropriated three and a quarter million dollars, will be nearly three blocks in length and probably six or seven stories in height. The present terminal at City Hall Park will be completely removed, and it will then be possible to obtain from the City Hall an unobstructed view of the bridge structure and of the Brooklyn shore beyond.

To enable the surface cars to reach their own station, which will extend for two blocks north and south, and will be entirely below ground, North William Street will be closed, and the roadways on which the trolley cars run will commence to the east of William Street on an easy descent, which will bring them down below surface level without interfering with street traffic. The elevated trains will be loaded and unloaded at two different levels within the station, the first of which will be one story and the second two stories above the street surface.

It is not to be expected that the station will cause any material increase in the number of cars or trains that can be run across the Brooklyn Bridge, which is already crowded to its maximum capacity. The advantage of the terminal station, which will extend north from the present terminal as far as the junction of Duane and Center Streets, is that traffic will be more completely organized, the passengers who take the surface cars being distributed to the proper platforms reserved for each particular line of travel. Furthermore, it will be possible to permit trains from all sections of Brooklyn to cross the bridge without change during the rush hours.

The Subway loop, which has been authorized by the Board of Estimate, begins at the Williamsburg Bridge plaza in Brooklyn, crosses that bridge to Manhattan, and extends below Delancey Street to Center Street, beneath which it runs to the Manhattan Bridge. After crossing that bridge to Brooklyn, it runs by way of the new Flatbush Avenue extension—Fulton Street, Lafayette Avenue, and Bedford Avenue—back to the Williamsburg Bridge plaza. In Manhattan the line will be carried southerly below Center and William Streets to a point between Maiden Lane and Wall Street, with an eventual connection with Brooklyn by one or more tunnels. Moreover, it is probable that ultimately the loop will have an extension through Grand and Desbrosses Streets to the North River.

The most serious objection to the proposed loop is that the cars of the elevated roads of Brooklyn are not built of that fireproof construction which is considered to be necessary for the safe operation of a modern subway, and therefore they could not be sent through Manhattan by way of the loop. Had a temporary elevated loop been built, its construction could have been rapidly completed, and the Brooklyn elevated cars have made immediate use of it. Meanwhile, the construction of the permanent subway might have been undertaken, and special cars constructed by the Brooklyn roads for service by way of the loop.

## A NEW ELECTRIC LAMP FILAMENT.

After seven years' research by Prof. H. C. Parker and Mr. Walter G. Clark, of Columbia University, these gentlemen have discovered and perfected a new incandescent lamp filament that is a marked improvement over the usual carbon filament both in the quality of light produced and the economy and life of the lamp. The inventors have christened their new filament the "Helion," on account of the resemblance of the spectrum of the light produced by it to the solar spectrum.

The new filament is composed chiefly of silicon, which is reduced and deposited upon a very thin carbon coil similar to that used in the ordinary incandescent lamp. The completed filament is mounted on a base in an exhausted bulb like those ordinarily used.

The Helion filament is remarkable in several respects. Foremost among these is the white quality of the light, which is obtained at a comparatively low temperature and with a consumption of electrical energy of but one watt per candle power produced. The new filament, while non-metallic, produces the unit of light with the unit of electrical energy at a much lower temperature than do some of the more recent metallic filaments when giving like results. The consumption curve in watts per candle is practically a straight line from 1,575 deg. C. (3½ watts per candle) up to 1,730 deg. C. (1¾ watts per candle). From this point on the curve gradually flattens until, at 1,800 deg. it is a horizontal line corresponding to a consumption of but one watt per candle power. Each filament has a point of maximum candle power, and increasing the current beyond that normally used at this point does not increase the candle-power. Filaments have withstood 100 per cent overload of current beyond the point of maximum brilliancy without rupture. The amount of overload one of the new filaments will stand was forcibly demonstrated by mounting one of them in a bulb on two pieces of copper wire several times greater in cross-section than the filament. The filament withstood without damage a current that fused the wire. Comparison between the luminosity of a Helion filament lamp and that of an ordinary incandescent shows that the former produces three and one-half times more light with the expenditure of considerably less energy at the point of greatest luminosity, which corresponds to the same wave-length for each. The high efficiency of the Helion filament is thought to be due largely to selective radiation, for although an increase in temperature above 1,720 deg. increases the intensity of the light, it does not make much change in its color, as is the case with the usual carbon filament lamp.

The life of the new filament appears, from the few tests which have thus far been made, to be comparatively long. The extremes of eight lamps tested were 485 and 1,270 hours. The short-lived lamp showed a decrease in candle power of 15 per cent, while the