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SCIENTIFIC AMERICAN SUPPLEMENT

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THE TRANSPORTATION PROBLEM IN NEW YORK CITY.

We have shown in a preceding issue that the difficulties of the rapid transit question in New York are caused by the peculiar nature of the site upon which the city is built—an extended peninsula with a broad belt of water hemming it on three sides—and that there would be a prejudice against any scheme of underground transit which would seriously imperil its success, should it ever be built. The statistics of the amount and increase of travel in recent years prove very clearly that, bad as the crowding on the leading lines of travel now is, it will rapidly become much worse. The situation calls for immediate action; and unless some means be devised of quickly enlarging the present carrying capacity of the Brooklyn Bridge, of the elevated roads, and of the Broadway cable road, we shall see at no very distant date a veritable deadlock on these lines of travel during the morning and evening rush to and from the lower city.

The Elevated Roads.—The simplest and most natural way to enlarge the capacity of the elevated roads would be to lay two additional tracks; widening the existing structure wherever it might be necessary. The two outer tracks could be utilized for local traffic and the two inner tracks for the through traffic to Harlem and the suburbs beyond. This scheme would involve the four-tracking of the Third and Sixth Avenue lines, whose carrying capacity is at present the most heavily taxed. On the Third Avenue line the four-tracking could be completed without a break from City Hall Park to the Harlem River; and from Chatham Square to South Ferry it would be possible, by reducing the distance between centers of tracks to the smallest allowable limit, to lay a third track. On the Sixth Avenue line two extra tracks could be laid from Chambers Street to Harlem, and there would be room for one extra track from Chambers Street to the South Ferry. At the turns at Third and Fifty-third Streets the lack of space would necessitate a separation of the four tracks, two of them being carried around the block and through the next cross street; but this arrangement would present no difficulties in the operation of the road. With such an extension of the system the elevated roads would be capable of handling their traffic with facility and at a greatly accelerated speed. By utilizing the inside tracks for a swift through service to the upper city, a large portion of the traffic could be picked up at suitably chosen downtown stations, and carried to the Thirty-fourth Street Ferry, the Grand Central Station, or to the outlying districts at or beyond the Harlem River, in one-half the time that is now consumed on the journey. This would instantly relieve the crowded state of the local traffic; and the interest on cost of the new construction would be more than covered by the receipts from the increased travel to the upper city which would follow upon the opening of so vastly improved a service.

Such an enlargement of the capacity of the elevated roads would not only relieve the present overcrowding, but it would prepare them for the increase of travel which will result from the completion of the new East and North River bridges. These bridges will attract a considerable portion of the present ferry traffic to themselves; they will also carry a large through traffic, which will converge to them from the New Jersey and Long Island suburbs; and the bulk of this travel will be unloaded upon the elevated roads. With their present equipment they would be quite powerless to take care of it; but with a separate express line, as above suggested, they could quickly run these passengers to their downtown destination.

The Broadway Cable Road.—Next in importance to the elevated roads is the Broadway cable road, which runs through the main artery of the city's business and travel—one of the longest, richest, and most busy thoroughfares in the world.

The travel upon this road is at all times of the day heavy, and during the morning and evening "rush" the overcrowding is even worse than that upon the elevated system. It frequently happens between the hours of five and six at night that the inside of the cars and the platforms are so crowded with standing passengers that it requires brute strength to wedge one's way through in order to alight. Ladies form no small percentage of these herded patrons of the road; and it is a matter of daily occurrence that lady typewriters and clerks, who are returning home, wearied with their day's work in the city, have to stand on the platform, in such a crowd, often subject to the exposure of the weather, for a distance of twenty or thirty blocks!

It is impossible to increase the capacity of this road by the means suggested for the elevated system. The existing tracks, as it is, are a serious obstacle to vehicular traffic; and the laying down of any more is out of the question. For the same reason it would be inexpedient to run two or three cars coupled together; stopping at the crossings, they would seriously interfere with the east and west bound traffic. There is another means of increasing the capacity of the road, which, though it is comparatively novel in America, would be perfectly feasible, and that is by double-decking the cars. By resorting to this expedient the accommodation of the system could be doubled in a comparatively short time.

The double-deck car is not an experiment: it has been tested, and is now running on many of the street lines of European cities. The upper story is a duplicate of the lower story, and it is reached by a winding stairway at each end of the car, which is provided with a stout hand rail; the steps, risers and sides of the stairs being formed of solid plating. Such a car will carry upon the same length of wheel base just double as many passengers as the ordinary car.

By placing upon the road a limited number of double-deck cars and running them during the busiest hours of the night and morning traffic, the cable company would be prepared for all emergencies and could give its patrons what they pay for, and what at present more than half of them seldom get—a seat.

The objection will be urged that the swing of the cars in rounding the street corners would be liable to throw passengers from the stairways, and to meet this it would be necessary to substitute transition or easement curves for the present sharp and most uncomfortable curves; such, for instance, as exist at the entrance to Union Square.

The transition curve commences with a very small deflection angle, which increases gradually as the curve proceeds. By this means the violent lateral lurch, which now makes travel hideous at such points on the line, is avoided; the car being imperceptibly deflected from the tangent upon which it has been running. This alteration, coupled with the insertion of a super-elevation in the outer rail of 1¾ or 2 inches, would enable cars to round these curves with a smoothness of running which would be a revelation to Broadway travelers.

The adoption of such cars would necessitate raising the superstructure of the elevated road some 5 or 6 feet, at such points of crossing as occur at Thirty-third Street; and the columns would have to be lengthened by varying amounts for a distance of 500 to 600 feet on each side of the crossing, so as to carry the roads over on an easy grade.

This scheme for the relief of Broadway traffic could be quickly carried out, and, in view of the immense relief it would bring, its cost would be moderate. It is perfectly practicable; and the reserve of carrying power which it would place at the disposal of the company would enable them to cope with any possible increase of travel for many years to come.

The Brooklyn Bridge.—Perhaps the most seriously encumbered line during the busiest hours of travel is that across the Brooklyn Bridge. Here, more than anywhere else, some immediate plan of relief is called for, and it is gratifying to learn that with the opening of the new terminals, and the doubling of the present switching capacity, it will be possible to decrease the headway between trains from 1½ minutes to 45 seconds. This will double the capacity of the cable road, and should go far to relieve the present overcrowding. The report of the board of experts, in accordance with whose suggestions the present improvements are being carried out, states that "if, as is probable, the headway can be made 40 seconds, the capacity for four-car trains will be 36,000 per hour," as against the present capacity of 16,000, "and for five-car trains 45,000 per hour, assuming that passengers insist upon crowding the trains to the extent of 100 per car rather than wait."

Should the increase of travel in the future be so great as to overtake this enlarged accommodation, it would be feasible so to strengthen the stiffening trusses through which the present cable line runs that they could carry upon their top chords an electric trolley line, operating single cars; and this could be done without materially raising the unit of stress throughout the main members of the bridge itself. If the tracks were laid well over to the inside, as close to the vertical cables as practicable, comparatively light floorbeams could be used, and it is likely that the posts on the inside truss alone would have to be stiffened. By laying directly upon these floorbeams stringers of a trough section, with the rails placed centrally within them without the intervention of cross ties, a very light floor would be secured. If the cars were run singly, any serious concentration of rolling load would be avoided, and the combined stresses resulting from the dead and live loads would not, it is certain, call for any considerable strengthening of the existing trusses beyond what was above suggested.

The trolley line would run above the present cable line until the end of the trusses was reached, when it would swing out over the roadway on either side, finishing in a loop in front of the present terminal stations. The cars would thus run on a continuous track, without switching; and they could handle the traffic at the curved platforms, which would be located at a sufficient height to clear the existing cable car line.

The increased capacity of the cable road resulting from the opening of the new terminals, supplemented at an early date by a light trolley line, as indicated above, would provide adequate seating capacity, until the opening of the new bridge further up the river shall permanently relieve the situation.