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For THE CANADIAN ENGINEER.

REVOLUTION OF THE PRESENT RAILWAY SYSTEM BY THE ADVENT OF THE ELEVATED ELECTRIC RAILWAY.

BY A. DAVIS, CONSULTING ENGINEER, MONTREAL.

About sixty years ago England gave birth to the steam surface railway, and inaugurated the present system, and now it is about to inaugurate the railway of the future. England waits the proper time before adopting any new invention, and spending money uselessly. Her people will generally make sure of the new undertaking, and will then wait to see if anything better will turn up that can replace what is already in operation with lasting advantage, as they have done in the present case. They have waited sixty years for new developments in railway systems, but in reality there has been comparatively no change in the last fifty years, although it must be admitted that the speed has been increased on passenger trains during the past forty years about twenty miles per hour. The changes in themselves have not been elementary, but consist only in making the cars more comfortable for the traveling public. The weight and size of the railway rolling stock has been increased greatly for facility and economy in operating railways of America, but not so rapidly in England. In this fact the prudence of the English people again shows itself. They correctly

think there is a limit, and have stopped increasing the weight of their rolling stock, and have turned their attention to how it would be best to meet the emergency which demands greater facilities and quicker means of transit, with more absolute safety.

Our American railway managers as yet see no limit, and they are increasing the size of the carrying capacity of their rolling stock. From ten to thirty-ton car engines are also increased in power and corresponding weight; all this with one idea in view, and that to reduce the cost of operation of their line. Of course, this looks well calculated to give the company the desired result. The main substance in this decision is the great saving of labor; in fact the managers will tell the directors of their companies that in place of two trains being required to move a given quantity of freight, one train with one staff will do the work, so that 50 per cent. is saved on engine drivers, firemen, conductors, and brakemen, and 50 per cent. on locomotives. This is for freight trains only, as the number of passenger trains remains the same. When this report is made at a directors' meeting, there are smiles and happiness all round. They are also shown the great change made by steamship companies of replacing the small steamers with those of four times the carrying capacity. In this, no doubt, a great saving is obtained without so great an outlay. A large expensive steamship must be paid for to replace, say four of the smaller ones, but it cannot be compared with the change that follows in the railways increasing the carrying capacity of their rolling stock proportionately. The changing of the small steamers to the large ones means one steamer to each four, hence one crew, one set of officers, one set of engines and boilers, in fact, one complete ship at sea, one steamer berth at harbor, all in place of four. It is true that the crew will number a few more men than on a small steamer, and the consumption of coal is greater, but not nearly as much coal will be used as on four smaller ones. The risk of accidents at sea is lessened by 75 per cent., therefore the saving must be very great. Also, the steamship company does not lose the small steamers, as steamers of almost any size can be put into service at various classes of carrying on the sea, so that reduces the expense to a large extent, and the extra expense ends there.

Now let us see how differently the change affects the railway companies when the carrying capacity is proportionately changed. In place of one ship, thousands of new cars are required, and in place of one engine, hundreds of new locomotives are needed. This is not all. The very moment this new heavy rolling stock is ready to be put into operation, new and heavier rails, new and larger ties, and new and stronger bridges are required for the whole line, as well as new turntables for locomotives; the road-beds require additional ballast, and in many cases new engine-houses are needed. In the repairing shops additional machines to