

pledge the credit of Canada to its utmost borrowing capacity in pursuit of phantom railways to the Pacific, or any where else, but can scarce spare a thought — or a dollar — for the improvement of the river. In all the leading journals of the country, railway questions command columns of editorials, where the Welland canal could hardly obtain lines. I am of those who hold that for railways, as national undertakings, we have for the present at all events, done our whole duty, and that we will best consult the future of Canada and best promote the development of her magnificent resources by henceforward, for a time, directing our thoughts, energies, and means in improving and perfecting to the fullest measure of its capacity that which, in all its natural aspects certainly, is the grandest system of internal navigation in the world.

Yours, very truly,

W. SHANLY.

JAPANESE DWARFED TREES.

The Chinese and Japanese have a great fancy for dwarfing trees. This they do by such means as horizontal grafting (of which we have some specimens in our collection) and by studiously withholding more nourishment than will barely keep the plant alive. We present, here with, an engraving from the *American Garden* of a species of Pine (*Pinus densiflora*, var. *albifolia*) which has been thus dwarfed. This plant—at least one hundred years old—is only about four feet high, while the trunk is nearly equal in diameter to the vase in which it is grown—about twenty inches—so that the rate of growth has not exceeded four-tenths of an inch per year. The patience and perseverance of three generations of men in growing and caring for such a plant is marvellous. Although we may consider the result absurd we must give them credit for the skill they exhibit in controlling or bending Nature to their whims or caprices.

MODE OF MAKING FIRE-ENGINE HOSE WATER-TIGHT.

The *Bayerisches Industrie und Gewerbeblatt* contains a proceeding, which has been patented in Bavaria, for rendering hose of fire-engines completely water-tight, so as to withstand the greatest pressure. The hose are, after they have been cleaned and dried, impregnated with a mixture of 100 parts of glycerine of 24° B. and 3 parts of carbolic acid, which may be done either by drawing the hose through the liquid, or, better still, by brushing it well in. Thus treated, the hose are said to preserve a certain degree of dampness, without, however, being liable to rotting in the least degree, and so suffering deterioration in quality and durability. The brass fittings of the hose are attacked only imperceptibly by the acid contained in the composition; but even this may be easily prevented by giving them before impregnation a coating of weak shellac varnish, or by greasing them well with tallow. The hose, which are said not to leak in the slightest degree, must be cleaned every time they have been used, dried, and impregnated anew with the liquid. The previous drying of the hose is, however, not necessarily essential, more especially in winter, when drying is slightly difficult; it suffices to let the water run well out of the hose. As frost does not affect the mixture, hose prepared in the above manner, do not freeze easily at low temperatures. This fact makes the suggestion one worth consideration in Canada.

A PRELIMINARY meeting of railway servants engaged in the passenger departments of the London and North-Western, Lancashire and Yorkshire, Manchester, Sheffield, and Lincolnshire, and Manchester South Junction and Altrincham lines, was held on Thursday evening, the 5th inst., at the British Hotel, Oldfield-road, Salford, to take into consideration the best means of ameliorating their present condition, when it was resolved to hold an aggregate meeting on Sunday, the 15th inst. in Manchester, in order to decide as to what further means should be adopted towards the object in view.

A SELF-PROPELLING TRAM-CAR.

We recently devoted a brief paragraph to a preliminary notice of this invention, patented in March last by Mr. Leveaux, and relating to an apparatus or automatic means of imparting motion to carriages on tramways, railways, and other roads, and we now resume the subject with the purpose of detailing all the features of this automatic motive power, as illustrated in the engravings on page 256.

Even if the time had not passed when the question of whether or not tramways should be permitted in urban thoroughfares might be regarded as open to discussion—for we take it that tramways, urban and suburban, have passed from the sphere of speculation into the domain of fact, and become a permanent institution of the period, notwithstanding the objections of "carriage people"—the invention of Mr. Leveaux would possess substantial claims to consideration, as exercising a preponderating influence in favour of the adoption of tramways, to the full comprehension whereof it is necessary that the primary and essential conditions of the question should be fully stated and thoroughly understood. These may be very briefly summarised.

The facilities for public intercommunication in urban and suburban localities, by the public thoroughfares, are of three kinds, omnibuses, tramways, and cabs or the like vehicles plying for hire, all equally dependent for motive power on horses—a condition which is not of encouraging aspect, either in the present or the future, in view of certain contingencies, such as, e.g., the increase in the price of horses, and the cost of their keep; the possibility of an equine epidemic, such as has occurred in America, or a strike among the drivers, hard-worked and underpaid. It is an undoubted fact that the working of tramway cars by horse, is not only severe, in tasking the powers and shortening the working life of the horses, but is a very heavy tax upon their earnings. Nevertheless, it is equally certain that, as yet no mechanical power has been devised or applied so as to supersede them, in spite of several hopeful and promising projects for steam tramway cars, &c., which have, however, failed to bear fruit practically hitherto, and the great desideratum of a suitable motive power has so far remained unsupplied.

It may be broadly assumed that whatever mechanical motor may be adopted, it should, having regard to the safety of the public, and the other traffic uses of horses, fulfil certain conditions: it should be thoroughly under control, and exerted only along a prescribed course; also noiseless, so far as practicable, and not emitting any objectionable humming, puffing, hissing, whirring, whistling, clicking, clatter, or noise calculated to be a nuisance and cause fright; there should neither be any visible smoke, steam, or vapour, nor any annoying and unpleasant chemical odour, gas, fumes, or vitiated air. Moreover, it would be well to have no boiler, generator, tank, or receptacle for inflammable liquid, involving risk of explosion. As regards the extent and duration of its exercise, the power need not exceed in capability the ordinary working speed of the present conveyances, nor be exerted throughout long distances or periods.

Whatever degree of success may hereafter be attained by steam, gas, heat, petroleum, or other engines, in the realisation of the above conditions, we are at present disposed to consider Mr. Leveaux's invention as alone substantially attaining the same. Its principle consists simply in the application of coiled springs wound up by machinery, and acting in uncoiling through suitable intermediate gearing, upon the running wheels of the tramway car. Although up to quite a recent date, the conception of springs applied to the generation of power has been limited to watches and clocks, mechanical toys, &c., and has been developed on no scale practically larger, so far as we know, than in the well-known self-coiling shutters, yet this is clearly only a question of power and degree, affecting simply the conditions and capabilities of the manufacture, which have indeed, in effect, presented the only difficulties to be overcome.

In application to the ordinary form of tramway-carriage, a portion of the space below the floor of the car is utilised for an arrangement of a series of drums or barrels, containing the springs, which may be arranged transversely in two groups or sets, suitably inter-connected, so as to form one continuous volute, acting to generate revolution of the driving-wheels, and thus effect propulsion of the car. At the terminal, or other intermediate stopping stations the means of winding up and re-