If this be good authority, which we have reason to believe it is, then it is simply impossible for the New York companies to comply with our law and their own too. Unless their law is changed next year, there is likely to be a general leave-taking on the part of these companies, so soon as the three years, for which a provisional license has been granted by the Dominion government, shall have expired.

IRON AND STEEL RAILS.

The question of economy in rails is one of much interest and should be carefully considered by the directors of companies whose lines are, or soon will be, in course of construction. The experience of the relative endurance of the different kinds of rails is so short that it can hardly be assumed as conclusive. We know that cold affects steel less injuriously than iron and that owing to the severity of our climate, rails of good quality are more required here than in England. Capt. Tyler found that some of the iron rails on the Grand Trunk lasted six times as long as others, under the same description of traffic, and that some cheap rails had lasted longer than those for which a higher price had been paid. The reason why more breakages occur in winter than in summer it is asserted, is that the extreme cold renderers the ballast and sleepers rigid. Mr. Sandberg's experiments on iron rails in Sweden resulted in showing that on an average the strength of a rail in winter is not more than one-fourth of the strength exhibited by the same bar in summer. Steel rails have been laid on the Hudson River road and the 10 miles of Bessemer track on the Erie have given satisfaction. In the last report of the Grand Trunk it is stated that, "The experience of all railways on the American continent has proved that iron rails as now manufactured, do not stand the strain of a heavy traffic, and they are of course more severely tried in the northern climate. All the trunk lines are now renewing the heaviest worked portions of their roads in Bessemer steel rails, they having found that the best iron rails obtainable do not last more than an average of 5 years, and in most cases considerably less. The Directors have decided in future to relay those parts of the main line where the traffic is heaviest and the climate most severe with Bessemer steel, and they will next year send to Canada 5,000 tons of these rails."

It has been assumed that under a very heavy traffic common iron rails will last five years; steel headed rails, fifteen years; and solid steel rails, thirty years. The cost of iron rails is £7 stg., per ton; steel-headed £10 per ton; and solid steel £15 per ton. A table whose calculations were based on this assumption shows that solid steel rails are the cheapest up to ten years wear of iron rails; that steel-headed rails are cheapest for between ten and twenty years; and that iron rails are cheapest when they last twenty years or more. The conclusion to be drawn from this is that the amount of traffic must decide which material it is the most economical to use for the maintenance of the permanent way. In the Swedish lines steel rails are being adopted though the traffic is comparatively light.

When the subject was discussed by the institution of Civil Engineers, in March, 1868. many different opinions were expressed. Mr. Williams said he was convinced that the question of good or bad iron rails was simply a question of welding. Putting a steel top on an iron rail lies open to the objection that steel cannot with certainty be welded on to the iron and there would be danger of the steel head coming off under heavy work. Sir Charles Fox thought that the value of steel rails was underrated inasmuch as it was generally considered as a question of steel vs. iron. He did not say that the material of steel was not better for the manufacture of rails than iron, but he thought that was not a fair exponent of the difference of the value of the two. In many cases defects in rails arose from lamination of the iron resulting from imperfect welding. It was better, therefore, to have a harder material for rails; but, with harder rails, engineers might be tempted to increase the load to be placed upon them. Mr. Harrison gave instances where iron rails had lasted a great length of time and thought that the use of steel might be unnecessary even as a matter of economy. Mr. Fowler believed that steel would, for almost all purposes eventually supersede the iron, but he had no confidence in a calculation which assumed that steel rails would last over thirty years. Mr. Deas stated that the North British Railway had used solid steel rails for six years. Not one of the switches and crossings had worn away, whereas the switches of iron rails that had preceded them had worn out in from six to nine months. Mr. Menelaus believed the only charge brought against the quality of steel rails was their brittleness. Mr. Shaw said steel rails had the advantage of being more homogeneous, and were, therefore, less liable to lamination, yet more regard should be paid to extra cost and the possibility of having bad steel rails as frequently as bad iron rails. Mr. Bruce thought that steel rails were not altogether perfect. Out of one lot of 200 tons which he had used recently, five of the rails broke literally on being thrown out of the wagon; individual steel rails were as likely to be defective as iron rails. Mr. Brereton did not consider it indispensable to seek for other materials such as steel, except for special occasions. He instanced iron rails whose life had averaged fifteen years, Mr. Straff considered that where iron rails would last over six years, steel rails at their present price could not be substituted with economy. Mr. Mills said, from experience on the London, Chatham and Dover road it appeared that the power of resisting wear and tear in steel rails amounted to fourteen or fifteen times that of iron rails. Mr. Taylor said, that considering the comparative scarcity of steel producing ore and the high price of steel rails, for some time at least, the bulk of the supply of rails must be from iron, and so long as a thoroughly good iron rail could be made for from £6 10s. to £7 per ton, to last fourteen or nineteen years, of which there was no doubt, he did not think that the days of the iron master were numbered. Mr. Williams said, as far as he could gather, there could be no question as to the preference of steel rails on main lines exposed to heavy traffic and high speed, when the maximum life of iron rails did not exceed eight years. Capt. Tyler said that during a recent inspection of the Grand Trunk, he found that rails laid down within the last year had been failing to an extraordinary extent, and that portions of the line relaid with new rails were obliged to be again renewed in from three to five years, while the older rails were still necessarily kept in the track.

When in Canada, Captain Tyler spoke very highly of the rails re-rolled in the Toronto Mills, and calculated that the average life of those rails on the Grand Trunk was eight years, of those rolled in the States, for the Portland section, five years, and of those brought from England three years. A short time ago the Great Western ordered some hundreds of tons of the Toronto rails at $50 a ton, in preference to English rails at $43 as they had found that the English rails went to pieces under the heavy weight of the sleeping cars. Out of one lot of a thousand tons of English rails laid on the Grand Trunk road, no less than one hundred tons were sent to be re-rolled within three months. The Grand Trunk have down about two and a half miles of Bessemer rails, which have fully answered expectations. At the Union station, Toronto, there are some steel-topped rails which have been down for five years, and are now as good as when laid, though seventy-five trains a day pass over them. The objections to the purchase of steel rails are that dependence cannot be placed on their quality, and that there is no known process by which they can be successfully reworked. Should the Siemens-Martin pro-