

with the view to their conversion into railways later on, since carriage roads take a much more direct route than railways can possibly follow, and, what is more, cost more to keep in order. The Pioneer, or steam caravan, has but one rail elevated on stout posts at about three feet above the ground, the carriage or panniers ride astride it and do not touch the ground, which is therefore left intact. Nature resents earthworks of every description, therefore the Pioneer avoids them altogether,—no small advantage in a country where labour is wanted for better things. People laugh at its appearance because they are not accustomed to it, but what can be more calculated to provoke derision than our system of railways, where to obtain a few inches of level road to run upon (about ten inches for a double line) engineers deem it a *sine quâ non* that forty or fifty feet of earthwork should be levelled. The Pioneer uses one rail to run upon, and does not level the ground at all. Which, therefore, is the most sensible? Again, our engines demand weight as pulling power, and the steeper the line the heavier the engine our engineers require. On the Crystal Palace Line of the Chatham and Dover Railway, a purely passenger line, the engines actually weigh fifty tons, and the rails and bridges of course have to be made to support this leviathan. The Pioneer engine abolishes the necessity of using weights for obtaining pulling power, the engine being fitted with horizontal wheels, which grip the side of the fence-like structure. Thus it can climb a mountain side, and go as the crow flies, taking behind it a train of 100 tons, while on such grades an ordinary train would have become all engine. Mr. Fleming insists, very properly, on cheap working expenses as meaning more than cheap first cost, and it is by avoiding weight that the Pioneer can carry goods at about half the cost of an ordinary railway. While resident in Turkey some ten years, I had daily the problem to solve of how to make a railway in no time, without any money to speak of, and still everything to be strong and substantial; and it was this training which has enabled me to come down from our high estate of saloon carriages and Pullman cars, to devise a system of steam caravan suited to the pockets of poor and vast continents who, in the usual course of events, might never see a railway at all. Surely in such countries it is not at all profitable to spend the time of men in cutting off the tops of mountains and filling the valleys with them, especially as the worse the mountains are, the fewer the inhabitants available to perform the operation. It is surely absurd to propose such unnecessary work in Canada, or to employ cattle for dragging carts over roads which cannot be kept in order, since Mr. Fleming states there are