the maximum to thirty-five miles an hour: in such cases the average speed will not be more than twenty-five miles.

Greatly-exaggerated ideas sometimes prevail about the possibilities and propriety of running trains at high speeds. With the features of the country between Christchurch and Oamaru, we could, by incurring a proper outlay and using heavier rails and stock, run trains at forty miles an hour average speed at an increased cost. But, when physical configuration gives us a line like that between Oamaru and Dunedin, with 1-in-50 grades and sharp curves, no reasonable capital outlay would permit of such average speeds being safely or economically worked: twenty-five miles an hour average speed is sufficient, having regard to economy, on such a class of line. On such lines as that from Wellington to Featherston, where the features of the country are more rugged, we must be content with a lower speed than this. Judged by results in other parts of the world, the Wellington line is a worthy monument of engineering ability and skill, executed after the most thorough and careful investigation of other possible routes. It is a credit to the Government of the colony that planned and executed the scheme, and gave such an outlet, at a moderate cost, to the great producing district beyond it. The Americans are justly proud of the engineering work carrying the Denver–Rio Grande Railway through the great cañons and passes in the Rocky Mountains, but in no part has the work been so difficult as is the case with the Rimutaka Pass. The average speed of the express train from San Francisco to Ogden—895 miles—in crossing the continent is twenty-three miles an hour; it has 1-in-40 grades, on which fast running is not possible. On the Oregon Short Line from Pocatello to Portland,—730 miles—part of which traverses some difficult country, the average speed of the Pacific express is twenty-four miles an hour; but on a considerable length, over difficult country, its average speed is from sixteen to seventeen miles an hour.

Our practice in New Zealand has been the same as the western railways in America in limiting the extreme speed to thirty-five miles an hour between stations on level country with 53lb. rails and suitable engine-power, and in other respects our practice in train-running is very similar; but the Americans on the same class of line can get a better average speed, because they have not overdone their railways with stations in the manner which has been done in New Zealand. This subject has been for so many years constantly represented in official reports that I need not dwell on it, except to say that in the general interest it would be well to remove many stopping-places, though it may not suit individual interests to do so.

In England steep gradients are rare and limited in extent. On the Continent of Europe they prevail where the country makes it necessary, as, for instance, on the Saint Gothard line, and on the line between Genoa and Milan, where 1-in-40 grades are used, trains have to run at low speeds.

In most cases the passenger and goods trains are run separately: where the traffic is very light, mixed trains are run. The Westinghouse air-brake is in use on all passenger trains, and is generally approved of. The vacuum automatic brake, which we have fitted a train with experimentally, is the one generally in use in England. It is not used in the United States, so far as I can learn.

The Americans excel in all kinds of woodworking: their carriages are many of them quite works of art, those on the best trains costing, probably, from £1,500 to £2,000 a piece. An ordinary 60ft. first-class car, to hold sixty persons, will cost about £1,000, and weighs about twenty-seven tons. I never saw a badly-built carriage in the States. The double bogie is universal. The gauge generally being 4ft. 8½in., the stock can be made loftier and more roomy than that on our narrower gauge. Vestibule express trains are close-coupled trains, with closed passages between the carriages, magnificently fitted and equipped. These trains have dining-, smoking-, and sleeping-cars. Meals are served at one dollar a head each meal. The price for sleeping-car accommodation, I found, varied from two to five dollars a night.

Electric lighting in carriages has made practically no progress in the States as yet—in England it is more advanced; outside lighting by electricity is on the other hand far in advance. The use of mineral-oil lighting is general, but it is condemned on account of the great danger of fire. Train-heating is carried to great excess; it is unbearable to those unused to it, and is even complained of by the American public. In some of the best trains attention is given to ventilation; but this is rare. A first-class carriage full of people, with a closet in it, and well heated, is a most unwholesome vehicle to travel in; the atmosphere is often most offensive and unhealthy. This great evil is now receiving attention in some parts.

As regards our own practice, we cannot do better than to follow the course which we have done for the last seven years, and continue converting all our old type of carriages into bogie stock of American pattern.

The sleeping-cars with berths lengthways do not appear to be so comfortable as some with transverse berths in use in Europe. The latter are not only more comfortable, but afford privacy for women, which the former do not.

Americans devote great care and attention to their passengers. A large passenger-train, carrying Pullman sleeping-cars and a dining-car, has quite a small army of attendants. There will be a train-conductor, a baggage-man, and three brakesmen for the company's contingent. There will be a Pullman conductor, and a separate attendant to each Pullman car. The dining-car will have cooks and several waiters, the entire crew often exceeding twelve persons. Services of this kind can only be kept where there is a great traffic as between very large cities. In the remoter districts trains on long journeys stop once in four or five hours for meals. Dining and Pullman cars are only available for first-class passengers.

With reference to rules, regulations, and precautions for the safety of life and property on the United States railways, they appear to me to be behind the general European practice. The block system is very little used in the States. Some of the rules and regulations which I saw were deficient. They are said to be different on different roads where through-running often takes place.