

and two-thirds non-smoking. A small luggage compartment will also be provided. Further reference to this subject is unnecessary, as I have in my Congress report dealt pretty fully with it.

In Cork I had some time to spare, so I had a look at a 2 ft. 6 in. gauge line. The stock was good and well designed, but I do not think it would meet with public approval in New Zealand. What is known as a light railway in England is in many cases more substantially built (heavier rails) than our 3 ft. 6 in. gauge. Most of the lines are the standard, 4 ft. 8½ in. gauge.

I visited the Inchicore works of the Great Southern and Western Railway Company, Ireland, where I served my apprenticeship many years ago. The shops are well run and much enlarged and improved since my days there. The company build their own locomotives and car and wagon stock. I saw some very fine locomotives which had been built for express work. The carriages were good, and I liked them better than the English carriages; more roomy. The Great Northern Company of Ireland also owns some very fine stock, the modern carriages being very good. Creosoting sleepers was being done at Inchicore when I was an apprentice there. I saw it in full swing when going over the ground. The system is the same as is in operation in New Zealand.

With the view of ascertaining how coal was being shipped at a big coal-export port I visited Cardiff and Barry in company with Mr. Fraser, Chief Engineer, and Mr. H. McLachlan, Secretary of the New South Wales Government Railways. The Great Western Company courteously arranged for the visit to Cardiff, and placed their District Goods Manager at our disposal, and I have to thank that gentleman for the trouble he took to post me up in the working of the various coal-shipping appliances, &c. There are two methods of loading coal at Cardiff. One is by means of an hydraulic lift or elevator which raises the wagon a sufficient height to tip the coal into a shoot which delivers the coal into the ship. The shoot is adjustable so as to minimise the amount of fall and so to reduce breakage. Hydraulic capstans are numerous. In some cases the coal is delivered from the shoot into a large skip which is lowered by a crane attached to the lift to the bottom of the ship's hold. The trucks come square on to the ships and they are tipped endways. Two roads hold full wagons and two roads are for empties, each road holds about twenty wagons; modern wagons carry 10 tons, but there are a large number which carry 8 tons. The skip contains a little over 3 tons and has to be lowered three times for each truck of coal. There are no hopper wagons in use. This system is preferable to staiths but is not equal to the system in use at Greymouth and Westport where the coal is placed on board by cranes without being tipped on to a shoot and thence by a skip to ship. The skip is only used when the fall into the hold is excessive. The second method of loading is by means of the Lewis-Hunter patent coaling-cranes. Three or more cranes can be worked simultaneously and 9,234 tons of coal have been shipped into one vessel in twenty-eight working hours. The working is as follows: A large box or skip capable of holding a truck-load of coal is placed in a pit attached to a tip, the truck is run on to the tip and the coal is discharged through the end door of the truck into the skip or box. The crane lifts the skip, swings round, and lowers it into the ship's hold. This is considered the most perfect system of loading coal. The cranes are very massive, but they work very slowly, the hoisting and slewing speed being quite 50 per cent. slower than the working of the New Zealand cranes. The conclusions I arrived at with regard to this system was that it was better than No. 1 system, but that it was not so good as our crane shipping. As a general rule the coal is weighed on a weighbridge close to the lift or tip; the empty truck is also weighed. Extensive siding accommodation is provided. Storage for five thousand trucks is common. The trucks are owned by the colliery owners.

A briquette plant was working at Cardiff. Pitch was used as the binding material; the cost of pitch per ton was £1 15s. The briquettes were sold at the rate of 14s. 9d. per ton. The manufacturers buy small coal from the collieries at a low rate. The continental railways are the best customers for briquettes. They are loaded carefully by cranes and stowed on board ship like bricks would be.

In 1897, 12,116,100 tons of coal was shipped from Cardiff, since which date the business has considerably increased. Seven railway companies have communication with the Bute Docks (Cardiff). In addition to the coal business there is very large general business, Cardiff ranking as the third largest port in the United Kingdom.

My next visit in connection with the shipping of coal was to the Barry Docks, which are about half an hour's run by train from Cardiff. The undertaking is known as the Barry Railway Company, having a capital of about £6,020,440. The directors of the company were having a board meeting, and I was introduced to and lunched with them. After lunch a train was placed at my disposal, and the company's manager conducted me over the docks, warehouses, &c. One hundred miles of siding are laid in connection with the docks. In 1903 the exports were 8,855,180 tons and the imports 389,596 tons. The docks are more modern than those at Cardiff, and there is ample room for expansion. The system of loading coal at the Barry Docks is by means of elevator tips somewhat similar to those in use at Cardiff. Some of the tips are fixed, and some are movable, so as to suit the hatchways of different ships. The trucks are brought in at a high level to the lift, which raises or lowers them to suit the height of the ship. There are two empty and two full roads for each tip converging into one road close to the tip. Full trucks are weighed close to the tips and empties when returning from the tip to the empty siding. The full trucks are fed to the tip by hydraulic capstans. The empty trucks run back from the tip to the empty road by gravitation. A 4-ton crane is attached to each tip and is used as required to lower the coal from the shoot to the ship's hold. This is absolutely necessary, because of the large size of the ships. The greatest quantity of coal shipped from one tip in an hour is 490 tons. The trade was slack when I made my visit, due to the cancellation of orders by Russia and Japan.

My next visit was to Bath, where I went over the works of Messrs. Stothert, Pitt, and Co., the eminent crane engineers, and discussed with the firm the details of the hydraulic crane which they had in hand for Greymouth. From Bath I proceeded to Swindon where I visited the locomotive workshops