

raised to 3 or 4 lb., while the consumption of coal to the ton of pig was reduced from 8 tons to 35 cwt.

It was not until 1864 that the Welsh ironmasters turned their attention to steel-making, when a modification of the Bessemer process was introduced at Ebbw Vale. A mixture of Spanish and Brendon-hill ores, containing manganese, furnished a pig iron free from sulphur. A few years later every furnace in South Wales was using Spanish ores instead of Cumberland hematite, and by 1870 all the Welsh works had begun to make steel rails. The old iron rail plants were broken up and Bessemer converters and heavier rolling-mills were installed in their place. All that remained of the old works were the blast furnaces and some mills for rolling such merchant iron as was consumed in the locality. This was the second financial crisis the trade had to face, and it entailed a heavy outlay on new appliances. The steel-rail works of such firms as the Tredegar, Dowlais and Ebbw Vale Companies were as efficient as they could then be made. The discovery of Cleveland ore, however, soon brought the new-found prosperity of the Welsh steel-makers to an end. Their furnaces were situated on the hills 12 to 15 miles from the coast, and it became difficult to compete with Middlesbrough firms whose iron mines, collieries and works were on the sea-board, who discharged Spanish ores direct from the vessel into their depots, and who started business with absolutely modern plants. The Welsh steel-maker was obliged to haul two tons of ore up to the coal outcrop for every ton of pig iron he made, and his rails had to come down again to the port of shipment. He was, therefore, handicapped by railway rates alone to the extent of 10s. a ton as compared with makers on the North-east and West Coasts of England.

To meet these difficulties the Dowlais works were moved down to the sea at Cardiff, where they have been able to