

THE Railway and Shipping World

With which is incorporated The Western World. Established 1890.

Devoted to Steam & Electric Railway, Shipping, Express, Telegraph & Telephone Interests.

OLD SERIES, NO. 149.
NEW SERIES, NO. 67.

TORONTO, CANADA, SEPTEMBER, 1903.

10 CENTS A COPY.
\$1 A YEAR.

G.T.R. Locomotive History.

In its 50 years' existence, the G.T.R. has, in common with its contemporary lines, seen many changes in ideals and methods, but in none more than its locomotives. The original prospectus of the G.T.R. was issued in 1853. Its object was the construction or formation of "a Main Trunk Line of Railway throughout the province," of 5½ ft. gauge, and embracing the lines then completed, or under construction, which included "the G.T. Ry. Co., of Canada East; the Quebec and Richmond Ry. Co., the St. Lawrence and Atlantic Ry. Co., the Grand Junction Ry. Co., and the Toronto and Guelph Ry. Co.," and leasing in perpetuity the Atlantic and St. Lawrence Co. from its junction, near the U.S. boundary line, to Portland, Maine, a total distance of 1,112 miles, of which 250 miles were at that time open for traffic.

In 1860, when the opening of the Victoria Bridge completed the undertaking, the locomotive stock numbered 206, of which 165 were at work in Canada. These were constructed as follows: In the U.S. 72, in Canada 43, in England 50. The earliest of these was built by the Portland Co. in 1848, and weighed 52,640 lbs. Fifty locomotives sent from England were constructed on the lines of those in use upon the London and Northwestern Ry., by Peto, Brassey, Betts and Jackson, the contractors for the undertaking, at the Canada Works, Birkenhead, and delivery was made during 1854 to 1858 inclusive. Passengers by the Ottawa River Navigation Co.'s line in summer may see a unique specimen of these so-called "Birkenheads" (the last of its line), hauling the train which makes the connection between Carillon and Grenville, in good repair, and equal to years of more work at the age of half a century. The old characteristics of the engine still remain, and the railway has the original G.T. gauge of 5½ ft.

The first locomotive built in the G.T.R. shops was no. 209, designed by F. H. Trevithick, the first locomotive superintendent of the company, and nephew of the talented engineer whose name he bears. This locomotive was completed May, 1859, and was used for the transportation of freight between Montreal and Toronto. Mr. Trevithick, who, the writer believes, still resides in Cornwall, near the scenes of his great ancestor's original labours, relinquished office in 1859, in favor of his assistant, W. S. Mackenzie, who was, three years later, succeeded by the late Richard Eaton, who came from the Great Western Ry. of Canada with the late C. J. Brydges, in 1863. Mr. Eaton assumed the title of Mechanical Superintendent, and built his first G.T.R. locomotive at the Montreal shops, March, 1865. He had, however, previously constructed others at the Great Western works, Hamilton, and was the first to use steel in the construction of locomotive boilers, one of which, made of this material throughout, he built as far back as 1861.

Mr. Eaton's successor was Herbert Wallis, who took charge of the mechanical department Jan. 1, 1873. During his continuance in office up to May 1, 1896, the gauge of the G.T.R. was changed from 5½ ft. to the standard 4 ft. 8½ inch., mainly during the autumns of 1873 and 1874. During this change, urgency demanded the importation of some 160 locomotives from the U.S., of which the Manchester works contributed 61, the Baldwins 45, the Schenectady 20, the Rhode Island 15, and the Portland Co. some 20, while in Canada the Kingston works and those of the G.T.R. added their quota of new ones. These locomotives weighed 70,000 lbs. in working order, and hauled in average



MORLEY DONALDSON, M. CAN. SOC. C.E.
General Superintendent Canada Atlantic Ry.

weather, at a rate of speed, without allowance of time at stations, of perhaps 10 miles an hour, between Brockville and Montreal, freight trains of 500 tons, at an average expenditure in coal of about 1½ oz. per ton per mile.

It was during 1873 that coal began to be extensively used as locomotive fuel, no wood-burning engines having been constructed for use on the G.T.R. subsequent to 1872. In the effort to produce results, the eight-wheeled road engines were notoriously over-cylindered for the weight upon the driving wheels, which was greatly restricted by the light nature of the track and bridges. In this category it was impossible, for obvious reasons, to keep pace with the growing requirements of the

traffic, which were constantly asserting themselves in calls for heavier trains and higher speed, and to obtain which, side-tracks were lengthened, until nothing but the doubling of the main lines and the strengthening of the road and bridges gave the necessary relief.

The introduction of the Mogul type of locomotive, of which 10 were imported in 1874, permitted the utilization of a larger proportion of the total weight for adhesive purposes, and thus reduced the wear and tear of track. The driving weight was distributed over three, instead of two pairs of wheels, and thus it was possible, by the use of larger cylinders and higher steam pressure, to increase the capacity of the machines. Between 1874 and 1896, more than 170 of these locomotives were added to the G.T.R. stock, or replaced others of less capacity, and of those some 150 were constructed at the work shops at Montreal. Engine 572, built 1891, was of this type, the advantage of which lay in the fact that at little greater expenditure of fuel per ton-mile unit, trains were increased in weight to the extent of 130%.

In 1895, the G.T.R. built its first compound locomotive, which was adapted to the Mogul type. The high pressure cylinder measured 19 in., and the low, or second expansion, 29 in. in the bore. The stroke of the piston was 26 in., the initial steam pressure was 190 lbs. a square inch, and the total weight of the engine loaded was 118,412 lbs. In very carefully conducted trials between Montreal and Brockville, as between this and the then most recent example of simple Mogul type, the compound engine used 35% less coal per ton-mile unit, and its boiler evaporated 20% more water for each pound of coal consumed. The average train load (eastward and westward combined), and exclusive of the engine and tender, was equal to 1,109 tons, and this work was performed at an average speed of 21 miles an hour, with a consumption of coal at the rate of little over 1 oz. per ton per mile.

In the early days of the locomotive the train loads were under 100 tons, and the fuel consumption per ton-mile unit was about two pounds. Wood, in his treatise on railways, 1832, gives an average of 1.6 lbs. as the best English practice, after many experiments. There seems little doubt, however, that trains hauled in loads of 1,000 tons, by compound engines, can be conveyed to-day, per ton, at one-twentieth of the expenditure in coal that was common in the days of Stephenson's famous Rocket, and this, notwithstanding the additional calls upon the boiler for brake-power, increased speed, car-warming service, and the many little contrivances for the relief of the engine men and firemen.

The high and low pressure cylinders on the G.T.R. locomotives of to-day have respective diameters of 22½ and 35 ins. The stroke of the piston and diameter of the driving wheels are the same, but the steam pressure has been increased to 200 lbs. a square inch, and the total weight of locomotives in working order