1900, $125,000. The draw spans of the new International bridge, across the Niagara River and Black Rock harbor, at Buffalo, were so nearly finished on April 12, 1901, the day upon which navigation on the river was opened, that they were brought into service. The bridge was finally completed on July 27 following. The replacement of old iron bridges, which are not strong enough for the present heavy loads, by modern steel structures, has been continued. Those renewed, or in course of renewal, at the close of the year, are nearly all between Montreal and Niagara Falls. Among these was a double track drawbridge across the Lachine canal at Montreal. The extension of the track to Meaford harbor, of 2.12 miles, is so far finished that it can be used for the transportation of freight. The first movement of grain over it, from the elevator at the harbor, was made on Aug. 31 last. The Co.'s new general offices at Montreal will probably be ready for occupation about April 15, 1901. New stations have been built at Belœil, Plessisville, Helena, Point St. Charles, Thousand Islands junction, Trenton, Pickering, Meaford, Forest, Watford, Tara, Port Robinson, and Windmill Point. The materials used for repairs of main tracks and sidings were :—

New steel rails in main tracks ..	16,060 tons.
Re-rolled steel rails in main tracks	2,812 "
Partially worn steel rails laid in branch lines and sidings	20,422 "
New ties in track	1,739,376 "
Ballast	278,405 cubic yards.

The Acting Superintendent of Motive Power reports the expenditure, mileage, etc., as follows :

Half-year ended.	Expenditure.	Train Mileage.	Rate of expenses per Mile.		
			Train	Engine.	Car.
	Dollars.		Cts.	Cts.	Cts.
Dec. 1901 ...	2,671,012	8,694,993	30.72	24.75	1.79
" 1900 ...	2,562,699	8,691,679	29.48	23.77	1.80

An increase in expenditure of $108,313, or 4.23% compared with an increase in train miles of 3,314, or 0.04%.

	Passenger Trains.	Freight Trains.	Mixed Trains.
The average number of cars moved per train was	4.6	28.2	10.4
And for the corresponding period	4.5	25.9	10.5

During the half-year 28 engines were scrapped or sold ; 8 passenger and 9 freight engines were turned out new at the Co.'s works. The actual stock at Dec. 31, 1901, was 794, against the official figure of 803.

The comparative cost of repairs per train, engine and car mile was :

	Repairs and renewals of locomotives.		All repairing charges, including shop machinery, tools, and marine equipment, etc.	
	1901.	1900.	1901.	1900.
	Cents.	Cents.	Cents.	Cents.
Train ..	7.03	6.72	8.63	8.52
Engine .	5.66	5.42	6.95	6.87
Car.....	0.41	0.41	0.50	0.52

The expenditure on capital account was : 7 engines supplied with driver brake and air brake equipment, 2 supplied with driver brake, 22 supplied with car warming equipment, 18 supplied with train air signal equipment, 43 supplied with vertical plane couplers.

The Superintendent of Car Department reports the expenditure, mileage, etc., as follows :—

Half-year ended.	Cost of repairs and renewals	Miles run by Cars.			Cost per Mile.	
		Passenger.	Freight.	Total.	Car.	Train
	Dollars.				Cts.	Cts.
Dec., 1901	797,292	18,350,246	130,634,938	148,985,184	.535	9.17
" 1900	648,382	16,823,345	125,292,740	142,116,085	.456	7.46

An increase in expeniture of $148,910 or 22.97%, with an increase in car miles of 6, 869,099, or 4.83%.

At cost of capital 149 freight cars were equipped with automatic couplers and Westinghouse air brakes, and 68 with air brakes only. At cost of revenue 5 day coaches, 300 furniture, 26 box and 3 derrick cars, were built at the Co.'s shops.

The revenue account for the half-year was as follows :

RECEIPTS.

	£ s. d.	£ s. d.	£ s. d.
Passengers		840,485 16 0	
Less—			
International bridge tolls...	1,919 1 8		
St. Clair tunnel tolls	3,904 13 1		
Toledo, Saginaw, and Muskegon Ry., under traffic agreement	....		
		5,823 14 9	834,662 1 3
Mails and express.....	....	....	125,071 19 7
Freight and live stock		1,605,899 7 2	
Less—			
Cartage, etc....42,149 17 2			
International bridge tolls .. 9,165 6 10			
St. Clair tunnel tolls 15,127 5 3			
Toledo, Saginaw and Muskegon Ry., under traffic agreement.....	....		
		66,442 9 3	
			1,539,456 17 11
Miscellaneous receipts, rents, tolls, etc.....	....	....	70,613 16 5
			£2,569,804 15 2

EXPENDITURE.

		£ s. d.
Maintenance of way and structures		496,987 2 10
Maintenance of equipment.....		317,934 12 6
Conducting transportation.....		847,985 9 9
General expenses		60,370 14 9
Total working expenses.....67.06%		1,723,277 19 10
Taxes..... 1.32%		33,876 15 2
	68.38%	1,757,154 15 0
Balance to net revenue account ..		812,650 0 2
		£2,569,804 15 2

Dec. 31, 1900.	Statement of Train Mileage.	Dec. 31, 1901.
3,483,780	Passenger trains.....	3,673,824
4,669,763	Freight trains	4,478,410
538,136	Mixed trains.....	542,759
8,691,679		8,694,993

A London cablegram says cheerfulness pervaded the meeting. The only discordant note came from a shareholder, who expressed the opinion that there was not as much economy as possible in the management of the Co.

Sir C. Rivers Wilson declared that the Co. had the first of the railway managers of America, and in view of the results obtained the criticism was ungracious. He also characterized the past half-year as having been uneventful but prosperous. The volume of business had increased, more passengers and freight had been carried, the revenue had been considerably increased, and the improvements on the lines throughout the system had been continued. He outlined the progress of building the second track, and said he hoped it would be completed from Montreal to Chicago within a year, predicted continued prosperity; and expressed the hope that the time was coming when they would be able to close their capital accounts, as some of the roads in the U.S. had done, and pay for improvements out of the earnings of the road.

The directors whose term of office had expired were re-elected.

Water, in the Boiler, and Out of It.

Following is an abstract of an address recently delivered before the C.P.R. Club at Toronto Junction, by M. A. Chrysler, B.A.:—

I shall first consider water outside the boiler. On account of its commonness, water was once called an element, the others, of course, being earth, air, fire. It has long been known that earth is far from being a simple substance, but is composed of a large number of substances ; air, too, has been proved to consist mostly of two elements, oxygen and nitrogen, to which must since 1895 be added argon ; fire is believed to be not a substance at all ; and I shall endeavour to prove that water is not an element.

We may approach the question of the composition of water from two standpoints, which may be illustrated thus : To demonstrate the nature of a watch it would be possible to start with a whole watch and take it apart into the wheels, springs, etc., or it would be equally satisfactory to start with the individual wheels and other parts, and put them together so as to produce a complete watch. Let us apply the first of these methods to water, and accomplish what chemists call the analysis of water, that is, break it up into the elements which compose it.

When a current of electricity is passed through the apparatus before you, a colorless gas collects in each of the two tubes, twice as much gas in one tube as in the other. On applying a taper to the tube containing more gas, this is seen to burn with a colorless flame —this gas is the element hydrogen ; the gas present in smaller quantity does not burn, but rekindles the glowing end of the string which is held in the gas—this is the element oxygen. Hence water consists of two substances, and is therefore not an element. Another way of breaking up water is by putting a piece of the metal potassium in contact with the water. The metal spins around on the surface, and the hydrogen liberated from the water burns. In case sodium is used instead of potassium, the hydrogen does not take fire by itself, and so may be collected in a tube and then proved to be hydrogen, for instance by setting fire to it.

The reverse process, compared above to putting together the parts of a watch, may be accomplished by putting into a pop bottle of thick glass two parts of hydrogen and one part of oxygen, and applying a taper. A sharp explosion follows, and a minute quantity of water vapor is produced. In order to see the water which we thus make we may vary the experiment by burning a jet of hy-